

Crisis and Emergency Management

Theory and Practice

Second Edition



Edited by **Ali Farazmand**

Crisis and Emergency Management

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Second Edition

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To My Son, Cyrus

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Preface to the Second Edition

Over 12 years have passed since the publication of *Crisis and Emergency Management* in 2001. At that time, it was the most comprehensive book in the field of crisis and emergency management. Indeed, three months after its publication, the tragic event of September 11, 2001, took place, and the volume immediately found itself on the desks of the US president and many politicians, senior administrators, policy makers, and public managers, as well as specialists on crisis and emergency management worldwide. The book turned out to be a phenomenal success, with major applications in public, private, and nonprofit sector organizations across the globe.

However, many changes have taken place since then. The list of disasters is long, but the following highlights some of the events with relevance to, and implications for, crisis and emergency management: the September 11, 2001, terrorist attack in New York City and the ensuing US global war on terror; the US invasions of Iraq and Afghanistan, which caused massive destruction, claimed millions of lives, and created severe refugee crises; bombings in London and Madrid; the massive earthquakes in the ancient city of Bam in southeast Iran and of Sichuan in southwest China; the giant Asian tsunami; Hurricane Katrina in New Orleans; the tsunami in Fukushima and the ensuing nuclear meltdown in Japan; Hurricanes Wilma in Florida and Sandy in northeast America; the financial crisis in several European countries such as Greece, Ireland, Portugal, and Spain; the collapse of the Wall Street financial empire and the ensuing American economic crisis; the global crisis of capitalism and the crisis of governance in the Western world; rising unemployment as a result of the economic recession; the Israeli invasions of Lebanon and Gaza and the West Bank in Palestine; and the ongoing crisis in Syria.

In each of these crises, disasters, and natural calamities, the loss of human lives and the maiming of others run into the thousands, tens of thousands, and in the case of the war and invasion of Afghanistan and Iraq into the hundreds of thousands, if not millions or more. If you add to this the destruction of property, looting, violation of human rights, abuse of children and women, internment and torture of suspected Muslim terrorists in secret US prisons, and systematic persecution of minority religious groups across the globe, the large-scale tragedy that has befallen the human race over the last 12 years is evident. The plight of millions of working class people who have experienced distress, despair, neglect, and even violence as a result of the economic crisis brought upon them by *predatory globalization* and *predatory capitalism*, forcing them into a race to the bottom and inflicting big blows to competitive free market systems, only compounds these problems. Global warming has also been a silent killer, destructing species and their ecological environments and devastating the ecosystems of planet Earth. The age of predatory globalization has had many expected and unexpected detrimental effects on the world's environment, social systems, and governance and public administration systems, which have deteriorated human

conditions, widened the gap between the rich and the poor and increased the chances of disasters and of violent conflicts.

How do the victims of these disasters and catastrophes cope with the situation? How do the affected cities, towns, communities, and countries cope with and manage these catastrophes and crises? How do the world's collective governance bodies deal with such disasters or even genocides? Is the voice of the poor, the women, and the children heard, and is it heard at all? How are these disasters and emergencies managed, and what lessons have been learned from global crises and emergencies? This book addresses these and other relevant questions, analyzes the causes and effects of many such tragedies, catastrophes, disasters, crises, and events, and offers policy and managerial lessons, proposing ideas, models, perspectives, theories, and suggestions for capacity building in crisis and emergency management.

The age of predatory globalization in the twenty-first century is different from other ages; it is mostly characterized by mounting uncertainties, the randomness of events, and nonlinear and constantly changing dynamics. It is filled with unanticipated events, crises, and emergencies. Managing crises and governing emergencies in such an age of challenges demands knowledge, skills, and attitudes that were not available previously. This book presents many such capacities for today and tomorrow. It offers insights into organizational and community resiliency development, a *surprise management* theory for upgrading the knowledge and skills in managing crises and governing emergencies and for better and more effective organizational, political, social, and managerial coordination in the processes. It also presents numerous case studies that help enhance and advance the future theory and practice of crisis and emergency management. The case studies are informative and eye-opening, and the practices are innovative. This book is not only more comprehensive than its first edition, it is more up to date and advanced. The potential applications of the concepts, theories, practices, and case studies covered in this book for future crisis and emergency management are enormous.

The monumental success of the first edition of this book prompted me and the publisher to come up with a new edition, right after Hurricane Katrina, when the appetite and demand for more books on this subject grew rapidly. The result was a plan to publish a new, updated version of the book that would reflect major changes worldwide and the lessons learned from recent disasters, like the Katrina crisis and the Asian tsunami. But the challenges kept growing, and the increasing frequency of crises, disasters, catastrophes, and emergencies caused repeated delays and postponements of the new publication so that we could include the most recent developments. In the meantime, other books, mostly small and focused, or limited in scope, appeared on the market. None, however, could rival this book's carefully selected, comprehensive, up-to-date, and informative chapters. This book presents valuable materials with applications at the macro- and microlevel, at the local, national, and global level, and at the organizational/interorganizational and international level. It will serve scholars, students, researchers, policy makers, professional managers, and experts in crisis and emergency management worldwide. It is also an indispensable reading and a comprehensive reference source for teaching graduate and upper undergraduate courses in crisis and emergency management, security administration, and safety and public service protection. I hope that it also informs practitioners engaged, in one way or another, in these fields around the world.

Ali Farazmand

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Preface to the First Edition

This encyclopedic handbook was conceived a few years ago while searching for a comprehensive book on the subject of crises and emergencies. The search proved futile, prompting me to think about a handbook that would present a collective body of literature on these two important features of public management. Several concerns serve as the rationale for this handbook. First was the growing multitude of crises facing our world at the turn of the new millennium—political, economic, environmental, personal, organizational, and institutional. Crises, especially revolutionary and lingering or creeping ones, disrupt order and destroy patterns of stability, yet they may be important manifestations of evolutionary processes.

Second was the need for a handbook that would address crises in a systematic way and offer solutions or approaches to study them. There was no single comprehensive book that would respond to such a pressing need. Lack of such a resource book as a reference or text has led to haphazard application of trial-and-error ideas, many of which have caused harm, and even disasters, instead of reducing crises. One of the fundamental benefits of such a book is the lesson one can draw from crisis cases and situations in order to avoid future errors.

The third concern was the lack of a reference text that would address the complex issues related to emergency management. Because of the paucity of knowledge about emergency management throughout the world, there is a great need for a book to guide practitioners, scholars, researchers, and students in this critically demanding field of public affairs and administration.

My urge to produce a comprehensive handbook on this subject became even stronger when I visited Iran in 1994, long after the revolution of 1978–1979 that had caused innumerable disruptions and produced new opportunities and challenges. As I presented to publishers in Iran my edited encyclopedic *Handbook of Bureaucracy*, fresh from the press, as well as my *Handbook of Comparative and Development Public Administration* (both published by Marcel Dekker, Inc.), the first question almost every one of them asked me was whether I had published a book on crises or emergency management. The pressing need for such a resource in postrevolutionary Iran was obvious, but I quickly found out that it was a need common among all nations and in public administration worldwide.

The purpose of this handbook is to present original materials on diverse issues and aspects of the twin fields of crisis and emergency management that would serve as a primary textbook for upper undergraduate and graduate courses in crisis management, emergency management, public policy on mitigation and disaster management or prevention, various kinds of emergency situations, public management, and more. A wide range of issues, cases, theories, and applications can be found in this book. Presentations include theoretical, analytical, practical, empirical, normative, and historical treatments. Levels of analysis include macro, micro, and macro/micro, covering

a wide spectrum of discussions that address crises and emergencies in both a broad theoretical context and in terms of their practical applications around the globe.

The handbook is designed to inform a wide spectrum of audiences, including academic scholars, students, researchers, practitioners, public managers, and policy makers at all levels, from local to national to global, in the fields of crisis and emergency management around the world. Crises have always inflicted heavy costs on human lives, organizations, and governments. While some crises are natural and usually unpredictable, others are human engineered and can be avoided or prevented through elimination of their sources. Some crises are by-products of sharp and rupturing incidents and can be devastating, while others result from long-term processes that, when exacerbated by a rupturing crisis, go out of control and produce massive chaos with unpredictable consequences. Crisis management is an essential and inevitable feature of human and organizational lives, but it is an imperative function that modern public management cannot afford to overlook or ignore. Crisis management leads to emergency management because it demands immediate and focused attention with concrete action strategies and urgent plans of action.

Similarly, emergency management has been a common practice of human and organizational life throughout history. As a major function of public management, emergency management dates back to ancient times—for example, during the First Persian Empire, or Achaemenid Empire, founded by Cyrus the Great (559–300 BC) and under the subsequent Parthian and Sasanian empires (240 BC–AD 651). During the long history of the ancient Persian Empire, public management and bureaucracy were well organized, well developed, and well practiced with a high degree of efficiency.

Strategic management and emergency management were among the key features of the Persian system, characteristics the empires that followed, especially the Romans and the European nation-states, borrowed from heavily and passed on to modern public administration. Manifestations of this highly efficient public management in dealing with crises and emergencies were the high degree of alertness and preparation for flood control, managing disasters, planning for resettlement after earthquakes and other disasters, building dams and waterway management systems, constructing underground irrigation canal systems stretching for hundreds and thousands of miles, and having strong shelters in place for extreme weather conditions. Key features of this tradition were teamwork to control natural and man-made disasters, crises, and emergencies.

Therefore, public emergency management has a long historical tradition, which has passed on lessons, skills, mechanisms, and organizational arrangements that will benefit forthcoming generations. Today, not only do nation-states demand highly skilled teams and systems of emergency management, there is also a global demand for concerted efforts to tackle crises and emergency situations of massive magnitude.

In the new millennium, most major crises and emergencies are no longer national and local concerns; they are global concerns and require global attention. For example, problems causing atmospheric and environmental crises demand multinational and global cooperation, partnership building, and collective actions. Problems of labor, refugees, hunger, health, and wars require collective action of governments, nongovernmental organizations, and citizens worldwide to avoid massive crises, chaos, and genocide. Unfortunately, the spread of capitalism has aggravated many of these global crises and increased the scale and number of problems that call for emergency management.

Crisis and emergency management has generally been neglected as a field of study in public administration. Only recently has it been recognized and pursued as an important area of public management (notice the American Society for Public Administration's (ASPA) section on

emergency and crisis management). Despite this recent recognition, however, the dual fields of crisis and emergency management are least recognized as areas of scholarly activity among the public administration and public policy communities. In the chaotic, rapidly changing, uncertain conditions that characterize the current world, crisis and emergency management becomes central to all activities of public and private organizations. Massive corporate and government downsizing may be considered a short-term solution to the long-term problems of economy and society, creating a creeping crisis that might be triggered by even small events in the future. Crisis and emergency management requires strategic, long-term vision and creative thinking for the common good—living in a *global village* requires all the members of the community to cooperate.

Scholars, researchers, experts, and practitioners from all over the world who follow these lines of thinking were invited to share their expertise and experience in this knowledge-based volume. They responded with enthusiasm and proposed chapter contributions. The result is the *Handbook of Crisis and Emergency Management*, a highly comprehensive volume of original materials designed to cover all levels of analysis and forms of crisis and emergency anywhere in the world, from personal to organizational, local to global, corporate to governmental, and natural to human-made. This is the first handbook to provide a comprehensive coverage of this field.

The contributors and I certainly hope that this volume will serve as a major textbook for students and instructors in upper undergraduate and graduate courses in various curricula of public administration, public management, political science, management, public policy, and program management, and most importantly in the management of crisis and emergency management, in both public and private sectors, around the world. We hope that policy makers, government officials, corporate and business executives and managers, supervisors, employees, citizens, experts, professionals, academic researchers, scholars, and professional administrators and managers will find this a very informative guide and valuable reference book.

Finally, I would like to acknowledge the contribution of several other individuals who have made possible the completion of this major project. First, I thank Jack Rabin, who provided support for this handbook from the beginning. His comments were both encouraging and assuring. Second, I wish to express my deep appreciation to all the contributors for their cooperation and timely submission of their manuscripts.

I also thank Marcel and Russell Dekker for accepting this project for publication. Moreover, the production editor, Elizabeth Curione, has been patient and cooperative through the completion of the handbook. We communicated frequently and resolved many issues by coordinating closely on this joint effort. My special appreciation to her. Further, I must express acknowledgment to all the staff members at Marcel Dekker, Inc., whose assistance has been invaluable in the production process.

Finally, I thank my former graduate assistant, Jack Pinkowski, and doctoral students in our school of public administration, who provided assistance by preparing the data base on the contributors and performing related tasks.

I hope this handbook will serve as a valuable text and reference book for students, instructors, researchers, policy makers, and practicing public managers throughout the world.

Ali Farazmand

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Acknowledgments

It took me several years to complete this publication and accomplish its intended form. Copious amounts of time and energy were invested in this project, mostly by the contributing authors, who responded to my numerous calls for revisions and updates and who patiently and eagerly contributed to the body of knowledge contained in this large, comprehensive volume. All credit goes to them, and the responsibilities for any errors are mine. I am most grateful to them for their patience and cooperation. I appreciate the valuable assistance of my PhD student, Heidi DiCicco, who helped me finish the last stage of this book and get it through to production; I am also indebted to Amy Cartwright, my former senior student, who helped me during the earlier part of the process. Additionally, I would like to thank my CRC Press publisher, Richard O’Hanley, for his encouragement to publish this book, and his production manager, Lara Zoble at Taylor & Francis Group, for their patience, guidance, and assistance in getting the project off the ground.

Finally, I dedicate this publication to my son Cyrus, who is in college, and to my late parents, who were the victims of catastrophic disasters that took the life of one, and totally altered another’s. I am deeply indebted to my parents, who taught me the lessons of humbleness, humanity, work ethic, resiliency, and perseverance, as well as the public values of education, integrity, and responsibility—“education is an inexhaustible treasure.”

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Editor



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Farazmand's past select publications include *The State, Bureaucracy, and Revolution: Development or System Maintenance?* (Praeger, 1989); *Modern Systems of Government: Exploring the Bureaucrats and Politicians' Relationships* (Sage, 1997); *Modern Organizations: Theory and Practice*, 1st and 2nd editions (Praeger, 1994, 2002); *Administrative Reform in Developing Nations* (JAI Press, 2002); *Handbook of Comparative and Development Public Administration*, 1st and 2nd editions (Marcel Dekker, 1991, and Taylor & Francis, 2001); *Public Enterprise Management* (Greenwood Press, 1997);

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Chapter 1

Crisis and Emergency Management

Theory and Practice

Ali Farazmand

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1.1 Introduction

The world in the new millennium has faced massive wars and conflicts, tremendous uncertainties, chaotic changes, and significant crises of all kinds with various degrees of intensity that impose urgency and call for emergency management around the globe. It seems that the world has begun an age of unreason, in which all order is turned upside down. Governmental reports declare nation-states to be at major risk of losing territorial sovereignty and control of their independence in the age of globalization of capital and markets. The political–military power of the predatory globalization and global capitalism that transcends national boundaries has been defying conventional demarcation of statehood, as well as popular democratic ideals, broken the world peace, violated international laws, and put the world on the brink of a possible third world war with the threat of nuclear armageddon (Ohmae 1990, 1995; Korten 1995; Farazmand 1999, 2012).

The rise of globalization of capital and its negative consequences for both developing and more developed nations of the industrialized West has produced several concerns that embrace economics, environmental ecology, labor, culture, traditions, governance, administration, and politics. Energized by technological innovations, globalization has produced some positive effects,

such as bringing more markets and products to consumers with money and facilitating communication and travel among peoples and professionals around the globe. But, it has also caused many devastating adverse consequences worldwide—increasing child labor, slave labor, wage slavery, environmental degradation, violation of human rights, loss of control over national and local resources, loss of democratic rights of citizens to make independent decisions, and imposing powerlessness in the face of globalizing finance capital backed by the most powerful (and potentially deadly militarily) states—the United States and its European allies. Today, predatory globalization has established a firm grip on nation-states' sovereignties, forced most governments to take austerity measures at the expense of working and middle class people worldwide, and imposed virtual slavery for billions. The new barons of the global village—as characterized by proponents of predatory globalization—have been trying to flatten the world with the ideology and practice of market supremacy and advocating corporate structure as the ideal organization for governance and administration (see Farzmand 2012 for more on this).

With the fall of the USSR—the only socialist superpower capable of checking the excesses of global capitalism and its hegemonic state, the United States—has come an exacerbation of the multidimensional crises facing peoples, nation-states, governments, and cultures under globalization. Under the one-world ideological system of capitalism and market-oriented and corporate elite-based governance, conflicts and crises are suppressed—at least on the surface, voices of opposition and protest are silenced, and alternative forms of governance and socioeconomic order are crushed by military and other coercive forces, all in the name of a self-proclaimed ideology of market supremacy and capitalist democracy in which the wealthy and corporate elites rule (Korten 1995; Farzmand 1999). Crises are now being transformed into opportunities for further accumulation of capital throughout the world, which is considered a *global village* ruled by the feudal barons of the new world order. *Profit*, *social control*, and *capitalism* are the key words of the new era. The global public is easily manipulated by omnipotent media, financial means, and other tools to present the new global reality, an artificial reality carefully and neatly crafted and promoted.

In this environment of globalization, critics have ample grounds to express concern. For example, Rifkin (1996) has announced “the end of work,” Wilson (1996) has argued about the loss of urban jobs, Mele (1996) and Knox (1997) have argued about the loss of the sense of community and urban infrastructure, Picciotto (1989) and Cox (1993) have discussed the loss of territorial sovereignty of nation-states, and Korbin (1996) has warned about the “return back to medievalism.” While proponents of globalization presented a rosy picture of the new world order under corporate globalization, where there would be no conflicts, no wars, and no poverty, critics warned against the devastating effects of globalization. For example, while Fukuyama (1992) spoke of “the end of history and of man” and Huntington (1996) spoke of the “clash of civilizations,” Brecher and Costello (1994) warned of a “global pillage,” Parenti (1995) spoke of global “corpocracy and plutocracy,” Farzmand (1998, 1999) argued about “the rise of wage slavery and mercenary systems of socioeconomic order,” and Stever (1988) argued about the end of public administration. Crises of institutions have for the last 10 years reached a higher level of criticality. Of these, the crisis of governance in the West and in the core of global capitalism, as well as in community and family institutions that form the backbones of society, has deepened.

Popular books signal waves and shifting global paradigms away from stable patterns. The collapse of global systems and great powers, revolutionary changes, breakdown of family institutions and traditions, global financial crisis, and environmental decay are but a few such crises that should alarm us all. Information technology has also broken down barriers among nations, people, and organizations around the globe. No longer can organizations and governments rely on patterns of continuity and stability. No longer can individuals predict and feel secure about their futures.

No longer can anyone escape the devastating impacts of crises—crises that have reached a new level and have been eroding the fundamental underpinnings and basic assumptions of humanity. But these crises are largely covered up by the military, communication, and financial arms of the globally dominant states, some with predatory characters and behaviors. Feeling a sense of powerlessness and insecurity, therefore, people and groups worldwide seek alternative shelters for self-protection and expression in their attempts to escape degradation, dehumanization, indignation, and exploitation—it is a matter of survival. They are forced into practices of self-censorship, role playing, and pretension as the new culture of globalism and global order invades societies.

As a result, work alienation, social alienation, and self-alienation are increasingly seeping into personal and social life, and pervading societies, mostly in the countries of the South, but the phenomenon has eclipsed the nations of the North as well. Still, many also refuse the indignation, resist the destruction of who they are, and struggle to maintain identity, while some pretend to be part of the status quo to reduce survival costs, but they may be walking bombs ready to explode at any time. Some take their lives either individually or in mass, others find nothing to lose and turn against all social norms. Crises are therefore transformed into different forms and linger through different levels of criticality until they explode, perhaps globally all at the same time. The protest movement of “Occupy Wall Street” has now expanded and transformed into a global movement of *counterglobalization*, *counterrepression*, and *counterexploitation*, “reclaiming the people power from the elites,” and “fundamental institutional, political, and economic system changes” (Farazmand forthcoming).

1.2 Nature of Crises

Crises occur at all levels and appear in all guises. Some are long-term processes of deterioration, while others are rapid ruptures; some have their origins and roots in the past, while others are created by chance and the risks posed by a particular environment; some are caused internally, while others externally. Some crises are creeping and lingering, due to illegitimacy and system entropies (e.g., the Shah’s regime in Iran), while others may occur suddenly (e.g., the stock market crash of 1929, causing the Great Depression). Crises come in a variety of kinds and forms: economic crisis (note the chronic crises of debt among Latin American nations, some European nations’ financial crisis, the New York City fiscal crisis of 1974, or the Great Depression of the 1930s, and the stock market crash of 2008); political crisis (e.g., revolutions in Iran, Russia, France, Nicaragua, and China, as well as other wars); environmental crisis (e.g., ozone layer depletion, Bhopal and Chernobyl disasters in India and Russia, respectively, or the Three-Mile Island nuclear crisis in the United States); organizational and leadership crises causing severe decline and deaths (Hurricane Katrina and the New Orleans crisis—see Farazmand 1996, 2007); moral bankruptcy and unethical conduct in public office (e.g., Clinton’s presidency); and emergency management crisis of New Orleans caused by Hurricane Katrina (Farazmand 2007), or the Fukushima crisis in Japan caused by a massive earthquake and tsunami with the subsequent nuclear reactor meltdown (see Chapter 26).

Crises involve events and processes that carry severe threat, uncertainty, an unknown outcome, and urgency. Crises scramble plans, interrupt continuities, and brutally paralyze normal operations and human lives. Most crises have trigger points so critical as to leave historical marks on nations, groups, and individual lives. They are historical points of reference, distinguishing between the past and the present. They leave memories for those involved in such events as disasters, hijackings, riots, revolts, and revolutions. Years, months, and days become historic points of

demarcation, such as 1914, 1917, 1929, 1940, and 1978–1979; crisis events become memorable, such as the assassination of Rabin, the Cuban Missile Crisis, the Vietnam War, Nixon's presidency, the Middle East crisis and the Arab Spring or revolutions, the Persian Gulf crisis of 1991, the "black Friday" and the February Revolution (Iran), the October Revolution (Russia), and so on (Rosenthal and Kouzmin 1993; Farazmand 1996, 2001).

Crises also come in a variety of forms, such as terrorism (New York World Trade Center, Oklahoma bombings, and the September 11, 2001, bombing of the New York Twin Towers), natural disasters (Hurricanes Hugo and Andrew in Florida, the Holland and Bangladesh flood disasters), nuclear power plant accidents (Three-Mile Island, Chernobyl, and Fukushima), riots (Los Angeles and Paris riots of 1968 and 2011, or the London riot of 2011, or periodic prison riots), business crises, and organizational crises facing life-or-death situations in a time of rapid environmental changes. Some crises can be managed successfully, while others lead to failures and further disasters. Some lead to new and positive changes in society, while others to further calamities.

Some crises are caused by governmental and corporate actions (Exxon's oil leakage in Alaska, the Branch Davidian catastrophe in Texas, the 2011 BPM oil spill in the Gulf of Mexico, environmental pollution and decay, etc.) or inaction, leaving simple problems or conflicts that become transformed into major crises (the Balkan crises, prison riots, many African ethnic or tribal conflicts, massive epidemic health crises, or mass starvation and food crises, again as in Africa). Some events creep through, with a particular small starting point, and snowball over time into full-scale crises. This is common among public and private organizations, whose elites "may convert their embarrassment over prolonged negligence into over-hasty and ill-conceived efforts to undo years of non-action and non-decision making" (Rosenthal and Kouzmin 1993:5).

Crises consist of "a short chain of events that destroy or drastically weaken" a condition of equilibrium and the effectiveness of a system or regime within a period of days, weeks, or hours, rather than years. In this sense, a crisis is not the same as tensions, as referred to by many scholars, or the process-oriented crisis mentioned earlier. Therefore, there are two types of crises: a process-oriented one developing over a period of time, and a sudden rupture developing within weeks, days, hours, or even minutes (Farazmand 1996). The latter crisis is "fraught with far-reaching implications. It threatens to involve large segments of society in violent actions" (Dogan and Higley 1996:5).

1.3 Characteristics of Crises

A central feature of all crises is the sense of urgency, and, in many cases, urgency becomes the most compelling crisis characteristic. Situations change so dramatically and so rapidly that no one seems to be able to predict the chain of events or the possible outcomes. An important aspect of such crisis situations is the dynamics that evolve during days, hours, and even minutes. In a revolutionary crisis, such unpredictability, uncertainty, and change characterize the dynamics of the unfolding events. Leaders and decision makers are often caught by surprise due to the many forces, such as the masses, strength or weaknesses of the regime and the ruling elite, external or internal actors, climatic conditions, and national characters. Surprises characterize the dynamics of crisis situations (Farazmand 1996, 2001, 2007).

Some crises are processes of events that lead to a level of criticality or degree of intensity generally out of control. Crises often have past origins, and diagnosing their original sources can help understand and manage a particular crisis, or lead it to an alternative state of condition. Crises take several forms and display many patterns, such as defeat in international warfare, revolution,

sudden breakdown of unstable democratic regimes, economic disaster, *implosion*, loss of foreign support resulting in the falling of a dependent regime, and—*temperature changes* (Dogan and Higley 1996:9).

But, as mentioned earlier, some crises are sudden and are abrupt events that paralyze a regime, a community, or an economic system. Understanding the dynamics of crises helps develop a better understanding of crisis evolution and its management. It requires serious crisis analysis, which, in turn, needs to go beyond a focus on human error as the origin of the crisis. Organizational, leadership, and systemic deficiencies must be diagnosed as effective approaches to crisis management. Many organizations develop over time a culture devoid of ability to detect environmental threats challenging their survival, and many crises develop as a result of managerial and leadership incompetence (Perrow 1984; Turner 1989 cited in Rosenthal and Kouzmin 1993:6). Public organizations are not immune from this maladaptation or bureaucratic culture inflicted by many bureau pathological deficiencies and vulnerabilities. Crises therefore are destructive, but they may also develop opportunities for a new order, changes that may produce positive results. Therefore, crises create their own antistheses, which may dialectically reinforce and complement positive forces of nature.

The key to crisis management is an accurate and timely diagnosis of the criticality of the problems and the dynamics of events that ensue. This requires knowledge, skills, courageous leadership, risk-taking ability, and vigilance. Successful crisis management also requires motivation, a sense of urgency, commitment, and creative thinking with a long-term strategic vision, while still being mindful of daily operational imperatives. In managing crises, established organizational norms, culture, rules, and procedures become major obstacles: administrators and bureaucrats tend to protect themselves by playing bureaucratic games and hiding behind organizational and legal shelters. A sense of urgency gives way to inertia, organizational sheltering, and self-protection by managers and staff alike. This is the most devastating institutional obstacle to the effective management of any crisis. Successful crisis management requires (1) sensing the urgency of the matter at hand; (2) thinking creatively and strategically to solve the crisis with degrees, scopes, manifestations, and impacts; (3) taking bold decisions and acting courageously and sincerely; (4) breaking away from the self-protective organizational culture and taking calculated risks that produce optimum solutions; and (5) maintaining a continuous vigil on the rapidly changing situations. Reason, creative thinking, and perseverance must lead those involved in crisis management and crisis resolution. Any error or misjudgment can lead to further disasters, causing irreparable damages to human lives.

Crisis management or resolution requires strategic thinking about contingencies. Crises also develop opportunities, which must be explored through mobilization of assets and available forces. The sense of urgency calls for immediate attention, action, and reaction. The primary function of any government is to protect the lives and properties of citizens. Crises and emergencies generally test the competence of governments. Throughout the history of human civilization, policy makers have sought to anticipate the unexpected “in order to reduce the risk to human life and safety posed by intermittently occurring natural and man-made hazardous events” (Petak 1985:3). This notion needs to be capitalized upon as a noble policy and strategic choice of collective action. Unfortunately, not everyone thinks this way in a crisis situation; history is full of cases in which opportunists take advantages of chaos and disorder to enrich themselves, to take control of power bases, and to steal what does not belong to them.

Under normal bureaucratic situations, the management literature points to decentralized and hands-off decision making as a good organizational strategy. But in crisis situations, this model of stable organizational behavior is ill-suited and becomes seriously problematic. It is interesting to

note, ironically, that the crisis management literature points to a more centralized decision structure. “In intense crises, decisions should be made at the top of the organization because those at lower levels tend to ‘suboptimize’ based on their own interests, do not have all the information necessary, and are unaware of larger political or social issues or constraints” (Averch and Dluhy 1997:85).

The literature of urban disasters refers to the desirability of the emergence of *synthetic groups* (Wolensky and Wolensky 1990) operating as a working coalition of key actors and agents at different levels to provide command and control systems, and to facilitate damage assessment and resource deployment (Dluhy 1990). Absence of such command and control systems can cause severe problems and can exacerbate crisis situations, as it did in Miami, Florida, during the Hurricane Andrew crisis in 1992. “Dade County emergency managers had no way to enforce cooperation. . . . Organization chaos and weak command and control were the characteristic mode of the EOC [Emergency Operations Center] during the crisis period” (Averch and Dluhy 1997:84). Despite the federal, state, and local government assistance in disaster management, empirical research shows that minorities, especially blacks and Hispanics, and immigrant workers, suffered most from the South Miami disasters caused by Hurricane Andrew. Crisis and emergency management was least effective for these groups, who had to rely on their family and relatives for help and assistance. Long after the crisis, their suffering continued in the form of joblessness, loss of housing, hunger, disease, increasing crime rates due to deteriorating social and economic conditions, and a host of other associated crises (see studies in Peacock et al. 1997).

Contrasting evidence shows interesting observations of a swift and effective organizational response to the severe crisis and disaster situation caused by the 1989 earthquake in northern Iran, which claimed over 50,000 lives and destroyed two medium-sized cities and a number of towns, villages, and communities completely. The Central Government Emergency forces were matched more than equally by massive popular forces of assistance by all means possible, and it was the initial *command and control system* of the national government that, in a postrevolutionary situation still characterized by revolutionary spirit, helped contain the situation. Iran had gone through many crises since the revolutionary crisis of 1978–1979, including, especially, the 8-year-old defensive war against Iraq. Consequently, a degree of preparedness, coordination, and decision structure had already been developed in Iran, both organizationally and politically. Research on organizational and managerial response to chaotic situations of crises reflects the importance of central coordinating and command centers. This is an essential aspect of research on crisis and emergency management for the future.

The efforts of past decision makers, administrators, citizens, researchers, and all those involved in crisis and emergency management have provided the foundation for the current focus on these twin subfields of public administration in the United States and abroad. Not all emergency situations are caused by crises. In fact, many have nothing to do with any crisis at all. But, all crises cause emergency situations, which must be dealt with very carefully. As a central activity of public administration, emergency management is generally a process of developing and implementing policies and actions that involve (1) mitigation—a course of action to detect the risk to society or the health of people and to reduce the risk; (2) preparedness—a response plan of action to reduce loss of life and to increase the chance of successful response to the disaster or catastrophe; (3) response—provision of emergency aid and assistance; and (4) recovery—provision of immediate support to return life back to normalcy (Petak 1985; Farazmand 2001).

A more recent development in the fields of crisis and emergency management is the emergence of *chaos theory* in the social sciences, outlining—in social equivalence with the physical sciences—a state of chaos, disequilibrium, and disorder. Key to this multifaceted theory of social science, chaos theory is the prevalence of constant and rupturing changes that occur out

of order, disturb system equilibria, and cause chaos, eventually leading to a renewed order. The cycle of chaos/disorder/order is an evolutionary process that contributes to the transformation of social systems, including organizations with political and managerial implications. Stability and equilibria carry with themselves potential forces of change and disruption, which trigger forces of system instability and disorder—political, organizational, economic, and institutional—and place them on the verge of chaos and disorder. Patterns of change and instability characterize this chaos. The key to understanding and managing these changes is the application of nonlinear and multicausal or noncausal thinking within organizations and social systems. Long-term transformation results from short-term chaotic changes that cause system disequilibrium, a phenomenon that has major implications for crisis and emergency management around the world (for details on chaos theory, see, e.g., Jantsch 1980; Prigogine and Stengers 1984; Lazlo 1987; Loye and Eisler 1987; Kiel 1989; Pascal 1990; see also Koehler et al., Chapter 7 and Farazmand, Chapter 25 in this volume, and Farazmand 2004). But a more recent development in line with chaos and transformation theories is the advancement of the surprise management theory that I have discussed in a forthcoming work (see Farazmand 2007, 2009, and forthcoming).

1.4 Plan of the Book

This encyclopedic handbook is designed to inform academic scholars, students, researchers, practitioners, public managers, and policy makers about the twin areas of crisis and emergency management. It is divided into four major units, some with multiple parts, and consists of 41 chapters, which include this introduction and an epilogue. Except for a few chapters, which are the updated and expanded versions of earlier articles published in first-rate refereed journals, and a few chapters reproduced from the first edition of the volume, all other chapters are original and contain up-to-date material; they contribute to our knowledge on the twin fields of crisis and emergency management with significant implications for all parties concerned.

Unit 1 focuses on crisis management and analyzes various theoretical and empirical issues at macro- and micro levels. This is done in four chapters, which covers managing refugee crises, the global crisis in public service and administration, crisis in the US administrative state, and a case study of managing the crisis of Orange County Bankruptcy in California.

Unit 2 contains two parts and six chapters: Part I has one chapter on the Exxon Valdez oil spill disaster; Part II, which focuses on the conceptual, policy, and empirical aspects of emergency management, has five chapters that address a range of topics, including the implications of chaos theory, the lessons learned from Hurricanes Katrina, Ike, and Sandy, the psychology of evacuation and policy design, the role of technology and human factors in emergency management the evolution of emergency management in the United States and improvised explosive devices and the ways of coping with them.

Unit 3 focuses on national and international case studies, and includes 3 parts and 23 chapters. Part I covers seven chapters on crisis and emergency management in North and Latin America. The cases include: American presidential crisis management under Kennedy (the Cuban Missile Crisis), a case study of Broward County Sheriff's office program of public safety and emergency management in South Florida, an analysis of emergency management with lessons learned from the Three Mile Island and Chernobyl and Fukushima reactor accidents/disasters, the need for budgetary assistance for nonprofits in disasters, the issue of security for sale through contracts, international communications in refugee-assistance crises, and the role of public bureaucracy in managing human and natural disasters. Part II consists of eight chapters that provide in-depth

analyses of Hurricane Katrina, as well as one chapter that analyzes the Fukushima disaster in Japan, and the lessons learned for future crisis and emergency management.

Part III of this unit covers emergency management in Korea, disaster management in Hong Kong, crisis and emergency management in Japan (with lessons from the Great Hanshin earthquake north of the island of Awaji in 1995), the early warning success in mitigation and emergency management for the 1976 Tangshan earthquake in China, a comparative study of emergency management practice in India and the United States, and the crisis of governance in the wake of revolutionary uprisings in the Arab nations, dubbed Arab Spring. Unit 3 concludes with a very interesting case study of the 1989 rail disaster at Clapham Station in south London.

Unit 4 focuses on mitigation and strategic prevention of, and preparedness for, crises and emergencies. Six chapters discuss in depth a wide range of strategies, issues, concepts, plans, and ideas on mitigation, prevention, and preparedness. They include a view from local government on mitigation versus prevention, advancing community resilience to disasters, global resilience to enhance crisis and emergency management, contemporary community resilience capacity building, developing emergency managers for the new millennium, and coastal hazard mitigation in Florida.

The final chapter of this text is an epilogue with a personal reflection on disaster study, crisis study, and the discipline of public administration, by a very senior scholar deeply involved with the twin subjects of crisis and emergency management.

A couple of points warrant attention while reading this scholarly reference textbook: First, while the organization of the book places chapters in relevant and appropriate groups or categories, exclusiveness in treating some chapters is impossible and some what arbitrary, as they overlap with other areas of focus. For example, some chapters that covered under Hurricane Katrina also belong to conceptual and theoretical areas. Similarly, some chapters that covered under Asia and the Middle East may also belong to other and more general areas of crisis and emergency management. Second, the terms *crisis* and *emergency management* cover a wide range of topics and issues with broad scopes and meanings. They not only include the emergency management of natural and human-caused disasters, and the management of crises born out of such disasters, but also they include emergency governance on temporary bases during political, security, military, and national public health epidemic situations. Examples include wars, conflicts, public health disaster outbreaks, and so on. Similarly, crisis management includes a wide range of levels, scopes, types, severities and criticalities. Managing revolutionary crises is different from managing food shortages or refugee crises, and managing chaos and crisis-driven emergencies requires far more knowledge, skills, and attitudes than normal and benchmarked emergencies with routine or learned expertise from past experiences or practices.

Finally, references as well as subject and name indexes are provided, in addition to a list of contributors to this comprehensive book. I hope the readers will find this book informative, useful, and instrumental in policy making decisions, as well as in managing crisis and emergency situations worldwide.

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CRISIS MANAGEMENT
MICRO–MACRO
PERSPECTIVES

UNIT

1

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Chapter 2

Meeting Diversity in the Midst of Adversity

An Intercultural Communication Training Framework for Refugee- Assistance Crisis Management

Phyllis Bo-Yuen Ngai and Peter Koehn

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2.1 Introduction

Communication is a radiating process in the web of crisis-response determinants. In today's diverse world, emergencies increasingly occur in a context of sociocultural as well as institutional pluralism. Consequently, persons already involved in refugee-assistance crisis management, as well as new recruits, must be in a position to engage effectively in intercultural communication.

Developing intercultural communication competency requires specialized preparation—preferably in advance of assignment in the case of agency staff and integrated with local-level assistance activities for community members. In this chapter, the authors present their framework for a model training program that is specifically intended to build intercultural-communication skills among persons responsible for refugee-assistance crisis management. We assume that participants in the program will include a mix of non-governmental organization (NGO) workers* and governing board members with diverse professional backgrounds, government employees, refugees selected by their community, leaders chosen for training by local host communities, and volunteers.† Thus, the principal level of attention is the “*interorganizational domain*” (Hardy, 1994: 279; *italics as in original*).

The overall goals of our model intercultural-communication training program are (1) to enhance communicative and behavioral competency in dealing with refugee-assistance crises and (2) to facilitate the management of such crises by harnessing the power of diverse cultural perspectives. In the multicultural and multiorganizational working environment that characterizes refugee assistance, competency in transnational networking and intercultural communication involves attaining specific transaction skills (Fowler, 2006: 403). Mastery of these skills enables program graduates to select and apply appropriate intercultural-communication guidelines in essential strategic information exchanges (see, for instance, Schroeder et al., 2001: 387–388). The second major objective of the training program concerns promoting appreciation for and utilization of the synergistic potential of intercultural communication among transnational staff, community, and team members who engage with one another from diverse perspectives (Matveev and Milter, 2004: 105). In this connection, communication is advanced by welcoming feedback from laypersons and communities “regardless of its validity or the eloquence with which it is phrased” (Sarkissian, 2009: 172, 207).

2.1.1 Training Criteria

In the management of refugee-assistance crises, the performance of essential functions, including proactive needs and vulnerabilities assessment (Magistro, 2008: 2), resource identification and mobilization, service provision, conflict management (Matveev and Milter, 2004: 105), maintaining communication richness within and among transnational teams (Matveev and Milter, 2004: 105), media relations (Munteanu, 2008: 22), record keeping (see Kalantari, 2001: 619), and accountability, requires effective intercultural communication training for expatriate staff,

* NGOs typically are “keen to maximize the potential of existing employees through training” in advance of increased levels of assigned responsibility (Munteanu, 2008: 20, 22).

† On the importance of volunteer activity in crisis-management situations, see Sakamoto (2001: 574–575).

locally recruited assistance workers, and community members. In designing the overall program, coordinators should bear in mind that (1) emergencies “provide opportunities to train local people in skills that increase their capacities to deal with subsequent crises and/or development efforts” (Anderson and Woodrow, 1989: 79, 83) and that (2) trainees constantly learn from the explicit and implicit communication of insights and lessons they receive in the field.

In the current multicultural refugee-assistance environment, therefore, an intercultural-communication training strategy should (1) promote understanding among staff members possessing different nationality, ethnic, cultural, linguistic, class, and religious backgrounds; (2) involve selected participants from the affected local community(ies); (3) enhance teamwork and organizational goal attainment; (4) integrate the field experiences of expatriate and local NGO personnel; (5) be useful both for specific multicultural workplace situations and when interacting with a dispossessed clientele; and (6) enable trainees to impart the principal lessons of their training experience to fellow refugee-assistance workers from the same and different ethnic and cultural backgrounds. These six criteria should be applied when designing each training intervention and in assessing outcomes.

2.1.2 Preprogram Assessment

Although this chapter presents components and considerations for a model training program that are based primarily upon lessons from the study and practice of intercultural communication, actual programming must be tailored to the specific context. As Craig Storti (2009: 272) points out, “no two trainings are alike . . .” Thus, the first stage of the training process always involves needs and capabilities assessment. All participants should be invited to take part in a needs—and capabilities—identification exercise in advance of the course.* In the case of refugee-assistance crisis-management training, trainees are expected to arrive with a multiplicity of backgrounds and to share elements of a working environment that principally is defined by demands for emergency relief and sustainable development. The trainees’ common working environment is likely to involve a dispossessed and traumatized clientele in need of assistance, considerable local autonomy, demands for continuous vertical and horizontal communication, goal attainment that is contingent upon effective communication, frequent pressure for on-the-spot decisions and innovative responses, the primacy of informal interaction, logistical complexity, shortages of vital equipment and supplies, a high degree of uncertainty (including basic uncertainty over the duration of one’s mission), and lack of physical security (see UNHCR, 2006: 101).

As part of the needs—and capabilities—assessment process, responders should survey each group of prospective trainees separately. The survey should emphasize encounters with previous

* The importance of refugee participation and consultation in all stages of decision making regarding their training constituted a recurring emphasis among participants at a 1994 International Symposium dedicated to refugee training. The experienced practitioners and other experts in attendance agreed that refugee needs, identified through careful assessments that involve refugees themselves (specifically including women and the elderly), should drive the implementation of training programs (Koehn, 1994: 6, 64). Specific recommendations included the following: (1) “training should be a community-based process of learning, empowerment, and enhancing self-esteem which takes place within a planning/learning/change spiral where all are teachers and learners” (*ibid.*: 70); (2) “in order to be sustainable, training in administration and management should be future-oriented and participatory, accommodating people-oriented planning with involvement of all players at all stages . . .” (*ibid.*: 69–70); (3) training needs should “reflect the socio-economic, cultural, as well as human-resource needs of the country of origin and the refugees themselves” (*ibid.*: 72); and (4) appropriate training should include the incorporation and modification of traditional practices (*ibid.*: 68).

intercultural communication problems and approaches to cross-cultural adaptability as well as participant awareness, knowledge, concerns, expertise, experience, abilities, and desired skills (also see Pedersen, 1994: 28–30). Trainers need to be aware that resilience is generated differently in different cultures (Gunnestad, 2006). The survey should result in an inventory that guides trainers in tailoring the program to specific backgrounds and needs of each group of trainees. Information about trainees' emotional state and experience with an attitude toward the cultures involved allows trainers to adapt the affective, cognitive, and behavioral dimensions of the training program. Assessing trainees' potential for adaptation to a new culture, motivation levels, and intercultural sensitivity allows trainers to use affective, cognitive, and behavioral approaches in an effective sequence (see Bennett, 1986; Bhawuk et al., 2006). For instance, trainees with emotional stress would need affective and anxiety-reducing intercultural training first, while those who are ready to change and eager to learn new behaviors would benefit from an emphasis on behavioral training (Landis, 2008).

In preparation for program sessions, trainers also should integrate the trainees' individual, team, and task doubts and questions into anonymous and hypothetical incidents and situations for analysis and small-group discussion. For instance, if potential trainees mention in the survey that certain types of transnational conflicts have presented difficult problems to deal with, trainers can design directly relevant conflict management training sessions. Trainers should aim at addressing trainees' communication concerns and interests by offering practical advice throughout the training program. Moreover, program coordinators should use the survey results to identify trainees whose practical experiences, knowledge, and adaptability skills will enable them to serve as valuable resource persons (also see Anderson and Woodrow, 1989: 318–319).

2.2 Model Program Activities and Components

Orientations, behavior, perception, and communication are the key components of intercultural training (Fowler, 2006: 404). The intercultural communication training framework set forth here primarily is designed for refugee-assistance workers who possess some formal education. It consists of five principal training activities: (1) transnational critical-consciousness building (Freire, 1970), (2) developing transnational communication skills (see Koehn and Rosenau, 2010: Chapter 2), (3) emotion sharing, (4) training of trainers, and (5) post-course assessment and follow-on activities.

The first aspect of the model program—enhancing knowledge and awareness—sharpens trainees' transnational sensitivity and adaptability. This training enables participants to identify, understand, and cope with the communication dynamics of cultural differences and adjustments. The second training activity—developing communication skills—provides trainees with concrete and ready-to-use techniques needed for the exchange of vital information and for effective interaction in culturally diverse emergency-management situations. Building effective transnational communication skills requires an extensive training effort. Participative training and experiential learning are often used in intercultural training because of their proven effectiveness (Fowler, 2006: 406). In the discussion of this activity, therefore, we present an eightfold training design linked to specific teaching approaches that promise to be especially conducive for learning. The third dimension of the model program—emotion sharing—aims to equip participants with skills that facilitate management of the negative emotions (e.g., trauma, stress, frustration, fear, and depression—see Planalp, 1999) that frequently are encountered in refugee-assistance crisis situations.

The next sections of this chapter provide a step-by-step discussion of the proposed training framework, including the training of trainers and post-course assessment and follow-on activities. The order of the steps will vary, depending on the readiness of the trainees and the nature of the emergency situation. Thus, trainees who are experiencing emotional stress, unable to accept the dominant cultural values in the new environment, or unable to stand up for their own cultural values (1) need affective intercultural training first. Cognitive training is helpful only when trainees gain emotional balance. Once they have acquired the necessary cognitive framework to deal with cultural differences, behavioral training will become beneficial. For trainees who are ready to change and eager to learn new behaviors (2), behavioral training serves as a satisfying starter. Once new behaviors begin to develop, cognitive training allows for appreciation of cultural differences and affective training serves as a preventive measure for dealing with emotional issues in case they arise. For trainees who refuse to acquire new cultural practices and those who are willing to learn new practices but have little experience (3), the first step should involve cognitive approaches that provide a mental framework for dealing with cultural differences. This should be followed by behavioral training that provides positive reinforcement for learning new behaviors. Once they gain some experience interacting with people of other cultures, affective training serves to support these trainees when dealing with emotional issues (see also Bhawuk et al., 2006). In many emergency situations where training time is limited and actions are required urgently (4), a practical sequence would focus first on behavioral training, followed closely by affective-support sessions, and last, if time allows, cognitive training for educational purposes.

2.3 Multicultural Knowledge and Awareness Building (Cognitive)

The primary objectives of the first training activity are to raise general awareness among trainees about culturally influenced behavior, including differing perceptions, and to promote individual capacity to engage in culturally specific communication adjustments. Joseph Bastien (1995: 85–86) shows, for instance, that “it is only after doctors and nurses understand people’s cultural perceptions of... vaccinations that they can communicate cross-culturally in terms that the people understand.”

A helpful first step in knowledge and awareness building is to expose the trainees’ “own stereotypes, prejudices, misconceptions, or a combination of these, about members of cultural groups that are different from their own” (D’Andrea et al., 1991: 144). For instance, participants can engage in an ice-breaking exercise that generates “a degree of embarrassment and a desire to learn more about culture and cultural differences” (Brislin and Yoshida, 1994: 27; also see Pedersen, 1994: 34, 66, 74–75). It also is useful for trainees to discuss personal experiences, participate in role-plays and role reversals, and explain videotaped or enacted intercultural interactions from the perspective of learning to value, respect, and become comfortable with cultural differences (Sue, 1991: 102; also see Pedersen, 1994: 27, 39).

In the training framework developed by the authors, knowledge and awareness building includes mastery of cultural continuum identification and placement, sociocultural map construction, opening and revising culturally specific communication data files in one’s mind, and cultural adjustment action planning. We suggest that knowledge building begin by introducing cultural dimensions in the form of continuums that present different behavioral patterns (see Fowler, 2006: 405; Storti, 2009: 278; Lustig and Koester, 2010: 139). The six cultural dimensions selected by the authors for this purpose are set forth in Table 2.1. The trainer next describes the characteristics of

Table 2.1 Selected Cultural Dimensions

Context	High-----Low	Ethiopia	Tanzania	U.S.
Contact	High-----Low	Ethiopia	U.S.	Tanzania
Power distance	High-----Low	Ethiopia	U.S.	Tanzania
Uncertainty avoidant	High-----Low	Tanzania	U.S.	Ethiopia
Masculine/feminine	Masculine-----Feminine	Ethiopia	U.S.	Tanzania
Collectivistic/ individualistic	Collectivist-----Individualist	Ethiopia	U.S.	Tanzania

Source: Adapted from Ngai, P.B.-Y., *World Commun.*, 29(4), 6, 2000.

the two defining points on each dimension (also see Chapter 17 in this volume), emphasizing that countless variations exist between the extremes of each continuum and validating such differences.

Once trainees attain a firm grasp of the six cultural dimensions, they should be invited to locate the prevailing pattern of their own cultural practices at a point along each continuum based on personal understanding and the exchange of information and insights. In Table 2.1, the authors placed Ethiopia and Tanzania on each continuum as an example.

The next step, further illustrated by the authors in Table 2.1 by reference to mainstream US culture, is to fit the other culture(s) that trainees must interact with on each continuum. Acquiring a culturally sensitive understanding of unfamiliar behavioral styles requires prior study and “in-depth understanding of social groups, their history, their political dynamics, their cultural characteristics” (Eade and Williams, 1995: 253, 813). Gains in understanding can be achieved through reading, the presentation of empirical data regarding the specific culture(s) one is working with, panel discussions, interviews with experts and community members, exposure to audiovisual resources, field trips accompanied by expert debriefings, attribution training, bicultural observation, and cultural immersion (Pedersen, 1994: 37, 39–40). The ongoing participatory process of constructing a *sociocultural map* of the geographic area one operates within (Eade and Williams, 1995: 253–255) can be particularly useful in building knowledge about an unfamiliar local culture. A useful map juxtaposes patterns of cultural values with patterns of cultural practices. The former captures what the population believes as ideal, while the latter describes the observable behavior patterns (Lustig and Koester, 2010: 138). Trainees should be guided through this process

in order that the compilation of reliable sociocultural maps becomes a culture-specific tool they are capable of utilizing and comfortable with in the field.

The entire *continuum-placement* exercise is designed to assist trainees both in developing heightened sensitivity regarding behavioral variations across cultures and in *seeing* the extent to which specific cultures are different from and similar to each other.* It also provides an opportunity for trainers to discuss the effects of ethnocentrism and prejudice and to comment on the presence of alternative cultural patterns and the importance of overcoming stereotypes. When cultural differences and the challenges and surprises they can introduce (Storti, 2009: 274) are addressed in dealing with miscommunication and interpersonal conflicts, the barriers become depersonalized and hence manageable through mutual understanding and two-way adaptation (see also Fowler, 2006: 406).

After trainees are guided through peer-group discussion and individualized coaching to place the cultures they are dealing with on each continuum, the trainer should provide them with a handout that summarizes *communicative* differences at each end of the six cultural dimensions set forth in Table 2.1.† Trainees should learn how to use this handout to identify predominant communication styles within the particular culture(s) at issue. To address concerns about stereotyping, trainers should concomitantly explain that “to talk about culture, we have to generalize. And [make] the even more important point that when we generalize, we may be accurate about a group, but we would only be coincidentally accurate about any single person from that group” (Storti, 2009: 277, 280).

This type of knowledge training resembles opening *culture-specific data files in the minds* of trainees. Trainers should emphasize that such *mind* files are neither complete nor final and that each only refers to the superordinate, but shifting (Hecht et al., 1993: 23, 52, 55), pattern of communication. When working in an unfamiliar culture, retrieving the appropriate cultural data file will provide program graduates with valuable hints for understanding salient communication styles. Practitioners also should be prepared to modify the core knowledge files in their minds during the continuous process of learning about cultural variations *in situ*.

Next, trainees should be guided on how to construct a personal *cultural-adjustment action plan*. This training component focuses on the blending of cognitive and behavioral dimensions. The actual preparation and periodic modification of each participant’s dynamic cultural-adjustment action plan will be based upon the outcome of his or her culture-specific assessment and on the expectations and communication styles one encounters in the emergency management field site (also see Pedersen, 1994: 135–137; Ngai and Koehn, 1998: 49–50).

Table 2.1 and the communication styles handout serve as useful tools that trainees can take back with them to their workplace. Although the two devices provide only generalized information about six different communication styles across cultures, they also constitute magnifying glasses that allow trained assistance personnel to observe and understand their multicultural work situations more clearly and to monitor and adjust their own transnational behavior. In sum, the knowledge- and awareness-building dimensions of the training program are intended to equip trainees with capabilities in intercultural perception, learning, information gathering, decision making, leadership (see Munteanu, 2008: 22), and adjustment that will be of lifelong value in crisis management. With this background in place, the training program next turns to developing skills in intercultural communication.

* For examples of training programs that misuse this approach and attempt to “erase difference by imposing a single ideal of corporate and business practice,” see Upadhyaya (2008: 106, 110–119).

† This handout should be adapted from Table 17.1 found in Chapter 17 of this volume.

2.4 Developing Intercultural Communication Skills (Behavioral)

The principal overall objectives of the second part of the training program are to provide emergency-management practitioners with the sending and receiving skills needed to “improve and increase intentional communication across cultures” (Pedersen, 1994: 69) and with the ability to realize the benefits of transnational synergy when managing refugee-assistance crises. If successful, this part of the training program will equip crisis-assistance personnel to engage in multiculturally sensitive planning and to reach participatory decisions that are shaped by the unique orientations and customs of the involved refugee and host community populations.

In light of its principal objectives, the second part of the intercultural communication training program focuses on developing skills in eight key areas: intercultural nonverbal communication, written and verbal expression, information gathering and sharing, multicultural organization communication, interaction with clients of diverse cultures, reaching agreement in intercultural contexts, intercultural conflict management, emotional management, and harnessing transnational synergy. The instructional approach would include a structured learning mix of informative presentations about each skill; skill clarification through case study preparation and analysis; the joint development of new forms of practice decision making; rehearsal, with feedback, via role-playing, simulations, and action training; and the transfer of skills to emergency management situations through on-the-job training (see Pedersen, 1994: 41). Decisions on which skills and approaches to emphasize should be based on the outcome of the needs/capabilities assessment and on the particular set of cultures and subcultures represented in the program. In the following discussion, the authors elaborate on the nine components of their model skill-based curriculum and link promising instructional approaches to each training objective.

2.4.1 Component 1: Intercultural Nonverbal Communication

Nonverbal communication scholars suggest that people frequently communicate through nonverbal cues. Intercultural interactions present one context in which nonverbal misunderstandings commonly emerge due to lack of awareness and training. As Pedersen (1994: 91) points out, “persons from another culture may grossly misinterpret a simple gesture, expression, or implied attitude owing to a different cultural viewpoint. Hints, clues, understatements, and appropriate omissions are some of the more subtle tools of communication that present barriers to multicultural communication.”

To enable participants to avoid costly misunderstandings and to facilitate effective intercultural communication (see Sue, 1991: 103; Ngai and Koehn, 1998: 49–50), this training component first raises participant awareness of cultural differences in communicating through facial expressions, gazes, gestures, posture, body movement, space, dress, touch, vocalics, and the use of time. The importance of subtle nonverbal cues and barriers in communicating across cultures is demonstrated. Then, trainers assist crisis managers develop personal skills in observing, accurately understanding, facilitating feedback (Pedersen, 1994: 91), and utilizing appropriate nonverbal behavior to prevent misunderstanding and to enhance the intercultural communication of intended messages.

Approach: Implicit cultural messages exercises (see Pedersen, 1994: 82–83). Explaining and sharing one’s culture through drawing (see Pedersen, 1994: 84–85). Presentations and videos on reading and transmitting cultural nonverbal cues and on confused interpretations. Joint examination and reflection on the results of a nonverbal communication survey conducted among trainees. Sign and gesture exercise. Trainee role-plays guided by articulate cultural resource persons

(Pedersen, 1994: 37–38) of unfamiliar nonverbal behavior in multicultural teamwork and community interaction situations. Peer reactions and coaching. Modeling and demonstrations with videotaped feedback.

2.4.2 Component 2: Written and Verbal Expression

This component should develop enhanced behavioral sensitivity to cultural differences in verbal communication logic and behavior—including equivocation, requesting, compliance gaining, and taboo topics—and prepare participants for necessary linguistic adjustments. Trainees should learn to adjust in response to cultural variations in persuasion and structures of conversation (Lustig and Koester, 2010: Chapter 9). Training in public and media relations should emphasize effective public speaking in specific cultural and political contexts.

The written and verbal expression component also emphasizes the mastery of effective business-writing skills in English—the predominant language of formal communication within and among NGOs and between NGOs and host government agencies (Crystal, 1997). Although spoken English currently is the prevailing language of international and intercultural communication, its verbal expression differs widely across cultures and even within countries (Carbaugh, 2005; see also Mendez Garcia and Perez Canado, 2005: 88–89). For instance, “the style most favored for the presentation of information or argumentation, particularly in more formal settings, varies across cultures, and it is common for individuals to retain the discourse organization patterns and rhetorical style of their first language when speaking or writing in a second language” (FitzGerald, 2003: 86). Understanding important variations enables crisis managers to avoid costly misunderstandings and misinterpretations. Guidance should be provided in the concise and unambiguous drafting of documents such as situation reports (see Eade and Williams, 1995: 959–960), grant applications, budget requests, news releases, contracts and other legal documents, and interinstitutional agreements (see Siegel, 1985: 116). Furthermore, this component should introduce methods of designing educational materials that present topics in a language and style that are easily understood in the client culture (see Taylor, 1979: 441; Koehn, 2006: 38).

Approach: Presentations on cultural differences in oral expression—including informality versus formality, high involvement versus high consideration, fast and slow messages, and cross-gender communication. Training in culturally appropriate linguistic initiation and response for the work environment and in the effective use of questions. Role-plays using intercultural verbal exchanges. Presentations on effective English-language professional writing skills. Adopting an audience-oriented strategy is particularly important in multicultural settings. Explore cultural differences in organizing and presenting information and ideas. Video on *power writing*. Writing exercises with feedback from trainers and learning from others’ mistakes. Practice editing. Writing improvement goals should be set so that they *stretch* trainees but are attainable (see Anderson and Woodrow, 1989: 84–85).

2.4.3 Component 3: Information Gathering and Sharing

This component involves at least five training objectives:

1. Identifying which information is needed for problem solving, decision making, and public accountability in the particular humanitarian-assistance context
2. Learning how to locate essential information in a foreign environment

3. Developing competency in gaining access to reliable sources of information in different cultural contexts
4. Ensuring the physical security of staff and valuable organizational resources through networking
5. Building individual and institutional capacity to alert persons from diverse cultures and different organizations, sectors, and levels about impending crises

Approach: Handouts on crucial information needs given the specific crisis-management context. Training in locating and consulting available sources of useful data and in participative learning methods (PALMs) (Eade and Williams, 1995: 254–255). Presentations on information access in relevant emergency situations and on message-networking techniques. Case study analysis and small-group discussion among trainees regarding appropriate cross-cultural teaching/learning styles and ways to overcome obstacles to information gathering and sharing.

2.4.4 Component 4: Use of Information and Communication Technologies

Information and communication technologies (ICTs) have become indispensable tools in development work (Hudson, 2006). ICTs are used to facilitate the exchange of ideas for problem solving, coordination among agencies and virtual teams (see Storti, 2009: 284), service and supply delivery, telemedicine, and distance education and training (see Okigbo and Eribo, 2004; Hudson, 2006; Magistro, 2008: 3). Culturally sensitive training in e-mail correspondence, developing websites for information sharing, desktop training (Storti, 2009: 284–285), and the use of mobile phones for networking enhances refugee crisis assistant management. ICT-assisted communication is a form of non-face-to-face, non-person-to-person interaction, the value of which varies across cultures. For instance, prompt, frequent responses to e-mail messages may be considered to be professional practice in one culture but a low priority compared to in-person requests in another culture (see, e.g., Kim et al., 2004; Oxfam GB for the ECB Project, 2007: 93). Language choice and online verbal communication present other potential intercultural communication barriers when using ICTs for refugee-assistant management. Since English is used in over 70% of online communication (Paolillo, 2005: 57), access to information via Internet networks becomes a complicated issue in non-English-speaking countries. Culturally sensitive translation often is required. Crisis management e-mail formats and website designs should be responsive to users' cultural orientations and literacy habits. Moreover, some governments consider certain subjects to be *taboo* and attempt to censor them (Rogers, 2003: 263). Trainees need to be able to identify sensitive subjects and navigate communication around them.

Approach: Training-of-the-trainer workshops to create local technical teams responsible for installing, maintaining, and sustaining the availability of ICTs in refugee camps. Hands-on activities to familiarize trainees with the use of various ICTs and relevant websites. Practice sessions to detect and discuss cultural orientations toward the use of e-mail, cell phones, and the Internet. Critical incident analysis (Collins and Pieterse, 2007: 17) to explore local adaption of international protocols for effective non-face-to-face-mediated communication. Leadership focus groups that identify ways to combine the use of ICTs with indigenous communication channels. Training of multilingual *information brokers*, staff members, or volunteers who can assist others in finding information (Hudson, 2006: 20).

2.4.5 Component 5: Multicultural Organization Communication

This section deals with methods of effective interorganizational and cross-sectoral communication and networking in decentralized transnational and multicultural settings. Trainees learn how to assess organizational culture and develop skills in communicating across levels and within multicultural organizations, groups, and teams. In addition, trainers introduce the importance of transnational competency when one is engaged in processes of transparent decision making and reporting, interest articulation, and the identification of major stakeholder groups and their objectives, power bases, and limitations (see Siegel, 1985: 116; Moran et al., 2009: 294–295; Koehn and Rosenau, 2010: Chapter 2). Training also is provided in communication strategies for effective leadership in multicultural and transnational contexts (House et al., 2004) that involve team building and teamwork, developing trust, reaching consensus (Kealey et al., 2006: 42–44), making meetings work, networking, and functioning as an effective voice in mobilizing resources from community, government, and donor sources.

Approach: Presentations on effective organizational communication strategies in the transnational and multicultural workplace. Case study analysis and small-group discussion of organizational-communication problems. Group work with critical incidents involving refugee-assistance personnel from diverse cultural backgrounds that requires decisions be reached and an intervention plan be developed, admits no easy or clear-cut answers, and projects serious consequences (Pedersen, 1994: 81). Action training using actual or simulated policy dilemmas and intercultural-communication barriers. For example, an interorganizational committee of refugee-assistance managers devises an agreed-upon procedure for improving communication linkages among NGOs, central and local government agencies, and refugee and host community institutions. More complex challenges of a multisector and/or multilevel nature can be introduced as participants develop their analytical and problem-solving abilities. Cultural placement exercise using Global Leadership Organizational Behaviors (GLOBE) dimensions and cultural characteristics to uncover leadership styles among staff and volunteers possessing different backgrounds (House et al., 2004).

2.4.6 Component 6: Interaction with Diverse Populations (Local Capacity Building)

This component presents sensitizing background on relevant refugee populations, including the antecedents of their dislocation and their experiences with trauma, depression, uprootedness, and loneliness. The trauma experiences of politically dislocated migrants include deprivation of basic needs, physical injury and torture, incarceration, and witnessing killing and acts of human cruelty. Among refugees, such stresses occur prior to dislocation, during flight, and throughout the resettlement (and, if it occurs, repatriation) process (Bemak et al., 1996: 248–251).

Training is provided in effective intercultural communication strategies for (1) dealing with culture shock, distrust toward strangers, and insecurity in cross-cultural relationships; (2) building rapport and opening valued communication linkages that span cultures (see, for instance, Phillips, 1993: 107–108); (3) improving information gathering, information organizing, and information analyzing skills (Anderson and Woodrow, 1989: 47–48); and (4) enhancing self-reliance, resilience, and other emotional competencies needed to cope with distance, dispersion, and despair (Matveev and Milter, 2004: 105). Important related elements for refugee-assistance staff and volunteers are (1) sensitivity training regarding gender/age roles (and role reversals) and the importance of communicating with the “appropriate group for the most effective impact”

(Anderson and Woodrow, 1989: 67; Bemak et al., 1996: 251); (2) learning “the skill of respectful and careful listening” in culturally unfamiliar contexts; that is, being “ignorant but teachable” (Anderson and Woodrow, 1989: 86); and (3) training in how to establish early warning systems that centrally involve diverse communities (Lusty, 1979: 353).

Approach: Presentations on developing interculturally sensitive information models (see Bastien, 1995: 85). Knowledge sharing with informed resource persons that accurately and comprehensively explicates the particular refugee experience and promotes political and cultural awareness (Bemak et al., 1996: 255, 258). Relational role-plays that simulate critical interaction and role-confusion situations with and among refugee and host communities (see, for instance, Pedersen, 1994: 68–69; Bemak et al., 1996: 253; Goleman, 1998: 329–330). Critical incidents (Collins and Pieterse, 2007: 17) that feature emergency management personnel and refugees from culturally diverse backgrounds. Small groups of trainees and experienced trainers discuss and analyze alternative approaches to complex cases and incidents. Action training that builds communicative skills in developing self-reliant community involvement in needs assessment (Chambers, 1994), project selection (Hyden et al., 1996: 44–45), and project appraisal (van Bergen, 1995: 26). Enhancing the capacity of local participants “to learn from their own environment and experience” by encouraging “methods of experimentation... that are appropriate to the cultural context and that can become permanent systems for the discovery and communication of knowledge” (Anderson and Woodrow, 1989: 81). Implement a trust-building plan that involves appreciative inquiry, ranking trust cards, trust walks, a “communication charter that designs best strategy for communication amongst team members,” and aligning work practices (Oxfam GB for the Emergency Capacity Building Project, 2007).

2.4.7 Component 7: Reaching Agreement in Multicultural and Transnational Contexts

This component of the communication training program addresses negotiation strategies for reaching agreement in dynamic multicultural settings that involve “complex processes with many different stakeholders who have various levels of power and decision-making capacities” (UNHCR, 2008: 97). Trainees are informed regarding culture-general and culture-specific communication factors that inhibit and facilitate cross-cultural agreement reaching. The program should emphasize adaptive communication and devote special attention to the nonverbal elements of intercultural negotiation (see Ngai and Koehn, 1998). Successful trainees will develop competency in negotiation and persuasion in multicultural situations. Skills in working with interpreters and cultural informants are likely to prove particularly useful (Pedersen, 1994: 34). Action learning offers an efficient opportunity for facilitating agreement reaching in emergency contexts involving transnational responders.

Approach: Using reference criteria that are directly related to intercultural agreement-reaching situations, culturally different partners attempt to predict the other person’s reactions and responses (see, for instance, Pedersen, 1994: 87–88). Presentations and videos on effective transnational negotiation strategies. Role-plays (see Mak et al., 2003: 368–370) and behavioral rehearsals. Modeling and demonstrating intercultural negotiation and agreement-reaching communicative skills with feedback aided by audiovisual resources (Pedersen, 1994: 32). Individual practice with interpreters and cultural informants (Pedersen, 1994: 35). Facilitated action training. One type of role-play calls upon trainees to act out professional behaviors that violate the expectations of their dominant culture (Shaffer, 1998: 22–23). In the critical-incident format, problematic and

unfamiliar transboundary communication situations that closely reflect reality are presented to the trainee, who must think through and then (sometimes repeatedly) play out his or her role (Thomas, 1998: 75–76). Other role-play exercises enable participants “to practice and experience both giving and receiving help” (Hirshberg, 2006: 180). In all role-play exercises, transnational-competence educators encourage empathy, provide opportunities for repeated practice (Goleman, 1998: 270–271), allow ample time for critical reflection on and internalization of lessons learned, and provide detailed feedback regarding alternative and augmentative communicative approaches, demonstrated skill strengths, and needed skill enhancements/acquisitions. The action-learning process engages a diverse team of trainees in addressing an actual communication problem that confronts one of the cooperating organizations. Trainees simultaneously focus “on what they are learning and how their learning can benefit each group member, the group itself, and the organization ...” (Marquardt and Berger, 2000: 181). Action learning is built around a challenge, project, or task important to the organization that provides an opportunity for developing skills in transnational communication. Action learning first investigates and clarifies the precise nature of the problem and its underlying contributors. Then, possible solutions are identified, an approach selected and proposed and, if approved, implemented in stages. Reframings and refinements are adopted throughout the learning process as the “synergy of diverse groups asking fresh questions generates creativity” (Marquardt and Berger, 2000: 185).

2.4.8 Component 8: Intercultural Conflict Management (Training in Ways of Preventing and Containing Intercultural Conflicts)

This component should enable transnational participants to identify potential sources of conflicts (e.g., language choice in working and social relations) and effective communication responses in the multicultural work environment. It also involves training in network-management, relationship-building, and balance-restoration (see Pedersen, 1994: 200) strategies in multicultural settings. Participants should develop competency in mediating across cultures. Where appropriate, this component should include situations that necessitate dispute resolution and restoring reciprocity among culturally mixed communities receiving non indigenous or returning refugees (see Koehn, 1994: 82, 78). Trainers also demonstrate the importance of fair treatment as an uncertainty-management and anxiety-reduction approach to emergency and crisis situations (see van den Bos and Lind, 2002: 1, 4–5, 50).

Approach: Provide background on the refugee settlement process and on the principal players involved (see Pedersen, 1994: 34). Presentations and videos on effective communication strategies in intercultural conflict management and mediation situations. Discussion of conflict management and balance-restoration styles in different cultures. Case study analysis. Critical incidents and decisional situations involving conflicts among persons from culturally different backgrounds, using teamwork and comparative problem solving. Videotaped role-playing in simulated conflict and mediation situations with feedback from trainers and trainees. Action training in the use of inclusive communication strategies within work groups and among agency staff and community members.

2.4.9 Component 9: Harnessing Cross-Cultural Synergy

Emergency-assistance practitioners report that people are more receptive to change, to learning about capabilities and vulnerabilities, and “to considering new ways of doing things” in the

aftermath of disaster (Anderson and Woodrow, 1989: 14, 62, 83). Participants should emerge from the intercultural communication training program aware that emergency situations provide an opportunity to improve local conditions and that many promising culture-bridging options arise in crisis settings even when resources are limited (van Bergen, 1995: 27).

Facilitating creative and constructive input from a variety of perspectives requires the creation and maintenance of a climate that supports the articulation of challenges to agency thinking and customary practices. Moreover, the establishment of dynamic networks among autonomous organizations that share common concerns reveals that information diversity serves as a source of strength and as a vital aid to cooperation in crisis management (Eade and Williams, 1995: 379, 821). In this component, therefore, trainees should develop (1) learning skills that emphasize receptivity to new and different ideas and approaches; (2) competency in networking across multicultural team and transnational organizations; and (3) the ability to tap the power of diverse perspectives and change possibilities through networking, community and volunteer empowerment, and the judicious selection of multicultural communication styles and strategies from a wide repertoire of practical alternatives (see Pedersen, 1994: 36; Ngai and Koehn, 2002).

Approach: Training in identifying the advantages and power of diversity, in developing listening and adaptation skills, and in avoiding cultural chauvinism and stereotyping. Sharing traditional stories that capture indigenous ways of solving problems and living in harmony with nature and with fellow human beings (Bhawuk, 2003: 3). Critical incidents/opportunities with team initiatives; reports back to the entire group of trainees. Involvement in network-building and transboundary brain-storming exercises. Completion of challenging projects by multicultural groups and transnational teams engaged in goal-directed interaction. Facilitated action training.

2.5 Emotion Sharing and Intercultural Communication (Affective)

Emergency and crisis situations ensure that humanitarian assistance personnel operate in a stressful and rest-deprived work environment. The time pressures, workload volume, and burden of responsibilities they assume are likely to be exceptionally heavy. *The Oxfam Handbook of Development and Relief* adds that “they may witness atrocities and immense suffering; and may themselves be close to individuals who are killed, detained, tortured or bereaved” (Eade and Williams, 1995: 849, 973). Consequently, refugee-assistance workers often experience feelings of “helplessness, guilt or anger...” (Eade and Williams, 1995: 849, 973). In exceptional situations, NGO staff encounter death threats and are vulnerable targets for kidnapping and assassination (Burge, 1995: 157; UNHCR, 2006: 101; Power, 2008). Insecurity and fear for one’s own life exert a debilitating toll on vulnerable crisis managers. In one extreme case, “the perilous nature” of providing assistance for Rwandan refugees in Zaire in 1994 “was a regular agenda item in co-ordination meetings in Goma and in conversations among international and national staff” (Minear and Guillot, 1996: 65).

Service in a different cultural and socioeconomic context with minimal local support adds to the extreme and prolonged level of emotional distress that many crisis managers encounter in the field. Thus, expatriates who are living and working in isolation from their primary support system(s) are likely to experience refugee assistance as particularly emotionally taxing. *The Oxfam Handbook of Development and Relief* cautions that in such crisis- and emergency management situations, people may not themselves recognize the ways in which their responses and behavior are stress-related. A common reaction is to take refuge in work—by working long hours without

proper breaks and failing to relax or take leave. The individual's health and ability to function may seriously suffer (Eade and Williams, 1995: 973).

One important purpose of the intercultural communication training program, therefore, should be to prepare crisis managers to recognize and respect the early stages of stress among themselves as well as among other humanitarian assistance workers. Emotional stability among staff enhances multicultural team performance (Simkhovych, 2009: 385). Learning how to establish an organizational culture that ensures that staff are assigned manageable workloads, that guarantees sufficient and undisturbed leaves, and that enables assistance personnel "to articulate their concerns and know that they will be listened to sympathetically" (Eade and Williams, 1995: 973) constitutes another valuable dimension of the model program. Since emotional stability often is built upon cultural empathy* among multicultural staff and volunteers, empathy plays an important role in sustaining a supportive working atmosphere for multicultural teams (Simkhovych, 2009: 388). The training effort must provide managers with the communication skills required to reassure staff that protection of their own health and assessment/decision-making capacities are genuinely valued as an agency priority. Such training assumes even greater urgency in situations where refugee-assistance personnel and their families are exposed to armed conflict, personal physical dangers, and/or organized harassment. Then, crisis managers need to possess the ability to prepare precise and cautious guidelines for travel in dangerous circumstances (see, for instance, the checklist of issues set forth in Eade and Williams, 1995: 97–975), to arrange police escorts, armed protection, and reliable advance-warning communication systems (Juma, 1995: 111), and to ascertain what constitutes an unreasonable risk of continued involvement in a refugee-assistance capacity (Eade and Williams, 1995: 973–974).

In addition, intercultural communication training needs to equip humanitarian assistance workers with skills that will enable them to cope emotionally with a stressful multicultural workplace. Among those working overseas, in particular, the ability to deal with one's feelings and emotions largely conditions the outcome of group interaction (Brislin and Yoshida, 1994: 83). Trainers need to be cautious that *universal psychologies* and western psychology may be inadequate for understanding the psychological needs of specific groups of indigenous people (Bhawuk, 2008: 308). Strategies that incorporate insights from indigenous cultures are likely to be more effective. For many people, talking and writing about disturbing experiences constitutes an effective emotion management technique. We recommend, therefore, that this dimension of the training program helps trainees discover the comforting effect of writing therapy and, concomitantly, develop a willingness to share their feelings with trusted others. The integration of writing therapy with sharing across cultures promises to be especially beneficial in the refugee-assistance context.

Approach: One effective way to operationalize this training dimension is to encourage every trainee to keep a diary or journal from the onset of the comprehensive training program that records how he or she *feels* about incoming information regarding the multicultural emergency management work situation. For instance, a trainee may write in his or her journal that the isolated refugee camp is (is likely to be) a depressing and fear-provoking place or that he or she is (is likely to be) frustrated by the slow response rate exhibited in emergency situations. Each participant is paired throughout the program with a partner from a different culture with whom he or she shares journal entries. At the beginning of each training day, trainers should allocate half an hour for trainees to read their partner's journal and to talk with, listen to, advise, and console each other about how they felt about the new information acquired on the previous day. Such intercultural sharing

* Cultural empathy involves interest in people of different cultural backgrounds and sensitivity toward others' feelings and beliefs that one might not have experienced personally (Simkhovych, 2009: 388).

allows trainees to learn to express their feelings about what happens in crisis management situations, to prepare psychologically for emotional distress, and to develop the practice of seeking out and reflecting upon insights from a different cultural perspective. Also, this part of the training effort helps trainees develop the habit of expressing their feelings, especially disturbing feelings, in writing. Journal exchange enables trainees both to learn from another perspective and to be able to receive and provide emotional support. In short, the journal-entry exchange process amounts to a simulation exercise through which trainees acquire emotion management skills that are transferable to their work environment.

To supplement the emotion-sharing process, trainers are encouraged to invite experienced field personnel to share some of their own traumatic experiences and successful coping strategies. These accounts should be directed at reinforcing the trainee's emotional preparation and coping ability. In addition, the specific suggestions offered by experienced field personnel should prove invaluable to trainees in future crisis management situations.

We further recommend that, near the conclusion of the training program, trainers work with trainees to identify a suitable post-course communication partner from a different culture for each participant serving in an emergency management position. Communication partners, who will function as trusted listeners and emotional supporters, generally should be available to one another in the field. However, trainees should be aware that communication with their trusted confidant can be disrupted by crisis conditions, technology failures, or other complications. Thus, trainers also need to remind trainees of the therapeutic power of writing, especially in times of isolation. A diary would be a meaningful end-of-training gift for each trainee to take with them to their assigned site.

2.6 Training of Trainers

In order that the intercultural communication training program reach as many as possible of those involved in refugee-assistance emergency management, it should include a major training-of-trainers activity. Participants should be aware of their ongoing responsibility in this regard from the outset of the program. In light of this responsibility, each program participant should devote particular attention to training needs and capabilities assessment, curriculum application, training methods, materials development, and the management and evaluation of training programs (Collins, 1993: 342). They also should experience guided role-plays involving peer training in the eight key curriculum components and be provided with essential training materials. Finally, the training program should encourage participants to appreciate the value of learning by teaching at the grassroots level (van Bergen, 1995: 26).

In the field, trainees as trainers should promote cascading knowledge and empowerment as well as the transfer of portable intercultural communication skills. This goal is maximized by adopting a community- or team-focused approach whereby program graduates serve as formal and/or informal training team leaders. Emphasis should be placed on conveying information about useful techniques in a culturally sensitive manner that inspires skill transfer among community members (see Anderson and Woodrow, 1989: 238).

2.7 Post-Course Assessment and Follow-On Activities

Post-course outcomes assessments should apply the training criteria set forth at the beginning of this chapter and be related to the principal objectives of the program and of the participants.

It should incorporate the trainees' end-of-course written and oral evaluations and suggestions. A thorough assessment would utilize trainee articulation and application of evaluative criteria (Levin, 1997: 5), focus interviews, portfolio analysis, participant and coworker questionnaires, and on-site observations (also see Eade and Williams, 1995: 371; Koehn and Rosenau, 2010: Chapter 11).

Assessment should be linked to mastery of specific transnational communication skills during and immediately following the training course. This process should include formative and summative evaluations that are tightly linked to desired training outcomes (see, for instance, Pedersen, 1994: 35–36). Among refugee-assistance workers, competence in crisis management further requires the ability to interact flexibly and strategically with diverse partners in implementing pragmatic and timely interventions. Thus, post-course assessments also should expect to encounter demonstrated effectiveness in decision making through the application of multicultural information-sharing and group problem-solving techniques. When assessing transnational communication and interpersonal interaction in crisis management settings, however, both training program coordinators and participants must always bear in mind that “the ability to recover from mistakes is more important than perfection...” (Pedersen, 1994: 204).

Whenever possible, pre-training and post-training demonstrations should be documented by video for purposes of assessing skill gains, determining levels of goal attainment and transnational task effectiveness, and analyzing and addressing weaknesses through performance repetitions. In all cases, evaluators emphasize recognizing learners who demonstrate specific transnational-communicative skills and supporting those who need to improve (Kuczewski, 2006: 194; Killick, 2007: 211). Skill gaps revealed by critical assessments guide the refinement of communication training programs.

The ongoing dimensions of the training program should include guided individual apprenticeships and the informal daily sharing of tips and insights following conclusion of the formal training course (see Anderson and Woodrow, 1989: 85; Perille and Trutat, 1995: 8). In these learning-by-doing situations, local field staff and/or seconded technical/professional personnel teach trainees and vice versa (Yamamoto, 1995: 140–141). In addition, experienced trainers should visit trainees at their work site(s) to offer advice and constructive criticism on approaches to handling various crisis- and emergency management challenges and on promising adaptations in light of local workplace conditions (see Xiao, 1996: 57–60, 69–70). All follow-up efforts should emphasize the inculcation of lifelong learning skills.

Approximately at annual intervals after delivery of the training course, additional assessments should be conducted with participants and with trainee-trained field workers. This long-term assessment process can be based on questionnaires, interviews, participant (e-)portfolios (see www.acenet.edu/Content/NavigationMenu/ProgramsServices/cii/res/assess/Overview.htm), and field observations. In addition to serving as a guide for additional follow-up training where needed, the results should be used to identify gaps and strengths in the overall training exercise that would be valuable for program coordinators to address or enhance.

2.8 Conclusion

Effective intercultural communication in refugee-assistance crisis management requires an appropriate and continuous training effort. The vision of a model program presented here devotes attention to both content and learning-process considerations. The content recommendations, which are linked to specific training approaches, are intended to address the practical communication needs that increasingly arise among field workers engaged in refugee- and other humanitarian

assistance capacities given the transnational and multiorganizational nature of today's relief and development crises.

Readers are encouraged to draw liberally from the framework presented in this chapter when designing an intercultural communication training program that is tailored to a specific clientele. The authors would especially welcome reports from practitioners on training outcomes when elements of the program design and methodology presented here are employed and adapted in culturally and transnationally diverse circumstances.

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Chapter 3

Global Crisis in Public Service and Administration

Ali Farazmand

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3.1 Introduction

Public service has been one of the oldest and most cherished institutions of human history. In fact, civilization, administration, and public service have always developed together, one reinforcing the other. Throughout history, progress has been made toward improving the human lot, for which public service and administration have played a key role. Real progress in such a direction was made during the last two centuries when social, economic, and political struggles and innovations led to overall progress in human conditions for citizens worldwide. The rise of modern nation-states and the growth of professionalism—along with development in education and economic progress—also contributed to some degree to this human progress around the world.

The rise and expansion of modern capitalism, especially corporate capitalism, raised serious concern about the adverse consequences of this historical development. Subsequent struggles by working-class people and middle-class professionals worldwide, as well as the rise of world socialism, resulted in a minimal social safety net. The modern welfare state has absorbed many of the grievances raised by deteriorating human conditions for the mass of citizens, in the midst of prosperity enjoyed by the few elites.

With the rise and expansion of the welfare state and the accompanying interventionist state worldwide, public service and administration grew and expanded all over the capitalist world. This situation resembles to a very small degree the features of socialist countries in place throughout the twentieth century up to the big wave of structural changes that began to appear in the 1980s. Until then, public service and administration were cherished, as they contributed to civilization, corrected constitutional and political, as well as economic wrongs, and helped balance the excesses of market capitalism. However, with the accelerated rate of technological and economic globalization of capital and the rise of the strategic globalization policy of privatization, public service and administration became the targets of relentless attacks from corporate capitalists, conservative business and political elites promoting the ideology of market supremacy, and scholars and policy advisors.

With the fall of the USSR, the diminution and crisis of public service progressed at a new accelerated pace. Thus, the global system of corporate capitalism pronounced a death sentence on all that had been achieved through public service and administration over decades—in fact, over centuries. As a result of sweeping privatization, what had been considered *public* and the public sphere was attacked under the banner of efficiency and antipublic sector sentiment. This has been enforced through supranational organizations such as the World Bank (WB), the International Monetary Fund (IMF), and the World Trade Organization (WTO), all of which are heavily influenced by the leading and most powerful governments—the United States and its key Western allies. Public service therefore has been sacrificed for the rapid accumulation of capital, while the character of the state and administration has been changed in favor of strong police security and military systems to promote and protect corporate interests worldwide. The result has been a

global crisis of public service and administration, with three distinct manifest dimensions: crises institutions, image, and legitimacy.

This chapter outlines this global crisis of public service and administration by addressing the nature of the crisis, its core dimensions, and the factors causing the current crisis in public service worldwide. Consequences and suggestions for policy decisions and administrative action are beyond the limits of this discussion. A major thesis of the chapter is that, while there is a need for reform and improvement in public service delivery and administration worldwide, the root causes of the crisis of public service and administration are both political and economic. Much of the historical progress toward the betterment of human conditions is now expected to be lost, and people everywhere have become disposable commodities or tools of the new globalization of capital in search of rapid growth in profits.

Consequently, public service and administration have been transformed from institutions with long historical traditions into corporate, coercive state institutions enforcing the new rules of the corporate welfare state at local, national, and global levels. The global crisis of public service is now connected with other crises impairing the human condition: environmental degradation and destruction, child labor, mercenary labor, violations of basic human rights, furtherance of mass poverty, malnutrition, and wage slavery all over the world.

3.2 Nature of the Public Service Crisis

Public service is experiencing a crisis globally, nationally, and locally. This global crisis has many dimensions, some of which are discussed in this chapter. Fundamentally speaking, understanding this crisis requires a deeper understanding of the underpinnings that shape the contemporary global trends and changes in socioeconomic and political systems, as well as in the global power structures that have been causing much of the public service crisis experienced all over the globe. It must also be understood in connection with other crises facing planet Earth and all of humanity: financial crisis, moral and ethical crisis, environmental crisis, institutional crisis, political and cultural crises, and a host of other crises that affect public service and administration worldwide.

This global crisis of public service has not yet reached its critical point. In fact, it has a fairly long way to go before it reaches the criticality that is needed for fundamental social action and qualitative change. The multitudes of contemporary quantitative changes—innovations in technologies, increasing numbers of nation-states, and breakdowns in traditional structures—that have produced some degree of qualitative changes in human history have had profound effects on the lives of billions of global citizens. However, many of these changes have produced fruits that have benefited only a small number of individuals and governments, who have declared the entire globe their own realm. At the center of this small group are some of the most powerful globalizing barons backed and promoted by the military and political-coercive muscle of globally hegemonic states—the United States and its European allies. Here, both ethnocentrism and superpower arrogance appear to have dominated the psychological, as well as political, and economic environment of the globe.

The core of this globalization enterprise has focused its onslaught on the realm of public service, public interest, and the public sphere all over the world. Behind this global onslaught is the dogmatic, self-proclaimed ideology of global capitalism, which is equated with market-based governance, administration, and democracy. The traditional historical progress of the last four centuries or so against worker exploitation, human serfdom, child labor, human rights abuse, and other violations of human dignity has all-of-a-sudden become irrelevant, as new concepts of

corporatocracy and market idolatry are invented and propagated. The traditional domains of public service have been claimed and occupied by this new globalizing ideology, and a neocolonization has penetrated deeply into the heart of public service and those areas in which the unprotected have traditionally sought a level of sheltering.

Today, the public service image is totally tarnished by this globalizing ideological corporatism, and both its institutional capacity and philosophical identity have come under serious question. With the governmental elites—elected and nonelected alike—joining as accomplices and, in fact, major partners of this global corporate strategy, public service and administration have become critically impaired and driven deep into a major crisis that has reached a global scale. In fact, expressions such as “the quiet crisis of the civil service” (Levine and Kleeman 1988), “crisis in the US civil service” (Rosen 1986), “crisis in the US administrative state” (Farazmand 1989), “the legitimacy crisis” (Brown 2000), “crisis of morale...” (Ban 2000), and others are important explanations for, and evidence of, this global crisis, but they scratch only the surface of the crisis that faces public service and administration worldwide.

To understand and explain the core of this global phenomenon deeply, we need to look at the big picture and analyze the nature of the current crisis in public service, and the other pervasive crises mentioned earlier, within a broad theoretical framework. Here, a global political economy analysis is needed in order to explain the cause and effect of the crisis and to outline implications for corrective social action.

3.3 Dimensions of the Crisis

Three dimensions make up the current global crisis of public service and administration: those of image, institution, and legitimacy or philosophy.

3.3.1 Image Crisis

Public service has always been valued as a major part of human civilization. This has been due to many factors, including the nature of humankind as a social creature with concern for both the common good and self-interest. The state and public sector have always played a leading role in providing this common good and public service.

The rise and expansion of the modern state has also contributed significantly to the growth and expansion of public service. This has been accompanied by the increasing bureaucratization and professionalization of the modern state, as Weber (1946, 1984) predicted. Professionalization has contributed many values to administrative and organizational bodies. Ironically, some of these administrative values have, during the last few decades, come into conflict with long-cherished human values of citizenship and democratic principles. Professionalization of public service and administrative systems has indeed changed the nature of modern organizations by deeply implanting the instrumental rationality that has dominated societies, as well as organizational life, around the globe (Farazmand 1994a).

This dominance has been more prevalent in Western societies of the United States and Europe than in developing nations. Rationalism and positivism have become part of Western culture, whereas normative values are still dominant in most developing countries' cultures. However, there seem to be two trends: globalization and cultural convergence of this instrumental rationality, especially through the current government reinvention and reengineering, on the one hand, and, on the other, the concurrent counterpressures from below against this rampant instrumental

rationality in developed nations such as the United States and Europe. The result has been a clash of the major values underlying administrative systems and public service around the world with the invading values of corporate capitalism and self-interest individualism.

Public service received high values during and after World War II in both developed and developing nations. In the former countries, professionalization of public service reached the highest stage as bureaucratization of society increased and the role of government and state became more pronounced. This was even more important in underdeveloped and developing countries as these nations freed themselves from the yoke of colonialism, and nation-building became a top priority for development and independence. Nation-building was followed by institution-building, which meant the development of infrastructure in society and bureaucratization, and administrative capacity building for the implementation of national goals. Building of administrative capacity also meant expansion of public service and the growth of the administrative state. In both developed and developing nations under capitalism, the administrative welfare state grew significantly in response to the increasing needs and demands of citizens.

The rise of the USSR and the spread of socialism also forced capitalist nations to adopt mixed economies with a growing welfare state. The Cold War rivalry and competition between capitalism and socialism weakened both systems from within and made them more vulnerable to external pressures. Eventually, the fall of the USSR and other socialist states resulted in a rearrangement of societal, organizational, and economic order. Capitalism became the dominant type of economic system, with the United States and some European nations as the leaders of this global movement. Capitalist ideologies have claimed supremacy of the marketplace, private enterprise system, and administrative rationality. However, this new global trend has been accompanied by pressures from common citizens who seek empowerment, smaller government, and less governmental intrusion in their private lives, as well as democratization of policy, citizenship, and public service. Everywhere, ordinary people resist the empty claims and pressures against public service institutions and demand corrective action through community and global solidarity movements.

The result has been a clash of political citizenship values, on the one hand, and professional administrative values, on the other. Thus, public service has been badly damaged in terms of institutional capacity, quality, and public image. Corruption has also plagued public service, which has provoked massive resentment and protest against such practices. Resolving this conflict requires reconciliation and exercise of administrative ethics with citizenship ethics. It is through this integration that the image of public service can be revived and enhanced.

3.3.2 Institutional Crisis

Institutional crisis appears when an institution loses credibility, organizational capacity, and ability to function as a viable institution in connection with its environment. An institution may lack organizational capacity, or an organization may exist but have been politically deinstitutionalized, or its time and viability may simply have passed. In any of these cases, an institutional crisis may be manifest. A market or a government may face institutional crisis when they either lack or lose organizational and legitimacy bases. Without organization and credibility, an institution is shaky and fragile, while an organization without institutionalization is much more fragile and subject to breakdown.

Public service values and images have been tarnished severely ever since the rise of the new global corporatism and its corollary strategic design of privatization, antigovernment and antibureaucracy, anti-civil service, and antieverything that is *public* around the world. This is a phenomenon that is totally unprecedented in modern history. Even the ancient civilizations of powerful

empires and underdeveloped societies did not experience the current level of hostility toward what is *public* and public service and administration. Why? This is an important question that requires broad, theoretical, and philosophical answers.

To return to the central point of our discussion, the institutional crisis of public service began with the massive onslaught on public service, bureaucracy, and public administration since the 1980s. Led by two major representative speakers of the neocorporate elites of global capitalism, American President Ronald Reagan and British Prime Minister Margaret Thatcher, a global crusade was started with a global political economy agenda that aimed to fundamentally turn around the structural changes and transformations that had taken place for many decades in the twentieth century. They were the key speakers of the new global capitalist elites and of globalization that now demanded (1) sweeping privatization, (2) questioning the viability and values of public service through governmental organizations and institutional arrangements, (3) reconfiguration of organizational structures of society (public and private sectors), and (4) reduction of the modern state and public administration into a police state for social control, maintenance of order, and promotion of the surplus accumulation of capital, the ultimate objective of capitalism, dominated by globalizing financial capital.

As part of this globalization process, modern states began experiencing numerous strategic deinstitutionalizations of the administrative state. This was done by both policy and administrative actions aimed at breaking the institutional capacity of the modern administrative state. It includes the social and economic areas long established and characterized as the welfare administrative state, and a massive ideological, psychological, and propagating onslaught on the legitimacy of the modern public service, administrative state, and public administration.

Through massive downsizing, reductions in force, destabilization of the civil service structure, businesslike reforms, and an all-out propaganda campaign against public service administration, with drastic cutbacks in public personnel and service expenditures, the institutional capacity of administration has been destroyed or seriously diminished. It is to the point of driving it to failure in order to support the false claims of market supremacy over the public sector. The net effect has been an effective strategic implementation of the deinstitutionalization of public service and administration and, consequently, a crisis of public service worldwide.

3.3.3 *Legitimacy Crisis*

The legitimacy crisis has been featured by many aspects of the worldwide assault on public service and administration as inefficient, ineffective, unaccountable, undemocratic, unelected, bureaucratic, and wasteful. Much of these slandering assaults have come from the business sector, especially business corporate elites, including the corporate media and press, but they also have come from critical organizational and management theorists who aspire to improve organizational life and to improve public service productivity, responsiveness, and accountability to citizens. However, the intellectual suppliers of this worldwide anti-public service and administration assault have been the neoclassical conservative economic advocates of the rational choice or *public choice theory* (see, e.g., Buchanan and Tullock 1962; Niskanen 1971; Savas 1987 and others).

The legitimacy crisis also has its roots in the philosophical and conceptual grounds of the conservative Lockean view of antigovernment, private property and private business, and limited government intervention in the economy and society. Further, the legitimacy crisis is rooted in the political culture of the Western Anglo Saxon, Anglo American, mostly American political culture in which private property and self-interested individualism, as well as a culture of possessive consumerism, prevail. This is a phenomenon propagated intensely by corporate, business, and power

elites in pursuit of global dominance of market capitalism. The notion of public service, as it has existed and was cherished for several millennia, is generally alien to American culture. Therefore, public service and administration never became rooted in American political culture. Sadly, it is this corporate-dominated culture of anti-public service and administration that is now being imposed upon developing countries and less developed nations by various means of coercion—military, security, economic, social, and cultural—and through the globalization of economics and politics. Therefore, globalization of corporate capital and the hegemonic state power of the United States and its European allies transcend the global crisis of public service in favor of marketization, corporatization, privatization, and a self-interested, possessive capitalist culture.

3.4 Causes and Consequences of the Public Service Crisis

Elsewhere (Farazmand 1989, 1997), I have discussed in some detail a number of factors that have contributed to the rise, growth, and expansion of the modern administrative state, with which also came an unprecedented degree of professionalization of public bureaucracy and public service. The role of governments in society, economy, and administration grew dramatically. Governments became the engines of national development, of private sector development, of providing public goods, and of solving problems, as well as protecting individual rights.

Professionalization of the administrative state and public service has been a common phenomenon of both capitalism and socialism. In the capitalist countries, mixed economies grew, and the domain of public-private sectors gradually expanded, with a blurring of boundaries between the two sectors. The competing values of the public-private sectors also merged to an extent. Yet, public service values and the commitment and aspirations of those pursuing a career in public service remained strong. This was also the case in the United States and some other nations, where the rampant political corruption of the nineteenth and early twentieth centuries resulted in a major reform movement known as the Progressive Movement. It sought to eliminate political and governmental corruption by the application of a modern bureaucratic and administrative rationality based on neutral competence, efficiency, and effectiveness.

These professional administrative values replaced much of the values of the earlier political machine systems prevalent around the nation. Then, professionalization of bureaucracy and civil service followed and resulted in the separation of politics and administration (Thayer 1997). The politics-administration dichotomy was a dominant mode and philosophy in the administrative state and public service (Frederickson 1993; Van Riper 1997). However, despite major improvements in public service delivery and in professionalization of public administration, another major dilemma arose due to the mythical dichotomy of politics and administration (Riggs 1994).

The dichotomy put professional administrators in a vulnerable situation in that they could not be involved in policy decision making or be engaged in activities considered in the domain of politics, however defined. The democratic values of responsiveness, responsibility, and accountability became major political values, and clashed with the administrative values of professionalism, efficiency, and effectiveness. Consequently, despite the major earlier strands, the administrative state and public service and administration came under attack from an array of crusaders of the political values of democracy.

These anti-public service, antibureaucracy, and antigovernment trend has had major ideological, political, social, and economic underpinnings that are beyond the scope of this chapter (see Farazmand 1989 for a detailed discussion). Consequently, a severe decline of public service followed, in terms of both institutional capacity and of its image in the United States and around

the world, resulting in a major crisis of public service and of professionalism in public administration worldwide. The contributing critics of public service and administration came from many backgrounds, from left to right, and many factors contributed to this crisis.

3.4.1 Causes of the Public Service Crisis

There are many reasons for the current crisis in public service worldwide. Most of the factors or causes listed here are identified with terms beginning with the letter C. Some of these factors are at the macro, national, and even international levels and shape the environment in which public service and administration are provided. Others are microspecific and relate to the profession of public service and public administration, organizationally, individually, and professionally. The ordering of these factors is arbitrary and does not have any particular significance.

3.4.1.1 Crisis of Legitimacy

The crisis of legitimacy is a political and ideological crisis afflicting regimes and political systems in which the consent of people is not sought and the forms or styles of governance are accompanied by dictatorial rule with consequences including repression, corruption, and other manifestations of the abuse of power. Regimes not enjoying legitimacy—the popular consent or perception and attitudes of citizens toward a government—often have little credibility among citizens, and public service bureaucracy tends also to be perceived negatively by citizens. Lack of accountability, transparency, and responsiveness, compounded by moral and ethical scandals at the highest levels of governmental leadership, are a few of the reasons why citizens form negative perceptions toward their governments. Simply put, citizens lose confidence and credibility in their governmental and corporate leadership. This has been manifest in the United States for the last 30 years (see Brown 2000; Lipset 1987).

Crisis of legitimacy also refers to the crisis or lingering problem of the administrative state in the United States, where its largesse and policy-making roles have been criticized by many. Legitimacy crisis has roots in the political culture of the American-dominated corporate power structure, which favors corporate, market capitalism, and small government (see Henry 1995; Rosenbloom 1995). It also takes root in the philosophical grounds of the role of government in society, especially of the Lockean view of government. Governments and corporate elites around the world, in both industrialized and developing countries, suffer a crisis of legitimacy (Brown 2000; Lipset 1987), and this has contributed heavily to the current global crisis of public service and administration.

3.4.1.2 Corruption

Corruption is a multifaceted and pervasive phenomenon of many forms and degrees. A major impact of corruption is its immediate delegitimation effect on the government, regime, and state bureaucracy. The image of public service suffers seriously under a corrupt system of governance. Simply put, there is no trust in a government perceived to be corrupt. It also suffers when public service sectors are tainted by corruption. Examples are the Department of Housing and Urban Development scandals in the United States in the 1980s, bribery and other forms of corruption, the Pahlavi regime under the late shah of Iran, deposed by the popular revolution of 1978–1979, or the Somoza regime in Nicaragua, and the Marcos regime in the Philippines. Other examples abound.

Corruption may also have a destabilization effect on governments and political regimes. Corruption in public service and administration may benefit a few people, but its negative effect

on society's productivity is significant. Corruption also tends to widen the gap between the rich and the poor, thus creating an effect of inequity and injustice. All forms of corruption take a big toll on the image of the public service and administration (Gould 1991). As a universal problem, corruption has been a major contributor to the current crisis of public service around the globe.

3.4.1.3 Capitalism

Capitalism has also contributed to both corruption and the public service crisis in at least two ways. It has promoted businesslike forms of corruption as a way to increase the bottom line. It has also induced forms of corruption in making contracts with public organizational elites. Bribery and kickbacks are but two examples. Conflict of interest is another common example. Few Americans know that, for example, the members of the legislature in Florida, as in most other states, can be and are on the payroll of private corporations. Since most of these legislators come from the well-to-do class of business/legal elites, their success in election has also been produced by strong support of the corporate power elites, who, in turn, expect or demand passage of laws favoring their interests. Conflicts of interest are massively reported as private dealings, and corporate representation disproportionately affects ordinary and poor citizens. The nature of capitalism promotes business-induced corruption in various forms such as bribery, conflicts of interest, special favors, kickbacks, etc.

The second way in which capitalism has caused a crisis in public service is the corporate sector's antigovernment, antibureaucracy, and probusiness slogans that have eroded public service institutions' image and legitimacy. This has often been under the banner of business efficiency and free market choice (e.g., the public choice theorists' arguments; see Farazmand 1994a,b). The idea that *money talks* seems to have had an influence on people's perceptions of business and government bureaucrats dealing with private corporations, especially the *iron triangles* (ITs).

ITs have special places in capitalist societies. A typical IT is found, for example, in the department of defense, and includes the bureaucratic elites, related legislative members, and corporate business elites producing weapon systems. They are present in every policy area and dictate policy choices in favor of powerful business interests whose protection and promotion are directly linked to the main functions of governmental officials, from the top chief of state, the president, or other form of leadership, to the lowest possible level of organizational hierarchy. Capitalism inherently promotes corruption and causes erosion of public service and administration. By nature, it is anti-public service because, under capitalism, the rich and business elites can afford to buy almost anything, whereas the middle class and working lower classes, as well as the poor who are unable to work, are in serious need of public goods and services, such as education, health, transportation, and enabling socioeconomic opportunities. The latter group cannot afford to buy these things in the marketplace where money is the only purchasing power. The current global financial crisis in capitalism also has aggravated both the public service crisis and the crisis of governability. This dual crisis has affected billions of people around the world, resulting in the global mass movement of "Occupy Wall Street" against the greedy corporate elites.

3.4.1.4 Cutbacks

Massive cutbacks in public sector expenditures have been a major responsible factor contributing to the current crisis of public service and administration worldwide. Cutbacks in the public sector have occurred in at least five major forms: (1) cutbacks in public investments of infrastructure development, or public works; (2) massive cutbacks on social service programs necessary for the

sustenance of a large number of citizens in need of assistance; (3) cutbacks of organizational capacity, such as personnel and operational expenditures; (4) cutbacks in the institutional and operational capacities of governmental regulatory functions; and (5) cutbacks in the enabling role of government to provide economic and social opportunities for the vast majority of citizens. Cutbacks have deeply hurt public service and administration systems worldwide.

3.4.1.5 Communism

Communism provides equitable and massive public services, but equalization and leveling off sometimes are not valued by citizens, who take them for granted and are enticed by the anticommunism propaganda of capitalist regimes. The inability of communism to effectively repel the capitalist regime propaganda, its lack of dynamism in producing luxury and appealing goods and services, and its preoccupation with self-defense and protection against the various forms of onslaught of capitalism have made the system vulnerable. Therefore, it has contributed to some degree to the current crisis of public service in two ways. Its lack of incentives for individual creativity and opportunity for personal development under some existing socialist systems has been compounded by the poverty-level standard of living. Often, public service is viewed by people as being poor in quality, as opposed to the privately provided goods and services in mixed economies—regardless of the fact that most public services were provided free of charge. The fall of the leading socialist states, including especially the USSR, has also fueled the anti-public service and antibureaucracy fervor among peoples and private sector–corporate elites in capitalist nations.

3.4.1.6 Cost

Costs, especially cost overruns, have been a major cause of public service decline and crisis. Most governments around the world have been operating with significant budget deficits for the last decade or so. A national budget deficit has a major negative impact on the image of public service. Cost overruns in government procurement and other activities—for example, \$700 for toiled seats in the Pentagon in the 1980s—badly tarnished the image of the bureaucracy and public service in the eyes of citizens.

Cost also means that monopolistic government bureaucracies are not efficient in delivering services and that many public services are too costly, especially social services. These latter perceptions have often been fueled mainly by corporate business elite circles in order to discredit public sector organizations, but the shortcomings and excesses or wastefulness of some government bureaucracies cannot be ignored; they must be exposed for transparency and accountability purposes.

3.4.1.7 Conflict of Interest

Conflict of interest arises when members in public service engage in contractual or other governmental transactions with certain private contractors with whom the officials—both political and career—have private interests. Conflict of interest occurs in many forms, and it may contribute to major cost overruns.

3.4.1.8 Corporatism

This has been another cause of crisis in public service. It has promoted the corporate ideology of private enterprise against government regulation and administrative processes. Corporatism has

its roots in political economy, in that its ideological underpinnings dictate corporations as the best and ideal form of organizational arrangement of society.

Corporatism also means corporations are the alternative to formal traditional governance and administration of economy, social services, and legal and professional establishments. Here government intervention may be desirable under this notion to help serve the interests of the dominant corporate power structure, which claims to run the economy and provides goods and services in the marketplace. Corporatism feeds on the rhetoric slogans of freedom, liberty, market, and financial gains. Yet, the fundamental question of corporatism begs the explanation of who benefits from these rosy concepts—average citizens or the privileged corporate elites and business class of the rich and affluent? The latter benefits from the anti–public service and anti–public sector organizational arrangements because it is alien to the social and economic problems that the underprivileged or average citizens face on a daily basis. Corporate ideology attempts to terminate the alternative concepts to the social and economic orders that may be attractive or utilitarian to a broad-based populace. Simply put, it is a door shut to the world outside, while classification inside is both constantly tightening or rigidified, and opportunities tend to strangle the mass citizenry with *a race to the bottom*.

In such a microcosmic world of corporate isomorphism, the broad *public sphere* in which social breathing allows common citizens to think and search for alternative identity is constantly shrinking in favor of *idolism*, a notion that subscribes to the worshiping of repressive corporate idols in control of the destiny of masses of citizens. It is this isomorphous *idolic corporatism* that is both stifling and deepening the crises that have already reached a level of criticality worldwide with numerous manifestations in the environment, ecosystems, population, governance, and administration, and destructive migrations (Parenti 1994; Weiner 1995). A massive punctuation of glacial magnitude is needed, and will be inevitable, to break down this idolic isomorphism. A heavy price will be paid by humanity before such a social breakdown occurs in this idolic corporatism, a phenomenon that social chaos theory attempts to explain. In the meantime, public service crisis will continue to deepen with casualties everywhere around the world (Brecher and Costello 1994).

3.4.1.9 Colonialism and Neocolonialism

Most developing countries were subjected to colonialism in the last centuries. Colonialism has left major legacies of economic, political, and bureaucratic corruption in newly independent nations, most of which lack a developed free market system, an indigenous administrative and civil service system, and an independent political elite. The result has been a de facto colonialism and continuation of the colonial bureaucratic presence in many nations of Africa and Asia. The public sector is often perceived as an instrument of former colonial powers.

This phenomenon has also been observed in twentieth-century countries experiencing neocolonialism and imperialism. Many political, administrative, military, and business elites of these developing countries are heavily influenced by the powerful Western powers such as the United States, Britain, and France. Many regimes in these nations are perceived by their people and intelligentsia as puppets of the foreign powers. Consequently, their state and bureaucratic systems lack popular legitimacy and credibility due to mass corruption and repressive behavior, as well as due to their subservience to foreign neocolonial powers. Consequently, their public service and administration are heavily affected by the global domination of corporate elites and by the globally dominating governing elites, whose primary interests are the promotion of financial accumulation of surplus capital and political–military control of the world, creating and promoting the isomorphous ideology of idolic corporatism worldwide.

3.4.1.10 Cold War

The Cold War also drained the institutional and fiscal capacities of both the capitalist and socialist systems. Indeed, the expansion of the public service and welfare state in capitalist nations with a mixed economy has been perceived and attacked as part of the ideological Cold War strategy. The Cold War took a toll on the public service image—by being viewed as socialistic—in capitalist nations. The ideology of idolic corporatism had found the welfare state useful, while at the same time, it was opposed to its behavioral and structural consequences of public service and administration. This duality and conflicting feature of idolic corporatism has been embodied in American political culture that is shaped by corporate elites.

3.4.1.11 Culture

Some cultures have an inherent tendency to promote the anti-public service image. This is particularly true in countries like the United States, in which corporatism and the private enterprise system appear to dominate the American individualistic and political culture. Unlike the case in other nations, public service has never been valued widely in the United States, where it is the weakest in the world. Idolic corporatism has planted very deeply a sense of antipublic and proindividualism in American culture, which is now also invading the world far beyond its territory (see, e.g., Bellah et al. 1985; Macpherson 1987; Triandis 1995).

3.4.1.12 Commercialization and Commodification

Commercialization and commodification have similar effects on public service image and legitimacy in the United States and many other nations. This trend appears to dominate the cultures and societies on a global level, but its origins are the United States and Britain. Commercialization and commodification have intellectual roots in contemporary neoconservative public choice (misleadingly called *public choice*, while it should be called *elite choice* or *affluent choice*) theory, and practical roots in Anglo American idolic corporatism with isomorphic manifestations. Money as the ultimate means of exchange and transaction process has become a gospel of all interactions and social relations, including of human body and soul, of culture and identity, of pride and existence, and of everything else (see Parenti 1994 for the “land of idols in America”).

Commercialization has degraded and devalued humanity and human dignity, as well as all other phenomena and objects in the universe; objectification of all that exists and their valuation by commercial means of exchange, that is the price. Both intellectual and practical roots of commercialization and commodification have contributed to the current crisis of public service and administration, and they are being spread throughout the world by means of both global capital and global coercion of the hegemonic state power.

3.4.1.13 Consumerism

Consumerism is another ideological phenomenon dominating the current reforms and reinvention programs of governments and public service around the globe. It is a major by-product of idolic corporatism, as well as being its major basis of expansion and promotion. Originating in the United States, this conservative, neoclassical, public choice theory ideology places individual consumers at the center of the debate and claims a legitimacy for consumer sovereignty. Its

market-oriented consumer ideology is being extended to the public sector, forcing governments and public administrators to view people as consumers, not citizens or owners (Schachter 1997).

This public choice ideological perspective has in fact degraded citizenship and reduced citizens to consumers in the marketplace. The result has been the loss of trust in and appreciation for public service, especially those services and goods that are not quantifiable, measurable, and have no price tags, such as police protection, defense, social services, professor–student and doctor–patient relationships, and the like. As an ideological extension of idolistic corporate capitalism, consumerism is advanced to a level of false identity with individual fantasies for perceived ultimate power and control. In such an artificial environment, idolistic corporatism thrives and feeds on mass citizenry with short-term, partial, and *only now* means of subsistence turning them into consuming animals (like pigs—the more they are fed, they more meet they produce for sale and profit). This would allow the inventories of idolistic corporatism to produce more for further consumption and further surplus accumulation of capital. Consequently, the rich get richer and the poor get poorer.

Once unable to consume, unable to work as wage slave, the modern ordinary citizen is reduced to a disposable object that can be auctioned in the real world of commodity consumerism, where others can offer pennies in exchange for bodies and souls through prostitution, drug dealings, and wage slavery. The utility of mass human beings stops when they are no longer useful to surplus accumulation of capital under idolistic corporatism. The public service and administration crisis deepens as consumerism is expanded ideologically and practically worldwide.

3.4.1.14 Confidence Gap

The erosion and loss of public confidence in governments, democratic as well as authoritarian, and in their governing elites have also contributed to the erosion of the public service image, the institutional and legitimacy crisis worldwide. Although this confidence gap has been experienced in private sector leadership (Lipset 1987), it is the public service that has suffered the most (Farazmand 1989).

Much of this confidence gap is rooted in the legitimacy crisis in corporate and government leadership in the capitalist world, but it has been masked by events and changes in other global socioeconomic and political systems; thus, the spillover of the masked crises to public service and administration has been both expansive and profound. Hard at work, the globalizing idolistic corporatism has obstructed continuing historical progress through various systems and has at least temporarily claimed a global hegemony. This confidence gap cannot be filled by injection of more idolistic symbolism, as people around the world demand substantive improvement in their lives, communities, and the quality of the environment that must sustain them. The result is a continuing crisis of public service, and there is no break in sight.

3.4.1.15 Careerism

This has also caused public service crisis in that many self-serving and self-conserving bureaucrats are engaged in activities or inactivities aimed at preserving and promoting personal careers at any cost. This has at times been at the expense of public service and public interests and has therefore contributed to the loss of public trust in civil servants who may be viewed as guardians of public interests. Many senior civil servants refused to speak up against or resist political pressures and intimidation tactics of the Regan presidency simply to protect their *careers*. By refusing to act professionally against immoral, illegal, or unethical political decisions of their bosses, these

career civil servants violated their basic professional principles and compromised their professional integrity and the trusteeship of general public interests.

Similarly, many Danish bureaucrats who cooperated with the Nazi forces during the occupation may be viewed as violating their ethical and moral principles as professional administrators. In the eyes of many citizens, civil servants are viewed as careerists who care only for their personal interests. Certainly, public choice theorists, as well as corporate elites, including of the media, have strongly perpetuated this idea. Careerism is a major delegitimizing problem in public service. Similarly, carelessness on the part of some public servants has contributed to the crisis of public service.

3.4.1.16 *Coercion and Control*

By nature, most public organizations are coercive in their relationship with the public. The argument that the public/citizens have become captives of the administrative state has received considerable attention of experts on modern public administration (Rosenbloom 1995). As a result, citizens have been learning to become a bureaucratic-self, in order to deal effectively with governmental bureaucrats (Rosenbloom 1995). The coercive behavior of public organizations emanates from the monopolistic and authoritative nature of government. Citizens have little choice but to pay the required taxes and dues.

The bureaucratic nature of most public organizations makes them highly control oriented. Organizational control performs essential functions of system maintenance and system enhancement in modern governance and administration. However, overcontrol-oriented organizations tend to become dysfunctional and long-run delegitimizers. Examples are the shah's regime in Iran and Marcos's regime in the Philippines. Simply stated, public bureaucracies become instruments of regime enhancement at the expense of public interests and citizen welfare (Farazmand 1989, 1997).

3.4.1.17 *Clientelism*

A major feature of *IT* operation, Clientelism also has fed to the problem of corruption, conflict of interest, and preferential treatment, leading to organizational injustice and abuse of public trust. Clientelism seems to have dominated the political process and the power elite configurations in the United States and most other capitalist nations. Clientelism serves particularistic, private, and strong interest groups at the expense of the broad general public interests. It is discriminatory and unfair, and erodes public trust in government and its administrators.

3.4.1.18 *Character and Conduct*

Problems of morality also have been major contributing factors in the public service image crisis. Official conduct and the personal character of public officials—both political and career—are significant symbols of public trust: good character and conduct present a positive image in public service, while bad character and unethical conduct portray negative images of public service and administration; they have negative impacts on governance and administration, with implications for system legitimacy. It is absolutely inconceivable for citizens to expect high public officials to be engaged in immoral and unethical behavior, such as sexual scandals in public office, as President Bill Clinton was, or others may have been.

These are prime examples of violations of public trust, public confidence, and conduct, as well as character. But unethical sexual behaviors are not the only examples of poor character or

conduct. Diverting public resources to and engaging in the organization and support of criminal organizations, and training criminals to destroy villages, kill innocent people, and destabilize the economies and political systems of other nations personally deemed unfriendly are other types of violations of ethical conduct at the international level. No system can claim to be democratic while at the same time thwarting legitimate democratic governments and violating the democratic human rights of citizens outside of its boundaries, no matter what the rationale.

Western capitalist democracies have engaged in numerous bloody interventions in developing countries against legitimate and democratically elected public figures whose policies and preferences had favored indigenous national public interests, rather than foreign multinational corporate interests. Under various pretexts, the United States and many western European powers have supported some of the most repressive and fascist regimes in the world. By implication, therefore, the concepts of good character and ethical conduct can and should also apply to national governmental behavior, as well as to the individual public official's personal behavior.

3.4.1.19 *Civil Service Crisis*

The civil service crisis has also occurred as a result of many forces attacking public bureaucracy and the administrative or welfare state. The largesse of the administrative state in the twentieth century aroused significant opposition from left to right, who criticized it on different grounds. Politicians, academics, media reporters, the press, and the general public have all contributed to the decline and crisis of civil service in many countries around the world, including the United States. Their main argument has focused on the fact that career civil servants are nonelected officials who enjoy job security and are not accountable for their actions, and that they are involved in policy making, as well as implementation, which is undemocratic.

Such an argument has come from a variety of academic and political circles from the mainstream to the right circles (see, e.g., Mosher 1968; Wilson 1986; and the public choice theorists such as Buchanan and Tulluck 1963; Downs 1962; Niskanen 1971; and Ostrom 1973; for details of this theoretical literature, see Farazmand 1997, 1989). The crisis in civil service has automatically contributed to the crisis in public service around the world. The more recent challenge to civil service systems has come from the conservative corporate ideological basis of idolical capitalism and market-based values. These values include efficiency at any cost to public interest, temporary and contractual employment, disregard for civil service protection, wage-earning jobs, abolition of job security, abolition of employee unions, and disregard for political responsiveness and political responsibility in serving public interests.

The whole notion of the civil service system has come under question or abolition. The U.S. 1978 Civil Service Reform Act was a prime example of turning right toward a conservative, business-like, public personnel system in which the civil service system is pushed to the back burner in favor of maximizing market values of efficiency and privatization of public services for profit accumulation of capital, which again enhances idolical corporate capitalism. This ideological trend is now being pushed worldwide, as globalization and global privatization are being implemented.

3.4.1.20 *Privatization*

Privatization has been a global strategy of the globalization process, transforming the entire world of nations, their governments, and their cultures into a corporate capitalism of grand scale. Armed with antigovernment, antibureaucracy, anti-public service forces that favored business-like organizations, market corporatism, and private sector values, privatization of public services and of

public enterprises began to take global proportions in the early 1980s. Two conservative right-wing political representatives of the big globalizing corporate elites, American President Ronald Reagan and British Prime Minister Margaret Thatcher started the crusade of transforming the public sector into the expanded realm of the corporate sector, claiming a global domain with no restriction.

A number of supranational organizations, such as the IMF, the WB, and the WTO, have been used by the US government as powerful instruments to force developing countries and European nations into this global strategy of capitalist transformation. This global trend of privatization has had devastating consequences for public service and administration worldwide, shrinking the public sector, undermining the institutional capacity of governments to perform their key functions, causing a severe crisis in legitimacy and performance, and denting the image of public service and administration (see Farazmand 1999b for details on privatization). If privatization has been bad for public service, then globalization, as has already been the case, will continue to cut deeply into many aspects of governance, administration, and what has traditionally been considered public service and administration.

3.4.1.21 *Globalization*

Globalization has become a worldwide phenomenon with transcending forces of integration aimed at global restructuring around ideological corporate capitalism with accompanying global governance and cultural convergence. Different perspectives and meanings of globalization explain the concept, but the most important and common of all is the concept of globalization of capital accumulation by globalizing firms and transnational corporations that do not recognize territorial boundaries and market products through multiple sources of technological means.

Through global factories, global production, global marketing, and global financing, transnational corporations are now able, with the aid of technological innovations, to make transactions anywhere in the world instantaneously. They are backed and promoted by the globalizing powerful state of the United States and other powerful allies with their military and security might, intimidating developing nations and crushing any government or group in their way for surplus accumulation of capital at rapid rates. Although nothing is new about globalization, for it has been around for many decades, it is the rapid rate of profit maximization by transnational corporations that has made globalization a political and economic phenomenon that never existed before.

A key requirement of globalization is facilitation or way-paving through the global strategies of privatization, deregulation, degovernmentalization, and shrinkage of the public sector to the bone, limiting the government role to policing and social control, corporatization, marketization, cheap labor forces, cheap natural resources, and structural reforms in favor of corporate business operations without constraints. The forces of global finance, backed and promoted by the United States and other big and powerful capitalist governments, enter anywhere on the globe they deem profitable and leave whenever they decide, leaving behind destruction in labor structure, environment, economy, and community. Consequently, globalization has caused one of the most severe sources of global crisis in public service and administration. This is a trend that will likely continue for many years to come. Degradation of the human condition, destruction of the ecological system, deterioration of living conditions of the working people, and reduction of human beings into disposable market commodities have forced millions of global citizens into a *race to the bottom* (see Farazmand 1999a, Korten 1995, and Brecher and Costello 1994 for details on globalization).

3.4.1.22 Other Trends Deepening the Public Service Crisis

The current global trends that have further deepened the public service crisis may be identified by the following D's and R's: The D's include deregulation, decentralization and devolution, debureaucratization, degovernmentalization, and democratization. The R's of public service and governments have included reinvention, reinstitutionalization, realignment, and reconfiguration of public–private sector boundaries, reengineering, reparticipation of the public in decision making, reorganization of the bureaucracy, redefinition of the term *public* in society and administration, reform of governmental and administrative systems, including the civil service system—making it more businesslike, reinstitutionalization, redevelopment, readjustment, and more. These have been the phenomena of government reform since the late 1970s, but especially since the 1980s. Central to all these problems and causes of the current public service crisis has been the problem of corruption, calling for an ethical movement in public service and administration around the globe.

3.4.2 Consequences of the Crisis

The current global crisis in public service and administration has many consequences, some of which have already been discussed throughout this chapter. Briefly stated, public sector infrastructures are in the process of destruction, a trend that will continue as long as the major causes of the crisis are not abated. These public infrastructures have evolved over thousands of years and have been made possible by the efforts and investments of various societies, allowing the sustenance and growth of human civilizations. Without such public infrastructures, stability and prosperity could not have been achieved. They have, up to recent times, sustained and promoted the viability of private businesses, as well as public sector institutions.

But these public infrastructures are now under severe threat of destruction for profit accumulation purposes. Moreover, human values are in danger, as almost everything is now up for grabs in the marketplace. Health, education, and economic and social opportunities are diminishing and may be lost to the vast majority of the younger generation, who comprise the brains and labor forces of future civilizations. For obvious reasons, it is the citizens of the less developed nations who will suffer the most.

The gap between the north and the south will widen, as will the gap between the rich and the poor worldwide, making it difficult, if not impossible, for the average, hard-working citizen to sustain a decent life. Consequently, more institutions of family and community will break down in the wake of market chaos, causing further crises in societies. Future generations will suffer, but the powerful business elites and their children will benefit from the opportunities in politics, education, administration, governance, and control of resources. They are the few who rule the many (Parenti 1995). Humanity is heading for a return to medieval feudalism (Korbin 1986), a socio-economic system characterized by a few ruling feudal barons, a mass of serfs unable to change their destiny, and a village surrounded by other feudal villages, and so on. Today, the global village is ruled by a few corporate elites, and the global governing elites/barons are ruling the world; there is little or no opportunity to escape. Until 1990, the two world systems—capitalism led by the United States and socialist systems led by the USSR—checked each other's excesses, and their rivalry served global citizens with a degree of calculated, and fragile, security, and a minimal extent of public service in the capitalist world. With the fall of the USSR, there is no power that can match the abuses of globalizing corporate barons and the exploitative, anti–public service stand of the colonizing hegemonic power of Western capitalism under US corporate leadership. Despite some positive consequences of this new global world order and corporate hegemony, critics argue

that the road to serfdom is widening and shortening, and will continue to do so, unless something is done at the local, national, or global level (Farazmand 1999a; Korten 1995). Unless a global movement of human networks for resistance and reversal of the process arise, which I believe is already in progress, the road to serfdom for billions of ordinary citizens will be inevitable.

3.5 Conclusion

There is a global crisis in public service and administration. To some, especially to the neoconservatives and establishment-oriented theorists and practitioners, there is no such thing as a crisis. To them, the new conservative view of public service and administration is summarized in the *new public management* and ideological rhetoric of business managerialism applied to public sector, shrinking it to the bone, stripping it from institutional and financial capacity, and setting it up for failure. This is a global strategy of corporatization, privatization, marketization, and commercialization that is pursued by powerful corporate elites who have captured all realms of life, society, economy, and public service. It is a global strategy to capture all public realms and to turn human citizens into consumers of corporate products, for more profits and more surplus accumulation of capital. In doing so, it has reduced citizens of the world into *consumer pigs*, feeding them with as much as possible to make them fatter for profitable returns.

The global crisis in public service is felt institutionally, financially, politically, organizationally, and psychologically. It has been accompanied and accentuated by other crises facing societies, both in the West and in the East. Crises in education, family, health, community structure, and other areas are only manifestations of the global crisis caused and perpetuated by small corporate elites, whose global design of corporate hegemony is set to conquer the entire world and its population, turning them into disposable objects for profit accumulation.

The global crisis of public service and administration can be cured if there is a global brake on the greedy and destructive forces of corporate capitalism. This globalizing destructive force of late capitalism has swept away whatever was achieved over decades, and even centuries, for the general welfare of societies, their average people, and their social systems designed so that a general harmony could be achieved by the majority of citizens. The welfare administrative state was in part responsible for providing a safety net for the poor and underprivileged, so that the upper-class elites could enjoy the benefits of tranquility, peace, and prosperity. With the fall of the USSR as the leader of the socialist world, which had at least served as a deterring factor against the excesses of globalizing corporate elites, there are no checks for the new giant power structure of globalizing transworld corporate elites who have staked a claim on all corners of the world for their profit-seeking objectives.

Public service has been sacrificed for private elite interests, and public means are being used for private corporate ends. In this process, governments are forced by both home-supporting governments of the globalizing states—such as the US government—and the local subsidiaries (read the business and military elites) to facilitate this globalizing exploitation of public means for private ends, using governmental forces—police, military might, and media propaganda—to promote this global crusade against average, hardworking citizens worldwide. The consequences will affect the entire globe, including the powerful and shameless elites, and everywhere through epidemics, crises in education and health care, family destruction, increased violence, crimes, and imprisonment of society and people, including especially in the United States and western Europe.

The current trend of global crisis in public service and administration can be reversed by exerting pressure from the grass roots. Governments also need to revisit their policy options and must

create an enabling environment for self-organizing organizations and institutions, and for citizens, to challenge both corporate and government institutions and to exercise their democratic rights of self-determination. There are many ways to start, and this chapter has mentioned a few.

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Chapter 4

Crisis in the US Administrative State

Ali Farazmand

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4.1 Prologue

These days, hardly anyone discusses the administrative state, much less the crisis that it has gone through. This chapter is a reprint of an article published in *Administration & Society* in 1989. The decades of the 1980s, 1990s, and 2000s were a period of globally designed structural changes that affected public sectors around the world. Under two ultra-right-wing conservative political leaders, Ronald Reagan in the United States and Margaret Thatcher in Britain, a worldwide antipublic sector crusade was launched under the banner of antibureaucracy and antigovernment. It shrank the realm of public spheres, public sector, and public administration, not only in the United States and Britain, but also around the world. Under the directions and pressures of these two countries, the World Bank and International Monetary Fund instructed almost all developing and underdeveloped nations to adopt “structural adjustments,” “deregulations,” “privatization,” and commercialization of their public sectors, public enterprises, and public administration. Therefore, the administrative state came under relentless attacks, causing severe diminution and crises in its institutional and legitimacy foundations.

Interestingly, it was the same world organizations and same global governments that pressured developing countries to nationalize industries and have the state take a leading role in running their economies and carrying out national development projects. Key to this earlier development was the massive growth and expansion of the bureaucracy, administration, and welfare state. Public enterprise also grew dramatically, and public corporations expanded. This was still in the so-called Cold War era, in which the two world system powers, America and the USSR, competed against and checked each other in the international arena. The late 1970s brought economic decline in world capitalism, and, along with other crises in political and social systems, institutional crises paralyzed corporate America, as well. With the acceleration of the globalization of capital at the turn of the 1980s, when the two ultraconservative leaders of western capitalism began their global crusade against the state capitalism and public sector, the crisis of the administrative state intensified.

As will be seen later in this chapter, the administrative state had already come under attack from a variety of sources, including some academics and corporate elites. The latter wanted to structurally alter the power structure and the organization of society and economy with a monopolistic way in favor of corporate power structure. Therefore, privatization was launched as a global strategy of globalization, and its aim has been to shrink the public sector, set it for failure so that more public sector functions could be taken by corporate elites, and expand the chaotic corporate market sector, full of instability and disorder. Bureaucracy was an antithesis of disorder for decades, and that is how the corporate capitalism grew and prospered in the twentieth century.

The administrative state became a major target of the corporate power structure led by the elites whose interests dictated such massive structural adjustments in and outside of the United States. With the fall of the USSR, there was no reason left for the continuity of the welfare administrative state; it was time to totally dismantle it. This indeed happened, but there was a point that most scholars and researchers have either ignored or are unaware of: the public bureaucracy and the administrative state were reshaped dramatically by the conservative crusaders; their mission and purposes of serving broad public service/public interests or common good were replaced by particularistic interests of the big business corporate elites, whose dominance and control of most powerful organizations and economy of the nation and of the world have frightened many observers. The service-oriented side of the administrative state was slashed by massive programmatic and budget cuts, while the functions of the military, policing, social control, criminal justice, and the court systems were expanded. Today, there are more police forces, more budget allocations for the

policing functions, and a lot more than designed to control the citizen public and to provide the stability and order that are essential to the smooth function of the market sector.

Therefore, the bureaucracy and administrative state did not vanish; they were reformulated and reemerged as an entrepreneurial leadership structure. With the fall of the USSR, the name administrative state has become virtually extinct, and its place has been supplanted by the coercive corporate welfare state. But what was the nature of the crisis in the administrative state? The rest of this chapter addresses this question.

This chapter argues that the US administrative state is in a legitimacy and institutional crisis, that this crisis can be understood in relation to the concurrent crises facing the socioeconomic and political systems in America, that the current crisis is a result of the inherently contradictory role of the administrative state in American society, and that the politics-administration interface and the new political administration theory of the 1980s have had major consequences in the administrative state and the society. Finally, the chapter briefly suggests an alternative solution to the problems of the administrative state in America.*

The administrative state in this study refers to the complex of institutions (departments, agencies, and organizations) of the executive branch of the federal government, with the exclusion of the Department of Defense. Strong evidence shows that the administrative state is facing another crisis of legitimacy. For example, Rosenbloom (1983: 225) argues that “accumulation of legislative, executive, and judicial functions in administrative agencies runs counter to the deeply ingrained desire within the political culture for a system of checks and balances.” Caiden (1983: 1) contends that public administration is defenseless against the accusations of being “parasitic, unproductive, inefficient, wasteful, incompetent, corrupt, and above all unnecessary.” Rosen (1986), Goodsell (1985), Rohr (1986), Rosen (1985), and Schroeder (in ASPA 1987a) discuss aspects of the current crisis and defend a strong role of the administrative state in society because they recognize the threat.

The first step toward understanding the crisis is to explain the rise of the administrative state and its legitimacy problem in a historical context.

4.2 System Legitimacy and the Rise of the Administrative State

A central characteristic of the American political system is its consistent inconsistency: policies and programs of one period dominated by one political party are often either removed or drastically changed in another period dominated by another party. This inconsistency in the system and its policy process has affected the role of the state in general and the administrative state in particular in American society since the creation of the Republic. Therefore, the role of the administrative state has for 200 years been unclear, a problem that “again confronts the nation as it moves into a new international economic and technological order” (Carroll 1987: 106). The consistent inconsistency of the system has contributed to the second central characteristic: the “reactive” nature of the policy process and policy politics (Greenberg 1986).

* This chapter is an updated and expanded version of the original paper by Farazmand (1986). Information has been collected from several sources. Interviews were conducted with 35 federal officials (former and present) at the MSPB, Office of Special Counsel, senior staff members of the Congress, scholars in the field, and federal employees' union officials. Also, government documents on the subject were carefully examined at the OPM Library and the Library of Congress, scholarly works in the field were reviewed, and other official and unofficial reports and secondary information were examined. Because of space limitations, a detailed analysis of the historical context of the administrative state has been neglected. This has been done elsewhere. See Farazmand, *Crisis in the U.S. Administrative State: A Political Economy Analysis* (forthcoming).

Public administration has existed in the United States since the colonial period because no government can govern without administrative organizations. But the real rise of the administrative state is generally dated from the 1880s and particularly to the 1930s (Nelson 1982; Rohr 1986; Skowronek 1982; Stillman 1987). What has caused this phenomenon? Briefly stated, the socioeconomic conditions of American society in the post-Civil War period were characterized by increasing inequality and a lack of real freedom, compounded by the problems of corruption, the spoils system, recurring business cycles, and the growing power of the national government through force and administrative governance (Rohr 1986; Stillman 1987). However, three major forces seem to have contributed significantly to the rise of the administrative state since the late nineteenth century: the farmers' movement, the labor movement, and the Civil Service and Reform Movement. As Stillman (1987: 5) notes, "The administrative state began much less auspiciously... with the aggressive agitation by aggrieved midwest farmers over what they viewed as imposition of unfair, gouging rates by monopolistic railroads. It was a nasty fight, almost a classic Marxian economic contest between classes." Also the Grange movement and other lower-class demands made possible the passage of the Interstate Commerce Commission in 1887 to remedy these intense socioeconomic problems.

Similarly, the labor movement had a major contribution to the rise of the administrative state. The rise of the industrial union, the Knights of Labor, in the late nineteenth century, and its continuous demand for major socioeconomic changes in the society, is a good example. The economic panic of 1873 worsened the "insecurities" of the now almost 10 million nonagricultural workers, who also were threatened by technological advancement in the system of mass production. Therefore, the activism of the labor movement, especially under the leadership of the Knights of Labor, challenged the status quo since "it proposed workers cooperatives to replace capitalism and wanted to do away with the wage system" (Rosenbloom and Shafritz 1985: 76). While the Knights of Labor organization was dissolved in Chicago's Haymarket Square, some of its "goals eventually came to fruition; among them were the 8 hour day, the abolition of child labor, the creation of a national bureau of labor statistics, and weekly payday" (Rosenbloom and Shafritz 1985: 76).

But the Civil Service and Reform Movement seems to have made the greatest contribution to the rise of the administrative state. Space limitations here preclude adequate analysis of the spoils system and the consequent reform movement that resulted in the 1883 Civil Service Reform (Pendleton Act). It is sufficient to say that this movement had a tremendous impact on public administration.

Thus the reactive system and its government responded to the societal forces' potential of challenging the system. This response was delivered through the growing intermediating administrative state. As Stillman (1987: 6) notes, it "provided a much needed *constitutional corrective* [emphasis added], offering enhanced individual freedom through the positive enlargement of the public sphere to check and balance unrestrained private power on individuals, groups, and society as a whole. It effectively supplemented, not supplanted, the Constitution..." which, as an economic document, addressed "the interests of those who wrote it" (Beard 1986: vi).

A central contradiction of the capitalist economy is that "wages, a cost of production, must be kept down; wages, a source of consumer spending, must be kept up" (*Dollars and Sense* [1976], quoted in Parenti 1983). This contradiction is a "source of great instability, leading to chronic overproduction and underconsumption" (Parenti 1983: 17). Without the intervention of the federal government in the management of the business cycle, many convincingly argue, the country "would continuously face collapse," undermining system legitimacy. From the end of the Civil War to the Great Depression of 1929, "the American economy suffered sixteen major recessions or depressions" (Greenberg 1986: 296).

The Great Depression of the 1930s was so severe that “none of the supposed ‘self-correcting’ feature of the free market was sufficient to bring the nation out of the doldrums” (Greenberg 1986: 296). The economic crisis of the 1930s was a potential threat to the legitimacy of the economic system and the political authority, and the enlargement of the administrative state was an inevitable and necessary consequence. The labor movement again questioned the legitimacy of the laissez-faire economic system, and its sociopolitical activism caused major threats to the political authority. The New Deal policies of the 1930s were aimed not only at rescuing the collapsing business sector, but also at preventing a massive social upheaval and buying legitimacy. For example, Rosenbloom and Shafritz (1985: 24) note that “the crash of 1929 and its aftermath seemed to many to require a radical reorganization of the society. It appeared as though the capitalist system had failed.” Parenti (1983: 85) reports that “actually the New Deal’s central dedication was to business recovery rather than social reform.... Faced with massive unrest, the federal government created a relief program that eased some of the hunger and starvation and—more importantly from the perspective of business—limited the instances of violent protest and radicalization.”

Similarly, Piven and Cloward (1971: 46, 1985) argue that the policies of the New Deal were a response to the political unrest of millions of Americans in misery. Once the threat subsided as a result of government aid, they argue, “large numbers of people were put off the rolls and burst into a labor market still glutted with unemployed. But with stability restored, the continued suffering of these millions had little political force.” For example, while the Wagner Law was a positive response to labor pressure in the 1930s, the Taft–Hartley Act limited the rights of labor in the 1940s (Rosenbloom and Shafritz 1985). Greenberg (1986: 315) argues that the Social Security Act was “Franklin Roosevelt’s response to the threats represented by widespread factory takeovers, the ‘share the wealth’ plan of Huey Long, and the popular Townsend movement.” Witte (1962: v) reports the very large movement led by Frances Townsend of California, who advocated a broad-based social reform and welfare plan. His petition was signed by 25 million people. Others also argue that the relief measures of the 1930s and 1960s were instruments of social control of the poor and disenfranchised people whose potential threat to the system legitimacy was recognized.

The growth of the administrative state, then, became a reality in response to problems of legitimacy and system crisis. The Keynesian revolutionary macroeconomic policies advanced ideas for solving the problems of unemployment, economic growth, and distribution of income in society, and the government, through its now large administrative state, became the coordinator of the system.

The administrative state further grew when the military and international role of the United States grew at an unprecedented rate, putting the country on a “*permanent war footing* since 1941. Well over one-half of all budget expenditures since that date have been devoted to military activities” (Greenberg 1986: 297 [emphasis in the original]). The Vietnam War and the domestic social upheavals made the enlargement of the administrative state possible even further. The massive federal grants-in-aid flew from the federal government, and Lyndon Johnson’s War on Poverty and Great Society programs required major administrative actions to provide relief services and meet the challenges of civil rights and other movements of the urban poor.

The growth of the administrative state began to be seriously questioned in the 1970s. The end of the Vietnam War in the 1970s that produced many losses, the Watergate scandal and the political crisis of the presidency, the energy crisis of 1973 through 1974, the two victorious revolutions in Nicaragua and Iran, the hostage crisis, the budget and trade deficit crisis, double-digit inflation, double-digit unemployment, and other problems associated with the general performance of the government as the solver of all problems and as the driving force of society had a tremendous

negative impact on the public perception and attitude toward government, causing a major “confidence gap” and “crisis” in the system. This crisis was aggravated by the economic recessions and many international political and economic challenges (Downs and Larkey 1986; Fainstein and Fainstein 1984; Feinberg 1983; LaFaber 1984; Lipset 1987; Parenti 1983; Scott 1984). Thus the crisis and confidence gap about government performance widened. But the main target of criticism and attack became the administrative state and the government.

4.3 Reaction to and the Crisis in the Administrative State

The rise and expansion of the administrative state has aroused significant reaction from many directions, which, along with other factors, have contributed to the diminution of its infant legitimacy. The following is a brief account of these reactions and sources of the crisis.

4.3.1 Reactions

4.3.1.1 Judicial Reaction

The federal judicial response to the rise of the administrative state has been characterized by an initial hostility and eventual “partnership” in which the courts have become more intrusive. The Roosevelt Court was the first to face the major administrative expansion created by the New Deal. Citing several cases like *Wyman v. James*, *Spady v. Mount Vernon*, *US v. Richardson*, *Branti v. Finkel*, and *Schechter Poultry v. US*, Rosenbloom (1986: 130, 1987) clearly shows the initial hostility of the judiciary toward the administrative state. Rosenbloom (1983: 225) notes that this strain on the separation of powers has contributed to a “crisis of legitimacy in public administration.”

4.3.1.2 Politicians’ Reactions

Being primarily interested in getting elected and reelected and enjoying the privileges of political power, the politicians—both conservative Republicans and liberal Democrats—have attacked the administrative state and its bureaucracy in general without making a distinction between the military-security bureaucracy and the general public service bureaucracy. This lack of distinction has often confused the problems of the large size and “pathological” behaviors of the bureaucracy. The politicians (members of Congress, presidents, and their political appointees) have much to gain politically from attacking the administrative state and its bureaucracy by blaming it for their policy failures (Greenberg 1986; Jones 1983).

The conservatives’ attack on bureaucracy has usually been based on the classical economic theory of limited government and market supremacy. They argue that a big government is a strain on the free market system, that the government limits the freedom of choice, that the bureaucracy is a major source of economic problems, and that it endangers democracy. The general expression is “getting the government off our back” (Boas and Crane 1985; Butler et al. 1984; Salaman and Lund 1981; Stockman 1987). The conservative attacks, however, have been consistently paradoxical. Rather than questioning the “outcome” of the administrative state activities “(who benefits?), conservatives examine the inputs (who directs the process? how much does government regulation cost?) and outputs (what is the total benefit?)” (Fainstein and Fainstein 1984: 311); and their solution to the problem of bureaucracy is privatization and deregulation. The Reagan presidency seems to be the best representative of this ideological argument. As a group of contemporary observers of

American government state, in a document known as the “Blacksburg Manifesto,” in the 1980s: “we have also allowed public administration to be diminished by the headlong rush to adopt a policy or program perspective excessively focused on output without a balanced concern for the public interest. Output and the public interest are often erroneously assumed to be synonymous” (Wamsley et al. 1987: 302). Public agencies can generate high outputs in the short run, but they may do so at the expense of their own “infrastructure and capabilities” (Wamsley et al. 1987: 302), as well as long-term public interests. Public agencies should not be compared with private corporations that achieve output often at the expense of social equity, environment, and labor well-being without being accountable to anyone for their harmful actions.

While the conservative politicians’ attacks on the “welfare state” have had tremendous negative impacts on the administrative state (as will be shown later), they have, ironically, both contributed to and significantly benefited from bureaucratic growth. In times of socioeconomic and political crises, they joined the liberal politicians to expand the welfare state because the state was vital to the continuous accumulation of capital and maintaining social control and political stability. As one of the top conservative politicians, former OMB director David Stockman, put it: “The conservative opposition helped build the American welfare state brick by brick during the three decades prior to 1980.” Regarding the expansion of Medicare and Social Security, Stockman adds, “Over two decades an average of 80 percent of House Republicans and 90 percent of Senate Republicans voted for these expansions” (Stockman 1987: 442, 447). According to an observer of American politics, the “mainstream” Americans have always had a “consensus” on matters of politics and policy: “Republican opposition to the New Deal was simply a matter of time-lag, ... By the time the Republicans regained office—in order to regain office—it was necessary for them to catch up with the consensus. Eisenhower came to administer the welfare state, not dismantle it” (Wills 1971: 509). It was the “mainstream” consensus that made the conservative Richard Nixon an ultimate liberal, who had to continue the American tradition of “liberalism” (Wills 1971: Chapter 6).

Thus the last three decades of state intervention in the economy both domestically and internationally benefited the conservative as well as liberal politicians and their “big” interest groups. The stock market crash of 1987, as well as the 2008 global financial crisis, and the urgent call for government intervention into the marketplace, are another good examples.

The liberal reaction to the administrative state has been mainly based on a concern for representative democracy. Liberals, unlike conservatives, recognize the need for the administrative state, or welfare state, for political and socioeconomic reasons. Their acceptance of the interventionist state in society and economy reflects their concern for the possible undesired consequences of the crisis-ridden, unchecked, inequality-generating system of the marketplace. They object, however, to the exercise of power by the bureaucracy because of its unelected position. The liberal politicians reserve the right of government policymaking for the elected members of the system. They too have contributed to both the rise and the diminution of the administrative state, as the bureaucracy has always served them as an easy target for attacks during election campaigns. Almost every presidential candidate has promised voters that he or she would “fix” the problem of uncontrolled bureaucracy, again making no distinction between the military–security bureaucracy and the general public bureaucracy (Goodsell 1985; Greenberg 1986; Rosen 1985; Rourke 1986b).

4.3.1.3 *Media Reaction*

The media and press have also contributed significantly to the crisis of the administrative state. State agencies have often become the targets of attack for government inefficiency, waste, corruption,

red tape, and other stereotypes. Owned and controlled by major corporate and influential business concerns, television and the press usually induce a negative public image of the administrative state and its performance. On the other hand, little criticism is offered of corporate waste, fraud, crime, inefficiency, and market failures. They distinguish between the public and private bureaucracies, and promote a negative public perception of the welfare state (Downs and Larkey 1986; Goodsell 1985; Parenti 1983).

4.3.1.4 *Public Reaction*

The public response has been based on the general image of the administrative state shaped primarily by politicians, business leaders, and the media, and secondarily by contacts with the bureaucracy at different levels. The political values of liberal democracy, limited government, liberty, and free enterprise have, as parts of American political culture, influenced the views of the public that the government is bad, and this is reinforced through the political socialization process (Greenberg 1986; Hartz 1986; Rosenbloom 1986). As a result, the public has a distasteful, hostile reaction to the administrative state and the bureaucracy (without making any distinction between the two public bureaucracies). They do not seem to realize that the very survival and expansion of the private corporate sector requires a strong national administrative state (Macpherson 1987).

4.3.1.5 *Business Reaction*

While business, especially the corporate sector, has often reacted negatively to the rise and expansion of the administrative state, its self-interest has sometimes pointed in the other direction. For example, business supported the policies of the New Deal to rescue it from the collapse of the 1930s, “but as the New Deal moved toward measures that threatened to compete with private enterprises and undermine low wage structures, businessmen withdrew their support and became openly hostile” (Parenti 1983: 85). Despite the continued protection of the state in domestic areas (subsidies, contracts, protective regulations, tax credits, stability, and order) and the international sphere (military interventions in countries threatening the interests of the transnational corporations, concessionary gains secured through government negotiations, and so on), business has remained hostile toward those parts of the administrative state that form the welfare state. This same state rescued major corporations such as Chrysler, Exxon, Union Oil, and others by “giving several billion dollars” to them since the 1970s (Stockman 1987: 415). Another example of state protection is Ronald Reagan signing a “bill paying dairy farmers \$1,300 per head *not to milk their cows*” (Stockman 1987: 418 [emphasis in the original]).

4.3.1.6 *Academic Reaction*

Fascinated by the notion of representative democracy through election, the academicians have also made their contribution to the legitimacy crisis of the administrative state, some intentionally and others unintentionally. The main argument of the academic critics has been that the center of power in the twentieth century has shifted from the elected legislative branch to the administrative state. This, they argue, has endangered democracy, representation, and accountability. They claim that the separation of power has “collapsed” and that the characteristics of the bureaucracy (as defined by Max Weber) run counter to democratic values (Nackmias and Rosenbloom 1980; Rosenbloom 1983; Wilson 1986). Therefore, the “fourth branch” (Meier 1987) of government has become a giant force of political as well as organizational power that makes policy, implements it,

and adjudicates differences. As a result, a “bureaucratization” (Nackmias and Rosenbloom 1980) of the three branches of government along with the other parts of society has taken place, and America has become the captive of a “professional state” whose members are neither elected by nor accountable to the public. Perhaps among the best representatives of this position are Frederick Mosher (1968), James Wilson (1986), Francis Rourke (1986), and the conservative scholars in economics and public administration associated with public choice theory, namely, William Niskanen (1971), Vincent Ostrom (1973), and those of the Heritage Foundation think tank (Butler et al. 1984; Salaman and Lund 1981). Others such as Ralph Hummel (1982) and Fred Thayer (1981) have criticized the nature of corporate as well as public bureaucracy from psychological, political, and philosophical points of view. While the former groups have directly contributed to the crisis in the administrative state, the latter group’s consistent criticism has also had an indirect effect on the administrative state. Similar “corrosive influence” upon the administrative state came from humanistic psychology and a variety of cultural dynamism during the 1960s (Wamsley et al. 1987: 303).

4.3.1.7 Leftist Intellectual Reaction

The Marxist reaction rests on the argument that in advanced capitalist America, the administrative state is a strong instrument serving the ruling class, and that the role of bureaucracy and state in society is determined by the economic requirements of capital accumulation. They attack the bureaucracy for its lower-class oppression and parasitic nature (Miliband 1969; O’Connor 1973; Ofee 1985a,b; Poulantzas 1978). From this perspective, the capitalist welfare state “(1) is largely devoted to enhancing the process of capital accumulation rather than directly increasing the welfare of the masses; (2) it provides social benefits only as they are necessary for capitalist legitimation; (3) it is the servant rather than the master of the capitalist class” (Fainstein and Fainstein 1984: 310–311).

4.3.2 Other Sources of the Crisis

One source of the administrative crisis is the very ambiguous meaning of the administrative state itself. For example, “welfare state” has variably been defined as a “particular state in the development of society,” as a “way of life,” as a “set of social and economic policies,” as “the mode and pattern of government, . . . and expansion of bureaucratic system,” and as “not only a product of government action but also a type of society where families fulfill an important role” (Shiratori 1986: 193–197). Various types of welfare states are identified by emphasizing freedom, autonomy, values, affluence, and fraternity. The concept is thus confusing. Is the military-security state part of the administrative welfare state? How is bureaucracy differentiated from the welfare state?

Another source of the crisis is the distinction between the public and private sectors. Convincing arguments have been made for differentiating public from private sectors in terms of organization, accountability, responsibility, constitutionality, legality, and so on (Allison 1987; Perry and Kraemer 1983). Yet the boundary has been blurred, and most of what the public sector does is through the private corporate sector, and much of what the private sector does is subsidized, assisted, and protected by the public sector (Goodsell 1985; Greenberg 1986). This has led some theorists to claim that “all organizations are public” (Bozeman 1987). The public does not know that many of the problems of the administrative state are actually caused by the private sector. The bureaucracy and the administrative state are expected to do impossible things and to perform functions with multiple and unclearly defined goals. It also takes social costs of the market

mechanism. Nevertheless, the public bureaucracy has been charged with inefficiency, corruption, red tape, and lack of accountability and political responsiveness. These charges have come from every direction.

Another source of the crisis is the Constitution itself. It does not even mention either administration or bureaucracy; rather it emphasizes the separation of powers. Thus the lack of constitutional legitimacy has always made the administrative state an easy target for political criticism (Rohr 1986). Consequently, “the history of the modern administrative process can be seen, then, as having been marked by an extended sense of crisis” (Freedman 1978: 9). Further, as Wamsley et al. (1987: 302) state, public administrators themselves have also contributed to the diminution of the administrative state. “For their part, public administrators have been entirely too timid in pressing their rightful claim to legitimacy.” They have also been “hesitant about extending the agency perspective in pursuit of a broader definition of the public interest” and in defending the legitimacy of the administrative state through their administrative behavior that would lead to building “trust among citizens” (Wamsley et al. 1987: 302).

Still another source of administrative crisis is the nature of its role in modern capitalist society. To maintain its relative legitimacy, the modern state has to play two simultaneous but often contradictory roles: the economic role of providing the optimal conditions for capital accumulation (even through coercive intervention at home and abroad) and the sociopolitical role of maintaining order, stability, and social control. A balanced performance of these two roles would be ideal, but it is rarely achieved and seems almost impossible because any such balanced administrative action will require an equal division and exercise of power by the administrative state in society. It also requires autonomy from private business, especially the corporate sector, a constitutional legitimacy, and an ability to take from capital and distribute it to those whose consent is necessary for system maintenance.

None of these requirements can be satisfactorily met, because the modern state is not and never has been neutral. The administrative state is dependent on and is mainly controlled by capital; it does not have a recognized status of constitutional legitimacy; and it is always subject to charges of limiting capital accumulation and liberty. This is because, taking from capital and giving to others for system maintenance decreases capital accumulation and would enlarge the public sector that may seek autonomy and, in an alliance with a massive clientele, attempt to challenge the corporate sector (Connolly 1984; Habermas 1984; Held et al. 1983). This would be destructive to the reign of the corporate sector. The business sector would not tolerate it, as it never has. However, reality shows that the state usually takes over unprofitable but “necessary operations and/or is absorbing the cost of looking after that part of the labor force which technological change has made redundant” (Macpherson 1987: 67).

The “incoherent” nature of the modern administrative welfare state has also been explained by economist Kenneth Arrow (1963), who shows the problem of internal contradictions in defining a democratic “social welfare function.” The welfare state is also called impossible, according to Heidenheimer et al. (1983: 330), because “it fails to satisfy socialist criteria for production organized around social needs rather than profit motives ... [and] the welfare state also fails to satisfy conservative criteria for maximizing individual liberty. It does not leave people, as Milton Freedman put it, ‘free to choose,’ and it neither fully accepts nor rejects market mechanisms.” The result is a legitimacy crisis of the state in general and the administrative state in particular.

The last source of crisis in the administrative state is the problems facing the economic and sociopolitical systems. As discussed earlier, the international politicoeconomic challenges facing the United States and the internal crises emanating from major economic recessions and depressions and political crisis, and so on, of the 1970s and 1980s, have resulted in a “confidence gap” on

the part of the masses and, therefore, a general crisis in the system. Evidence is abundant, Skolnick and Currie (1985) suggest that the “crisis in American Institutions” covers the family, environment, workplace, health, education, welfare, and national security. Scott (1984) shows the “persistence of economic problems in capitalist states.” Greenberg (1986), Parenti (1983), Habermas (1984), Connolly (1984), Thayer (1984), MacPherson (1987), and others also show how significant the legitimacy crisis in America is. Generally, this blame has been shifted to the government and its administrative state.

4.4 Confidence Gap and Politics–Administration Interface in the 1980s

The confidence gap resulted in the “triumph” of politics to restore system legitimacy in the 1980s. The rise of the conservative right to power under the leadership of Republican “crusaders” (Stoessinger 1985) was made possible by two broad phenomena: the diversion of public attention from internal crises to the external threat of the Soviet Union and the spread of communism and a constant attack on the administrative welfare state. Both have been advanced in the names of democracy, liberty, and American supremacy as the leaders of the free world. The principles of limited government, market supremacy, deregulation, supply-side economics, ideology, and global military accompanied by a resumption of cultural and religious fundamentalism were instrumental in rallying millions of uninstructed voters behind Ronald Reagan, who promised to restore American military and economic dominance in the global sphere (Carroll et al. 1985; Levine 1986; Newland 1983, 1987).

The triumph of politics has been of four types: (1) interest group politics, which has emphasized the maximization of the interests of the strongest supporters of the Republican regime both financially and politically at home and abroad; (2) partisan politics, which has emphasized traditional conservative Republican values of politics, economics, and culture; (3) policy politics, which has advanced to enhance both the special, big interest group politics and partisan politics; and (4) bureaucratic politics, which has served as a power instrument to enhance the earlier three types of politics (Cigler and Loomis 1986; Dye and Zeigler 1987; Joe and Rogers 1985). The triumph of conservative politics over administration has further aggravated the legitimacy crisis of the administrative state, which over decades had gained a professional legitimacy for public administration as a self-conscious enterprise.

4.4.1 Reagan’s Political Administration

The Reagan administration’s unprecedented attacks on the federal bureaucracy and administrative state have resulted in a theory and style that Chester Newland (1983) properly calls “political administration.” The major tenets of this political administration, most of which have been made bipartisan, include the following: ideological orientation of Reaganism; limited government; personalized presidency; supply-side management; privatization of public service; internationalized, warfare-security-oriented state; politics–administration dichotomy; overcentralization of policymaking led from the White House; high level of politicization of the bureaucracy and civil service; excessive practice of patronage and spoils system in the civil service; excessive and illegal use of partisan activities in the civil service; emphasis on conservative regime enhancement; “Government of Enemies”; deregulation; corporate protectionism; antilabor and antiunionism; and attempts to reverse many policies and Supreme Court rulings of the past that were aimed at

reducing economic injustice and serving the general public interest (ASPA 1986b; Goodsell 1985; Hecló 1984; Levine 1986; Newland 1983, 1987; Parenti 1983; Perlmutter 1984; Rosen 1986; Rubin 1985).

4.4.2 Tools of Regime Enhancement

The following have been used as major tools for politicizing the federal bureaucracy and civil service, serving the “particular” big economic interests of the corporate sector, and achieving regime enhancement: (1) extensive use of budget and program cuts, impoundments, deferrals, and recisions to “shrink” the size of the federal nonmilitary agencies while enlarging the military-security bureaucracy (Stockman 1987: Epilogue), making it, as Keller reports, “the world’s largest bureaucracy run out of control” (Keller 1985); (2) extensive use, and abuse, of the provisions of the Civil Service Reform Act of 1978, especially the Performance Appraisal and Senior Executive Service (SES) systems, to reward the ideological, political, and personal loyalists, to coopt potential supporters and to get rid of unwanted personnel (Levine 1986; Newland 1983; Rosen 1985); (3) extensive use, and abuse, of reduction-in-force (RIF) to cut the size of the federal work force, which resulted in the subsequent congressional and public employees’ union protests (ASPA 1985, 1986c; Rich 1986a,b; U.S. Government, MSPB-OPM 1984). “The current administration has brought an ideological dimension to the process” of RIFs. Consequently, “the process has been upgraded to a policy level” (Rich 1986b: 3).

Other tools include (4) extensive use, and abuse, of reassignments of non-Republican career personnel to undesirable positions and geographical locations (“described as Siberia”) as a mechanism for inducing resignation and cooptation (Rosen 1985: Chapters 4 through 8). A good example of this policy-level practice is the case of the reassignment for the resignation of Dr. Maxine Savitz, an SES career appointee in the Department of Energy in 1982 (U.S. Congress 1983a,b). A congressional hearing concludes that through “RIFs, reorganizations, and unprecedented attrition, those offices and programs in disfavor with the Department of Energy management have been crippled by inadequate staff, shifting managers, and poor productivity due to the removal of qualified personnel and a severely demoralized work force” (U.S. Congress 1983b: 1).

Other tools of control include (5) extensive ideological socializations and indoctrination for political appointees and their key administrators; (6) attempts to dismantle certain agencies with weak clienteles, while increasing the budget of agencies with powerful clienteles (e.g., Veterans Administration); (7) reorganization; (8) overcentralization of the federal bureaucracy by eliminating the middle-level managerial positions and concentration of policy functions in the White House; and (9) separation of policy from administration (Carroll 1987; Newland 1983; Rosen 1985, 1986).

While the administration has systematically rejected pro-poor protection, it has provided protection to the big business and corporate giants—through deregulation, billions of dollars in subsidies, guaranteed loans, tax credits, relaxation of labor laws, and attempts to reverse past legislation and Supreme Court decisions intended to limit the abusive power of the private sector in personnel actions (ASPA 1985; Stockman 1987: Chapter 12, Epilogue). The Equal Employment Opportunity Commission (EEOC) decision to abandon hiring goals and timetables and the administration’s attempt to nullify some of the provisions of the Civil Rights Act of 1964 are but two examples (ASPA 1986b: 1, 4). According to a member of the US Civil Rights Commission, the agency has lost its credibility “and become a little Beirut in the Potomac ... [and] is no longer an important voice on behalf of national goals and ideals” (quoted in ASPA 1986b: 1, 4). Partisan

politics have been highly promoted, and the Hatch Acts of 1939 and 1940 have been extensively used to punish those public employees and their union officials who participated in voting registration activities and/or endorsed Democratic candidates during the 1984 presidential election.

Whistle-blowing has become the most dangerous action in the federal bureaucracy, leading to quick dismissal without protection. Even congressional members advise whistle-blowers to make their disclosures anonymously, and the Reagan appointee in-charge of protecting whistle-blowers advised them in 1984: “Unless you’re in a position to retire or are independently wealthy, don’t do it. Don’t put your head up, because it will get blown off” (Rosen 1985: 93). This problem has recently caused Congress to pass another law to “ensure that civilian employees of government contractors are afforded job protection, and in some cases monetary rewards, for turning in unscrupulous contractors” (ASPA 1986a: 1, 4). In short, the triumph of conservative particular interest politics under Reagan has had dramatic impact on the administrative state.

4.4.3 Impacts and the Crisis

Some of the major impacts of Reagan’s policies on the administrative state are the following:

4.4.3.1 Loss of Expertise and Institutional Memory

Strong evidence indicates that a large number of well-trained, highly competent professional career personnel, whose commitment to public service has served several presidents, are no longer in the civil service. Many have been separated by reorganization and RIFs (especially at GS 5–13), 49% of whom are minorities and women (U.S. Congress 1984: 2–3). Many others have been reassigned either to undesired locations and positions or demoted (e.g., people with PhDs to clerical jobs). More important, many others have left public service and have taken higher-paying executive positions in large corporations. This is especially true in the case of SES: by March 1983, 40% of these invaluable public servants had left civil service, 22% were planning to leave, and 72% indicated that they would not recommend federal government careers to their children. By mid-1984, 45% of the SES executives “had left the government” (Goodsell 1985: 174–175; Hecló 1984: 12–14; Levine and Hansen 1985). This is a historical phenomenon in the American political system.

While the institutional memory, the “leadership core,” and the expertise of the administrative state (nonmilitary security) have been drastically reduced, the Reagan administration has not been able to fill many key positions of the bureaucracy because ideologically committed Reaganites have been reducing in number. The result has been a crippling of organizational competence (Goodsell 1985; *New York Times* May 3, 1985: A19; Rosen 1985). Thus the administration has achieved two objectives: (1) transferring the institutional competence of the administrative state to the private corporate sector and (2) advancing market efficiency as the slogan against the crippled bureaucracy (Farazmand 1985; Pfiffner 1987).

4.4.3.2 Efficiency

With severe budget cuts, loss of expertise, job insecurity (many civil servants have been replaced by temporary and unqualified persons), and dominance of unqualified and inexperienced political appointees, the crippled bureaucracy has naturally suffered efficiency problems and thus become subject to further public and political criticisms (Fainstein and Fainstein 1984; Farazmand 1985; Rosen 1985).

4.4.3.3 *Morale and Motivation*

Devastating adverse impacts have been inflicted on the morale of career personnel and their motivation for initiative, creativity, and innovation in public management. A highly hostile and suspicious environment created by the political appointees has caused alienation, extremely low morale, and a feeling of degradation among the career people (Denhardt 1987; Downs and Larkey 1986; Farazmand 1985). As one postal employee put it, “Working for the U.S. government today is like being a Jew in Germany when Hitler came to power. You are defenseless, blamed for all the problems of the country, and used politically as best suits the objectives of the Administration rather than the American people” (quoted in Goodsell 1985: 171). But professionally unqualified persons have been promoted in the bureaucracy in violation of civil service laws. The bureaucracy and civil service have become more than ever an instrument of Republican regime enhancement headed by the “government of enemies” (Hecl 1984; Stockman 1987: Epilogue). As Charles Levine (personal interview, August 1985) put it, “the time of neutral competence is over.”

4.4.3.4 *Minorities and Women*

Minorities, younger, nonveteran, and female personnel have been affected most by the changes in the administrative state. According to a congressional document, about one-half (49%) of all the RIFs have hit the minorities, 54.6% of these minority women. Other groups follow the minorities (U.S. Congress 1984: Executive summary and pp. 1–10). Charges of pervasive discrimination and prohibited personnel actions have increasingly been documented in past years (ASPA 1987b; U.S. Congress 1983a,b).

4.4.3.5 *Corruption*

Bureaucratic corruption by political appointees and their partisan administrators in office has been pronounced. The almost daily disclosure of these corruptions has ranged from favoritism to partisan preference, to patronage and “selling” the privilege of seeing the president to business leaders for contributions to the *contras*, to waste and billions of dollars of kickbacks, return of favors to corporate contractors, “conflict of interest,” and bribery (Rep. Barry Anthony on ABC’s *Nightline*, April 29, 1987; Farazmand 1985, 1986; Newland 1987; Parenti 1983: 96–97).

4.4.3.6 *Quality of Service*

Overwhelming evidence suggests that the phenomena outlined earlier have had, and will increasingly have, significant negative impacts on the quality of public service. This is especially true with the privatization or contracting out (“selling out”) of public service (Downs and Larkey 1986; Farazmand 1985, 1986; Goodsell 1985; U.S. Congress 1983b: 1–111). Evidence supports Howard Rosen’s (1985) argument that private companies bid on public service contracts with lower cost first, then once granted contracts and subsidy, they start raising prices, perform poorly, provide lower-quality service, violate safety regulations, fail to meet schedules, practice substandard compensation, and are not accountable to the public, and the government loses control over companies’ output. The result is poor service and no accountability (Farazmand 1985, 1986; Kettl 1988; Perlmutter 1984; Stern 1984).

The famous report of the Peter Grace Commission, whose findings have been seriously questioned by congressional investigations and by independent researchers, proposed a

comprehensive privatization of American government. As Goodsell (1985: 174–175) put it, its ideas “extend to items deeply imbedded in the citizens’ personal relationship with government, such as readiness to save our lives, ... its provision of the coin of the realm, ... its trust in our word, ... and its own fiduciary promises. Should the values inherent in such relationships be subject to cost comparisons and motivated by profit-seeking?” Another expert, Chester Newland (1987: 54), reports that “cost overruns, excessive prices, performance failures, and corruption in space, defense, and other national government contracts have become routine, increasing as deinstitutionalization and politicization have advanced” under Reagan.

Deinstitutionalization of public service as a result of privatization and replacement of the welfare state with the warfare state (with a budget increase of 40%) by the Reagan administration has returned to the corporate sector some of the favors that the “BIG money” and “particularistic interests” paid during the presidential and congressional elections in the 1980s (Newland 1987: 45, 53). Congressional criticism of the officials in the Department of Commerce shows “the automatic approval of decisions already made outside the Government in business and industry” (quoted in Parenti 1983: 299). While the “Nixon administration” was a “business administration” and its “mission” was to “protect American business,” (according to Nixon’s Secretary of State William Rogers; quoted in Greenberg 1986: 302), the Reagan administration has undoubtedly been BIG business administration (Newland 1987: 45–53; Stockman 1987: Epilogue). Privatization has reduced the American citizens down to “consumers” of the marketplace (Frederickson and Hart 1985). While Peter Grace’s plan for privatization has been implemented by Reagan, children of the Boston area have been dying of leukemia caused by Grace’s chemical company’s contamination of water wells (CBS, February 3, 1986; *Washington Post*, June 1, 1988: A3). Other aspects of the loss of public service can be shown by statistics: collapsing public bridges (57,000 in 1987 compared to 15,000 in 1983) (CBS, June 4, 1987); massive unemployment (about 7%–14%, including hidden unemployment) (Greenberg 1986: 319); and massive growing poverty (according to James Carroll, in 1983, “22.2 percent of all children in the United States were living in poverty.... These children constitute 40 percent of all poor people,... and 22 percent of its [nation’s] youth” (Carroll 1987: 112). Crisis in education, health, environment, and so on, should also be noted (Skolnick and Currie 1985; Thayer 1984).

4.5 Conclusion

The triumph of politics over administration in the 1980s under the Reagan presidency, a response to the sociopolitical and economic crises, has resulted in a significant diminution of an administrative state already facing a legitimacy crisis. This crisis has had and will continue to have major political and socioeconomic consequences in the United States. The important question today is “Will the administrative state survive the current crisis?” It is a conclusion of this chapter that despite the current crisis, the administrative state and its bureaucracy will ultimately survive and rise again. The survival and revival of the administrative state are inevitable and necessary because they are functional to system maintenance and system legitimacy; and the pervasiveness of state is a global phenomenon (Kazancigil 1986).

The corporatization and commercialization of the American government in the 1980s have had and will continue to have extensive social costs (market failures of externalities, unemployment, and so on) in the inherent crisis-ridden nature (business cycles) of the market system, requiring protective intervention from the state. In short, the highly centralized corporatization of America, including the agricultural sector, will enlarge the working class and the poor by millions. This army of unemployed and unskilled will join the millions of others already displaced by rapid

technological advancement. Such a massive pool of unemployed and underemployed will likely represent a “potentially disruptive and explosive mixture, . . . and the principal instrument for treatment of this explosive mixture under modern capitalism is the system of welfare” (Greenberg 1986: 320). Thus the corporate sector will need the administrative system to absorb the social costs of the marketplace, to cool the explosive mixture, and to provide system legitimacy through relief programs. In the words of David Stockman (1987: 413), the White House has also recognized “the political necessities of the welfare state.” The administrative state will be needed, as it always has been, to provide stability, system enhancement, and system legitimacy.

Contrary to the charges of the opponents of the administrative state, evidence suggests that in fact the administrative state has been more productive, more efficient, more equitable, more accountable to the public, and more responsible to political and policy goals than the private sector (Abrahamson 1987: 360–363; Downs and Larkey 1986; Goodsell 1985; Perlmutter 1984; Rose and Shiratori 1986; Rosen 1985; Thayer 1984). According to the American Society for Public Administration’s President Robert B. Denhardt, “Over the past 20 years governmental productivity has increased 1.5% a year, almost double the national average” (Denhardt 1987: 2). As John Logue (1979: 85) points out, “The welfare state is the victim of its success, not of its failures.”

Calls for revival of public service have been made recently by a growing number of academicians, practitioners, and legislators, and alternative approaches to administration have been suggested by some public administration scholars (Carroll 1987; Denhardt 1987; Goodsell 1985; Rep. Schroeder—ASPA 1987a). This chapter suggests an integrated model of public administration, which embraces politics as well as administration. For two centuries, the relationship between politics and administration has been one of the most controversial issues of the American government. No government in modern society can govern without an administrative system, and no administrative system is politically neutral (Waldo 1984). A reassessment of the Constitution (prepared for its *time*) is needed to grant the administrative state a legal legitimacy and to make it an equal partner in the institutional structure of the governance in America. Such an administrative state will have to be representative of different social classes and of ethnic and racial segments of the population. A politico-economically representative administrative state will be actively involved in making as well as implementing policy. An integrated administrative system will be professionally competent, politically more accountable, more responsive to public need, and more sensitive to public interests. It will also be a powerful instrument of system maintenance and system legitimacy. Elsewhere (Farazmand 1989), I have discussed in detail the major aspects of a proposed integrated theory of public administration that outlines the principal foundations for legitimizing the administrative state. For the purpose of this chapter, the proposed integrated theory of public administration emphasizes the “guardianship,” “trusteeship,” and “agency” roles of the administrative state and public administrators in serving the general public interests, not the particular partisan interests, and in promoting constitutional principles of democracy and social justice. Some of these aspects of the administrative state have already been suggested by others (Rohr 1986; Waldo 1986a; Wamsley et al. 1987).

It seems appropriate to use Dwight Waldo’s (1986b: 468) words that “public administration, seeking to solve problems in a very real world, is importantly involved in creating the political theory of our time. I am confident that this will be the verdict of the history.” Long-term damage to public service and administration has already been done. A joint effort by public administrationists, a politically conscious public, and politicians is badly needed now to change the current trend. Fortunately, there are signs of such effort. As Seymour Lipset (1987: 23) concludes, Americans remain “dissatisfied with the performance of their leaders in powerful nongovernmental

institutions, ... [and] the continuing confidence gap could easily give rise to an era of progressive policies aimed at reforming the structure of private power in the United States.”

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Chapter 5

Managing through a Crisis

A Case Study of the Orange County, California, Bankruptcy

Celeste M. Greene

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5.1 Introduction

On December 6, 1994, Orange County (O.C.), California, declared bankruptcy, creating the single largest county bankruptcy in US history. In a land where million-dollar homes on sprawling cliffs overlook the bright blue waters of the Pacific Ocean, the sudden declaration of bankruptcy came to many public officials and private citizens as quite a surprise. This financial crisis call sent shock waves through Wall Street and the entire nation. Many people asked, then and now: how could such an economically prosperous area go bankrupt? This case study will explore the main

factors leading up to O.C.'s declaration of bankruptcy, as well as the consequences, impacts, and preventive measures that could have helped avoid such a financial crisis. Additionally, this case study will review the currently proposed county bankruptcy recovery plan.

5.2 Methodology

The data collected for this chapter were compiled through personal and telephone interviews, newspaper reports, government documents, and journal articles. The chapter is based on nine focused, face-to-face personal interviews and seven telephone interviews conducted during the months of July 1995 and March 1996 in Orange County, California. The personal interviews were conducted on site at the offices of city and county officials. The telephone interviews were conducted from an apartment in Newport Beach, California. The questionnaire used to focus the interviews consisted of 15 questions (see Appendix 5.A) designed to determine the factors leading up to the bankruptcy, the role of specific individuals leading up to the bankruptcy, the impacts of the bankruptcy upon the cities within the county, preventive actions that could have been taken to avoid the bankruptcy, and possible postbankruptcy solutions. Each interview lasted approximately 45 min and was not tape-recorded. All documentation of the interviews consisted of handwritten notes and quotations. All city and county officials interviewed were sent a personal letter, 1 month prior to the interview, requesting the opportunity to interview them for the purpose of determining the causes of the O.C. bankruptcy. Upon the author's arrival in O.C., individuals were contacted and formal arrangements for the interviews were made.

In order to obtain a well-rounded sense of the impacts of the bankruptcy on different sectors of the citizenry within the county, interviewees represent the interests of both the public and private sectors. Selection criteria for interviewees included one or more of the following: (1) a top-level O.C. official, (2) an O.C. official whose position directly involved budgeting and/or financial management, (3) a top-level administration policy city official, (4) a city official whose position directly involved budgeting and/or financial management policies, (5) a representative of business interests of the county, (6) a representative of the voting population of the county, (7) a representative of general citizens' interests, (8) a representative of schools and/or colleges within the county, and (9) a representative of the private financial advisor to the county.

5.3 Overview of Orange County

The land that currently makes up the political jurisdiction of O.C. was discovered and settled by Don Hernando Cortez in 1519 (Ramsey 1973: 1, 58). In 1870, Dr. W. N. Hardin of Anaheim, California, brought the first orange to the county, later leading to a thriving agriculture-based economy. O.C. prospered from its agricultural industry, beginning with grapes in 1875 and followed by oranges and raisins. When the county was created, owing to the economy's dependence upon agricultural production, a five-member board of supervisors was appointed to oversee the five agricultural regions that today make up O.C. (Popejoy 1995). Originally part of Los Angeles County, O.C. did not split from Los Angeles County until 1889, after the strong leaders of the county felt they were not receiving proper representation in county government and that their specific problems were frequently neglected and overlooked (Ramsey 1973).

In 1995, the O.C. economy had a value of \$82 billion (Moore 1995). As the economic structure of the county has changed, it has come to rely less on agricultural production and more on the expansion of high-tech firms such as Rockwell, TRW, and Unical (Moore 1995). According to the president of Orange County Economic Development Consortium, Ken Moore, “It still remains an entrepreneurial county” (Moore 1995). Today O.C. is an ethnically diverse county. Hispanics rank second to whites in population, and Asians rank third (California County Projections 1994). Over one-third of the population in the county is made up of foreign immigrants. Financially, the county’s per capita income ranks slightly above the state’s per capita income. In 1993, O.C.’s per capita income was \$24,737, while California’s was \$21,517 (California County Projections 1994: iii). Other economic indicators, such as taxes from general and retail sales, showed growth in the economy from 1980 to 1990 (California County Projections 1994: iii).

As the county’s economic structure has changed, several high-ranking county officials have come to believe that the government’s present organizational structure is antiquated and should be restructured (Bergeson 1995; Popejoy 1995). Specifically, individuals within county and city government as well as civic organizations favor the appointment of a county chief executive officer (CEO) to provide executive leadership in county affairs (Bergeson 1995; Coloma 1995; Haddad 1995; Huston 1995; Popejoy 1995; Ream 1995).

5.3.1 Orange County, California, Bankruptcy

Further discussion of county government reform will follow a review of the main factors contributing to O.C.’s bankruptcy.

5.4 Factors Contributing to Orange County’s Bankruptcy

In 1978, California passed Proposition 13, which limited revenue generated from local property taxes throughout the state (Lucier and Levine 1980: 193; Mittermeier 1996). At the same time, this measure put greater demands upon local governments throughout the state to search for new ways to generate revenue to fund the many services local governments offer. Additionally, according to the Federal Mandate Accountability and Reform Act of 1994, during the 1980s and 1990s, the federal government promulgated and legislated numerous intergovernmental mandates. The combination of these two factors—Proposition 13 and increased federal intergovernmental mandates—forced counties across the country to search for new, creative sources of revenue to maintain a sufficient level of public services; in the case of O.C., it led to a gamble with public funds.

In an era when innovative government financing and “reinventing government” (Gaebler and Osborne 1992) is encouraged, O.C., like other counties across the nation, tried to raise revenue without raising taxes. This strategy provoked then O.C. treasurer Robert L. Citron to turn to high-risk investments such as derivatives. A derivative is “a financial instrument that is valued according to the expected price movements of an underlying asset, which may be a commodity, a currency, or a security” (Oxford University Press 1993: 82). Investing in derivatives when interest rates were low allowed the investment portfolio of the county treasurer to earn an average interest rate of 8.52% and at times as much as 5% points higher than the interest earned by the state of California on its investments. These high interest rates provided the county with a healthy source of revenue. In fiscal year 1994–1995, a total of 35% of the ongoing general fund revenue for the county was from interest earnings (Huntington Beach 1995). Thus, as earnings continued to

increase, county officials, such as the board of supervisors, were not inclined to question Citron's investment practices. However, as interest rates continued to rise, as determined by the Federal Reserve, the county's portfolio value significantly decreased. The fact that the county's portfolio value was highly dependent upon a stabilization or decrease in interest rates was clearly stated by Citron in the treasurer's annual financial statements of 1993 and 1994 to the board of supervisors (Citron 1992: 2, 3, 5; 1993: 2, 3). Thus, unlike the fiscal crisis of New York City in 1975 (Bahl and Dun-combe 1992; Glassberg 1981; Gordon 1977), in Philadelphia in 1976, and in Cleveland in 1978 (Inman 1983), the O.C. bankruptcy was caused primarily by the high-risk investment practices of the county treasurer.

Numerous other factors contributed to O.C.'s bankruptcy. According to a current board of supervisors member, "There were two factors which contributed to the bankruptcy: (1) lack of oversight [there was] not an accountable system and (2) failure of disclosure to investors ... i.e., more questions should have been asked" (Bergenson 1995). Additionally, there was an investment oversight committee, which Citron refused to meet with (Mittermeier 1996). Supervisor Bergenson, who took office shortly after the bankruptcy also added, "The Treasurer and Assistant Treasurer had total control and trust by the county" (Bergenson 1995).

Another factor contributing to the O.C. bankruptcy was the use of a financial maneuver by the treasurer called *leveraging*. A leveraged fund is "a mutual or investment fund whose charter allows it to borrow money in order to increase its securities portfolio" (Aveneyon 1988: 278). This investment strategy is speculative in nature: since interest and expenses on loans are fixed, the stockholders will receive a very high rate of return if investments bring a high rate of return. However, if the return is low, the stockholders will receive an even lower return on investments (Aveneyon 1988: 278). Through leveraging, the treasurer was able to take \$7.57 billion and leverage it 2.7 times into \$20.5 billion (Merrill Lynch 1995: 3). Citron also used reverse repurchase agreements, which are enforceable agreements between a seller and a buyer. These agreements require the seller to buy back what is being sold within a certain period of time or at a specific price and under specific conditions (Aveneyon 1988: 397). Leveraging and the use of reverse repurchase agreements without matching maturities helped contribute to the country's current fiscal problems.

Dan Villella, finance director of Huntington Beach, California, believes the causes of the O.C. bankruptcy were "Citron's investment practices, the leveraging of his investments, borrowing to get a higher return rate, and the fact that the Treasurer took a loan on his borrowing" (Villella 1995). The fact that the treasurer's investment practices turned sour raised questions among county residents about his qualifications to be treasurer in the first place. "Mr. Citron was an *elected* official with no qualifications other than to get elected" (Huston 1995). Janet Huston, executive director of the League of California Cities, O.C. division, states, "The Board of Supervisors had responsibility for county funds.... The Board was not involved in the county's investment policy" (Huston 1995). O.C.'s director of management and budget saw the problem as "a lack of sophisticated understanding of Orange County's fiscal program county-wide. For example, it was believed that the county had a sophisticated Treasurer, who understood what he was doing. If he were sophisticated, then he was driving his portfolio on ego" (Branca 1995). Branca's and Huston's views raise the important issue of which standards, if any, elected officials must meet in order to serve in public office.

The president of the O.C. League of Women Voters questioned the role of the state government in financing solutions to local problems. "The state used to fund local governments, but recently the state has been pulling back. The state was extracting \$6.5 million more from the county than it was putting in" (Haddad 1995). Thus, the net effect was that O.C. sent money annually to the state and the county received only a portion of what it collected and sent to the state.

The one significant event preceding the county's declaration of bankruptcy, on December 6, 1994, involved First Boston, which was selling the collateral the bank had invested in the county after finding insufficient cash within the county treasury's account (Huntington Beach 1995). This action by First Boston caused the treasurer to become concerned about other investors withdrawing their money or demanding the liquidation of collateral, which would, in turn, lead to a run on the investment pool (Popejoy 1995). "Declaring bankruptcy allowed the county to freeze the funds and stop the investment banking firms from liquidating the collateralized agreement for the Reverse Repurchase Agreements. However, many banks liquidated them anyway" (Popejoy 1995). In total, there were 187 investors (individuals, banks, investment firms, and cities) who invested \$7.57 billion in the investment pool (Citron 1993: 2, 3). All but two cities within the county, several cities outside the county, school districts, and others made up the investment pool.

The bankruptcy cost \$1.69 billion or 22.3% of the total investment (Huntington Beach 1995).

Some believe the main financial advisor to the county, Merrill Lynch, shares a considerable part of the blame for the bankruptcy. Former county CEO William Popejoy stated:

A number of investment firms contributed to the loss and failed to protect the interests of the county. When you sell to a municipality you have a responsibility to it. After a written warning by Merrill Lynch (ML) to Citron, warning him of the volatility of the county's investment in derivatives, ML continued to buy Citron the same funds they warned him about and underwrote a huge bond issue for \$600 million. Warning letters about the high volatility of the county's investment portfolio were never sent to the county Board of Supervisors. ML's actions run contrary to the advice they provided to the county. (Popejoy 1995)

Current county CEO Janice Mittermeier reinforces Popejoy's belief by stating "Merrill Lynch is extremely culpable. However, this is not to say that the county people aren't responsible" (Mittermeier 1996). Presently, the county is suing Merrill Lynch for \$2 billion (*Orange County Register* May 3, 1995b). These actions by Merrill Lynch raise the important issue of corporate responsibility. Should Merrill Lynch have continued to sell the county derivatives, knowing the risk involved in such an investment? Merrill Lynch paints quite a different picture of the financial relationship between the O.C. and the investment firm. Peter Case, Merrill Lynch's vice president of the Southern California District, offered his thoughts on the issue:

ML had a 20-year relationship with Orange County.... In 1992 ML began to discuss at least a dozen times the high percentage of derivatives in the county's investment portfolio.... In 1993 ML suggested to Citron to include in his report to the Board of Supervisors the amount of leverage in the portfolio.... Also, in 1993 ML offered to buy back the derivatives from the county, and Citron came back to ML and turned down the offer.... The problem was with leverage. Derivatives had the volatility of a five-year treasury bond.... ML was not aware that Citron was skimming interest and had secrets accounts. ML feels that it does not have to act as the supervisor of the Treasurer. That's the role of the Board of Supervisors. (Case 1995)

Citron reported in his 1993 and 1994 annual financial statements to the board of supervisors his use of reverse repurchase agreements and leveraging. The 1994 report included a mention of the 20% possibility that the treasurer's forecast of interest rate fluctuation was wrong (Citron 1994).

It is also clearly stated in both the 1993 and 1994 reports that the future success of the county's investments was dependent upon interest rates stabilizing or declining. These statements about the dependency of the county's continued financial success upon interest rates were warning signs to the board of supervisors about the high volatility of the county's investment portfolio. These statements were not questioned by the board of supervisors.

City and county officials, as well as county leaders of civic organizations, feel the Securities Exchange Commission, the rating agencies, and auditors (both internal and external) share the blame with Merrill Lynch (Royalty 1995; Watson 1995). According to the executive vice president of Orange County Taxpayers Association:

The county needed better auditors. Peat Marwick, one of the big six accounting firms audited Orange County and concluded everything was fine. They, too, are culpable.... The Board of Supervisors should have insisted upon a more thorough audit. But since Citron lied, they [the Supervisors] can be personally forgiven. They would be fired if this were in private business.... Also, equally liable are city managers, mayors and city council members who put money in the investment pool unquestioningly. (Royalty 1995)

Others blame the county's reporting policies for the bankruptcy (Uberaga 1995). The city manager for Huntington Beach, California, assessed the situation this way: "There should have been more explicit reporting mechanisms, both internal and external... more detailed reports of where the money was invested.... The county could have had an ongoing outside investment council" (Uberaga 1995).

5.5 Preventive Measures That Might Have Helped Avoid the Bankruptcy

There are several preventive measures that could have helped avoid such a large-scale municipal bankruptcy. According to Santa Ana City Manager Dave Ream, whose city had \$150 million invested in the O.C. portfolio and is still waiting for the 20% the county owes the cities (\$28 million for Santa Ana), "There needed to be an investment oversight committee. The state balanced its budget on the backs of the counties. When the state was in trouble in 1990, Orange County raised the risk level of its investments. In 1991 the pool was opened up for outside investors. There needs to be a central core to handle the day-to-day business of the county" (Ream 1995). Like Ream, many citizens and public officials feel strongly that there is a need for more disclosure of financial information. There are varied municipal accounting principles throughout the 50 states, yet the only provisions of the federal securities laws that are applicable to the municipal securities issuer are the *antifraud provisions* (Hansen 1977). Thus, in the case with O.C., if the investment procedures of the county treasurer were made public, the disclosure of this information could have called public attention to the matter much earlier.

Others raise questions about the auditing procedures of the county. These procedures permit a single person to serve as both auditor and controller. As noted by former county CEO William Popejoy, "The Auditor is elected and should be appointed. The Auditor served as the Controller too. Thus, there were no internal checks on the investments. The Controller writes checks and the Auditor checks the checks written. In this case he is serving in two positions" (Popejoy 1995). The question again is raised about the appropriateness of the current structure of the O.C. government.

Should the auditor and controller be two separate positions instead of one? If so, could this new structure have prevented the bankruptcy? Current county CEO Janice Mittermeier believes that, instead of changing to a system of appointing county officials, the county could impose minimum qualifications to run for office (Mittermeier 1996). However, this still does not guarantee that *risk takers* will not be elected to office.

As the bankruptcy has unfolded, former treasurer–tax collector Robert Citron has been replaced by his opponent in the previous election, James Moorlach. Both Citron and former assistant treasurer Matthew Raabe, who has also been replaced, have pleaded guilty to six counts of fraud in connection with investment practices that led to the bankruptcy. Citron’s felony charges include misappropriation of public funds, falsifying public documents, and misleading investors. He faces up to 14 years in prison and up to \$10 million in fines (*Orange County Register* May 8, 1995d). Raabe reportedly directed county treasury staff to divert extra interest earnings from the shared investment pool into the County General Fund, where Citron then leveraged them to produce additional earnings. Additionally, Raabe participated in a series of investment deals in 1993 and 1994 that allowed certain schools and other favored agencies to receive extra earnings at the expense of pool participants (*Orange County Register* May 17, 1995e).

5.6 Consequences of the Orange County Bankruptcy

There are many direct and indirect consequences of the O.C. bankruptcy. One direct consequence is the county’s debt of \$1.7 billion it must repay to pool investors. However, on May 19, 1995, investors in nearly \$1 billion of the county’s bonds agreed to postpone demand for repayment on their debt for 1 year, making full repayment due in June 1996 (Sterngold 1995: 19). An indirect consequence resulting from this direct consequence is that bondholders have agreed to accept a significantly lower interest rate during the next year, because the county simply does not have the money to pay the full market rate. A second direct consequence, as mentioned previously, is the county’s lawsuit against Merrill Lynch for bad financial advice, which costs the county extensive legal fees as a result of the ongoing litigation. The third direct consequence is that the county’s bonds have received a *D* (default) bond rating, mainly because of the county’s postponement of its debt obligation to investors (Martinez 1995). Standard & Poor lowered the county’s once perfect rating because the county’s deal to roll over its debt to bond investors does not stipulate how the county will produce the money to pay the interest due. This default rating for O.C. makes it the third largest municipal bond default in US history, behind the Washington Public Power Supply System in 1983 and the New York City bond default in 1975. The fourth consequence of the bankruptcy is the conflict of interests it created among county officials. As a result of these conflicts, William Popejoy resigned as CEO of the county in July 1995, citing a lack of financial and management autonomy from the board of supervisors, as they increasingly reinvented themselves in the micromanagement of the county (Lait 1995: A1). Finally, one of the more politically sensitive consequences is that several members of the board are facing a recall by the voters.

5.7 Impacts of the Bankruptcy

The bankruptcy has impacted the county’s cities, other cities, and school districts in a number of ways. On May 2, 1995, O.C. won bankruptcy court approval to disperse \$5.7 billion to more than 200 cities, schools, and government agencies, holding off a possibly disastrous string of municipal

defaults and bankruptcies (Johnson and Owen 1995). The investment pool settlement provides investors an average of 77 cents on the dollar in cash, with school districts receiving an additional 13 cents in recovery notes or a total of 90% of their total principal investment. Cities received 80 cents per dollar or 80% of their total principal investment (Ream 1995).

However, this settlement does not eliminate the bankruptcy. Actually, there are two bankruptcies: one is for the failed investment pool; the other is for the county itself. The May 1995 settlement helps to remedy the investment pool bankruptcy. The county bankruptcy must still be addressed, with its bondholders awaiting \$1275 billion and vendors holding \$100 million in unpaid bills; there are also other creditors who need repayment. On July 7, 1995, Wall Street investors voted to extend repayment dates on \$800 million, which triggered Standard & Poor to lower the county's bond rating to *D*. This default rating will hurt the county's ability to attract investors to invest in any local projects. Thus, in order to help the county's short- and long-term financial future, the county is hoping that its newly developed recovery plan, to be voted on May 8, 1996, will boost the county's current bond rating. Hopefully, as with the New York City fiscal crisis, the O.C. fiscal crisis will not lead to a fundamental or long-standing change in risk perceptions of investors that will result in higher interest rates in the municipal bond market (Kidwell and Trzcinka 1982). However, only time will tell. Thus far school districts within the county have been repaid the largest percentage of any investors, with a 90% repayment. However, according to Newport–Mesa School District Director of Fiscal Services Mike Fine, schools have definitely been forced to make sacrifices due to the bankruptcy. According to Fine:

Not counting the loss in principal the immediate impact of the bankruptcy was \$5 million in interest lost. The School Board adopted a plan to help in the bankruptcy which called to: 1) sell surplus school sites, providing \$4.5 million, 2) cut the budget by \$3 million, 3) increase lease revenue by vacating school owned sites.... In addition, we set up a budget committee of 23 people. The committee went through 66 items and ranked them in order of things that could be cut first to last. We decided to cut rates per child which run from \$46 for K–6 to \$76 for 9–19. Now schools have \$10 less per child.... Also, we eliminated elementary school counselors and 12 classified positions and laid off four management people.... We cut back on travel and conferences eliminated the Administrative Intern Program, reduced the heat in the swimming pools, eliminated two of five car phones in addition to grades 9–12 school bus transportation. Our main goal was no change in class size. We laid off no teachers. Our cuts were as far away from the classroom as possible.... However, these cuts only address the principal revenue, not the \$5 million in interest revenue still not paid. (Fine 1995)

The Newport–Mesa School District originally invested in the county due to the high interest yield. The school district, along with three other investors, invested with the firm Rauscher, Pierce, and Refsnes. The other investors were Irvine, North Orange County Community College, and the Orange County Department of Education for a total investment of \$200 million. Fine contends that the firm did not warn the districts about the county's intent to utilize derivatives and leveraging nor were they aware of the extent of their volatility. Newport–Mesa School District and the other three investors are asking the investment firm to repay them the several-million-dollar profit the firm earned from the investment deal. Thus, like the financial relationship between O.C. and Merrill Lynch, the public entity is holding the private investment firm responsible

for its loss of funds. Jim McIlwain, vice president of administrative services for Orange Coast College, which enrolls about 23,000 students as part of the Coast Community College District, stated that the district, consisting of three community colleges, had \$22 million invested in the county fund (McIlwain 1995):

The State sent the money to the County. We had no choice with the investment. The Coast District has received 90 percent of our money back. The three colleges in the Coast District lost \$2.2 million. This 10 percent still not repaid has not affected the colleges. However, we don't know about the future. We see increased state funding as an alternative. Some colleges in the County invested additional money in the pool, for example Fullerton and Cypress College. (McIlwain 1995)

Cities do not appear to be feeling the severity of the bankruptcy at this time. According to the city manager of Huntington Beach, Michael Uberaga, when asked how the bankruptcy had impacted Huntington Beach, he responded, "Through the deferral or elimination of capital projects. Also, there's been a one percent reduction in the Operating Budget.... Psychologically the bankruptcy has affected our community by validating the right wing mentality of such organizations as the Committee of Correspondence, which views government as ineffective and incompetent" (Uberaga 1995). According to the finance director of the city of Santa Ana, Rod Coloma, "The Orange County bankruptcy hasn't impacted the city. We are downsizing [which the city was in the process of doing before the bankruptcy].... The population has increased 50 percent in the last 12 years. Currently, we have \$30 million in capital improvements for jail and water bonds, that will not get done" (Coloma 1995). It is evident from the responses given by the city officials of both Huntington Beach and Santa Ana that the bankruptcy up until now has had little impact upon these two cities. The main impacts have been on the postponement of capital projects.

Other indirect impacts of the bankruptcy have been the decrease in the number of housing sales within the county and layoffs of county and noncounty employees. According to a report by DataQuick Information System, monthly home sales dropped in volume from 3000 in April 1994 to 2143 in April 1995. The decrease in home sales is from 39% of the previous year to 35% (*Orange County Register* May 4, 1995c) However, in February 1996, home sales increased 31%, the biggest monthly sales increase in nearly 2 years (Vrana 1996). This sudden increase in sales is partially attributed to the recently proposed bankruptcy recovery plan. In reaction to the impact on the real estate market, the bankruptcy prompted former O.C. CEO William Popejoy to announce the layoffs of 1040 county employees in March 1995 (Lait 1995: A1). Popejoy's budget proposal also called for eliminating 563 vacant positions, for a total savings of \$188 million (Lait 1995: A1). These cuts reduce the county's original operating budget by 40.6% (Lait 1995: A1). The general manager for the Orange County Employees Association (OCEA) noted, "The County had 18,000 employees [before the bankruptcy]. They've eliminated 4,000 positions and laid off 1,500 employees, 800 of them were OCEA people. Most of the cuts were unfilled positions, therefore, most were done by attrition. The county Sheriff's Department took a 40 percent cut in general fund contributions and the District Attorney took a 50 percent cut in general fund contributions" (Mittermeier 1996).

To ease the pain of the layoffs, the county set up a counseling office to find jobs and counsel the laid off employees. Popejoy is interested in helping laid off employees get jobs (Sawyer 1995). O.C. took the approach of both downsizing and rightsizing its government through a combination of layoffs and voluntary attrition. Voluntary attrition is more cost-effective and healthy for

organizational morale than layoffs (Greenhalgh et al. 1980: 315; Zaffane and Mayo 1994). The counseling and outplacement services offered to laid off employees will not only ease the pain for the people directly affected, but it will also help relieve the stress for the retained employees (Zaffane and Mayo 1994). However, owing to the large number of employees who were involuntarily laid off, some of the resulting personnel turmoil could detract from whatever gains the county achieved (Seglem 1992).

Ken Moore, president of Orange County Economic Development Consortium, reports some of the positive and negative impacts of the bankruptcy on the O.C. economy. "Business people who provide services to the county may be directly impacted, but some of the positive signs are plans of Rockwell, TRW and Unical to expand. Also, Chapman University reported there will be positive job growth for the first time in four to five years" (Moore 1995). Thus, it is evident that the O.C. bankruptcy has had a wide impact upon both the public and private sectors of the county's economy. While the public sector is downsizing, the private sector is expanding its operations. Therefore, possibly the growth in the private sector will help offset some of the negative side effects the bankruptcy has had on the public sector.

5.8 Viable Solutions to the Orange County Bankruptcy

After a year of turmoil, on December 12, 1995, the county proposed a viable bankruptcy recovery plan made up of five main elements: (1) the reallocation of the Bradley–Burns sales tax, (2) the transfer of motor vehicle fuel taxes, (3) the reallocation of property taxes (beaches, harbors, and parks), (4) the reallocation of property taxes (flood control), and (5) the reallocation of taxes (development authority) (Orange County 1996). Now to review each of the five points.

The first point of the recovery plan allows the county to reallocate and/or retain a portion of the Bradley–Burns sales tax currently allocated to the Orange County Transportation Authority (OCTA) or to the Orange County Transit District (OCTD) in the sum of \$38 million per year for 15 years. The second point is the allocation to the OCTA \$23 million of the county's yearly apportionment of motor vehicle fuel taxes for 16 years. This allocation of funding to OCTA will help to offset some of the impacts of the reallocation of the funds from the Bradley–Burns sales tax. The third point of the recovery plan involves the reallocation to the county of property taxes currently allocated and paid to the O.C. fund known as harbors, beaches, and parks, equaling an amount of \$4 million per year for 20 years. The fourth point of the plan involves the reallocation to the county of property taxes currently allocated and paid to the Orange County Flood Control District for an amount of \$4 million per year for a 20 years. The fifth point of the plan involves the transfer from the Orange County Development Agency (OCDA) to the county's general fund \$4 million per year for 20 years. Each of the five list points began on July 1, 1996. In addition to the implementation of the previously stated recovery plan, voted on May 8, 1996, the county introduced zero-based budgeting as a form of internal budget reform. Ms. Mittermeier says that this form of budgeting requires each county department to justify every dollar it spends (Mittermeier 1996).

The current recovery plan has come as an alternative to several other strongly opposed plans. On June 27, 1995, the county overwhelmingly voted down Measure R, a 0.5-cent sales tax that translated into \$50 per \$10,000 spent by each person within the county. The tax would have generated approximately \$130 million per year to help the county solve its financial problem (Orange County 1995). Thus, the citizens of O.C. expressed their antitax sentiment, as did the citizens of California in 1978 with Proposition 13 (Lucier and Levine 1980: 193). One of the

reasons for the overwhelming defeat of Measure R is the feeling that the citizens' money is not being well spent, as well as a distrust of public officials. Robert Behn of Duke University points out that taxpayers demand lots of services but are reluctant to allow their governments to spend their money to provide them (Lemove 1992). David Osborne notes that during time of severe fiscal crisis, raising taxes may not only be impossible but also counterproductive (Walters 1992). The problem Osborne notes is mainly caused by the disillusionment constituents feel toward government. Change may be accepted more easily as a fiscal crisis recedes and recovery begins. However, recovery sometimes is impossible without increasing taxes or raising fees. Another reason for the opposition to Measure R is the issue of equity. A sales tax is a regressive form of taxation and may tend to drive business elsewhere if it becomes too burdensome, thus reducing the tax base (Inman 1992; Pechman 1971). Therefore, the amount of revenue generated from the tax stabilizes as tax rates continue to rise, which reduce the municipality's tax base (Inman 1995). Those interest groups interviewed for this chapter who expressed support for Measure R were the Orange County Taxpayers Association, the O.C. Women's League of Voters, and the OCEA (Haddad 1995; Royalty 1995; Sawyer 1995). However, conservative groups like the Committee of Correspondence and the Citizens Bureau of Investigation opposed the tax (Uberaga 1995).

While O.C. residents are opposed to new taxes, as are large portions of residents in California and throughout the United States, many people do not realize that of all major industrialized countries, the United States has the lowest total tax burden, at 32.6% of the national wealth produced each year (Wood and Benson 1991: 147). In comparison, the Japanese pay 35% of their wealth; Britain, 39%; and Germans, 42% (Wood and Benson 1991: 147). Despite the low tax rate in contrast to other industrialized countries, most Americans continue to feel overtaxed.

5.9 Preventative Measures: Implications for Other Local Governments

In order for O.C. to avoid another bankruptcy, county and national officials are discussing how the county could have prevented the bankruptcy. There are many measures other local governments should consider to avoid the same problems faced by O.C. Much like New York City in its fiscal crisis of 1975, O.C. needed better managerial accountability (Viteritti 1978). In the O.C. government, the treasurer took much of the blame for the fiscal crisis. Yet if a better system of managerial and financial accountability had been in place, as was implemented in New York City, with its Financial Management System that integrates its budgetary and accounting systems (Viteritti 1978), maybe the county could have avoided such a disastrous fiscal crisis. Because of the unregulated entrepreneurial environment in which Citron was investing, greater discretionary accountability should have been used by Citron. When there is a lack of meaningful threats or sanctions from the external environment, public officials must take personal and professional responsibility for anticipating emerging standards of acceptable professional behavior and organizational performance, considering long-term risks as well as short-term benefits (Kearns 1995). In the case of the O.C. situation, Citron did not exercise proper discretionary accountability.

In interviews, the majority of local officials and citizen groups throughout the county supported of more oversight—for example, establishing an investment policy and improved reporting procedures for local governments (Branca 1995; Haddad 1995; Huston 1995; Moore 1995; Ream 1995; Sawyer 1995; Uberaga 1995). Others suggested the need for better auditing procedures

(Bergenson 1995; Royalty 1995). When asked about the possibility of imposing new regulations upon the municipal securities market to prevent municipal governments from investing in high-risk securities, such as derivatives, the current O.C. CEO expressed her opposition to imposing national regulations upon local officials (Mittermeier 1996). Instead, Ms. Mittermeier favors having the Securities and Exchange Commission (SEC) examine the private sector and the way it deals with municipalities (Mittermeier 1996). However, as noted by Kearns (1995) in the wake of the O.C. bankruptcy, government agencies should anticipate the formulation of these new standards and thus position themselves for the potential development of these new regulations by playing an active role in the creation of new laws.

Several other preventative measures that have been suggested by several county and city officials relate to restructuring the county government to allow for a more accountable and effective system. Marian Bergenson is one of the five members of the County's board of supervisors who has proposed the plan of replacing the current county structure of a part-time, elected board of supervisors and a full-time CEO with a full-time appointed county executive officer (Bergenson 1995: July 3). In her outlined proposal, titled "Orange County 2001," supervisor Bergenson expresses the county's need for greater centralized authority in one person for running the day-to-day operations of the county, separating the responsibility of setting policy for ensuring delivery of regional services to the part-time governing board (see Figure 5.1 and Figure 5.2 for comparison of old and newly proposed county structures). Bergenson believes this new structure should enhance accountability within the system through more defined roles and responsibilities of county officials. There is wide support for restructuring county government through a full-time county executive officer among county and city officials as well as citizen's organizations (Bergenson 1995; Branca 1995; Huston 1995; Moore 1995; Popejoy 1995; Ream 1995; Royalty 1995).

An alternative government restructuring proposal involves regionalization of city services (Villously 1995; Watson 1995). This proposal would involve a number of cities within the county joining together to collaborate in service provision, giving less responsibility for service delivery to the county. Bergenson also suggested the possibility of revolving private auditors instead of using the same private auditing firm year after year, which might enhance objectivity.

Three other methods of government reform suggested as preventative measures are (1) reducing the number of elected officials in county government by replacing them with appointed officials, (2) developing minimum qualifications for elected officials to run for office, and (3) separating the position of auditor/controller into two separate positions (Haddad 1995; Mittermeier 1996; Popejoy 1995; Ream 1995; Uberaga 1995; Watson 1995). The main reason given for replacing elected officials, such as the treasurer, with an appointed official is to set certain standard qualifications for people who will fill these positions as well as provide for greater fiscal and managerial accountability. The city and county officials interviewed for this study felt that Citron held the position of treasurer—tax collector knowing he was elected by the people and thus felt only accountable to those who elected him.

Additionally, several individuals interviewed felt elected officials have trouble downsizing (Ream 1995). Thus, more efficiency may be gained through more appointed positions. However, the current county CEO believes elected officials can also be required to meet certain minimum requirements before running for public office (Mittermeier 1996). The preventive measure of separating the offices of auditor/controller into two offices is seen as another way to lead to greater accountability. Separating the tasks of writing the checks and verifying the checks that have been written for the county makes good financial management sense (Popejoy 1995).

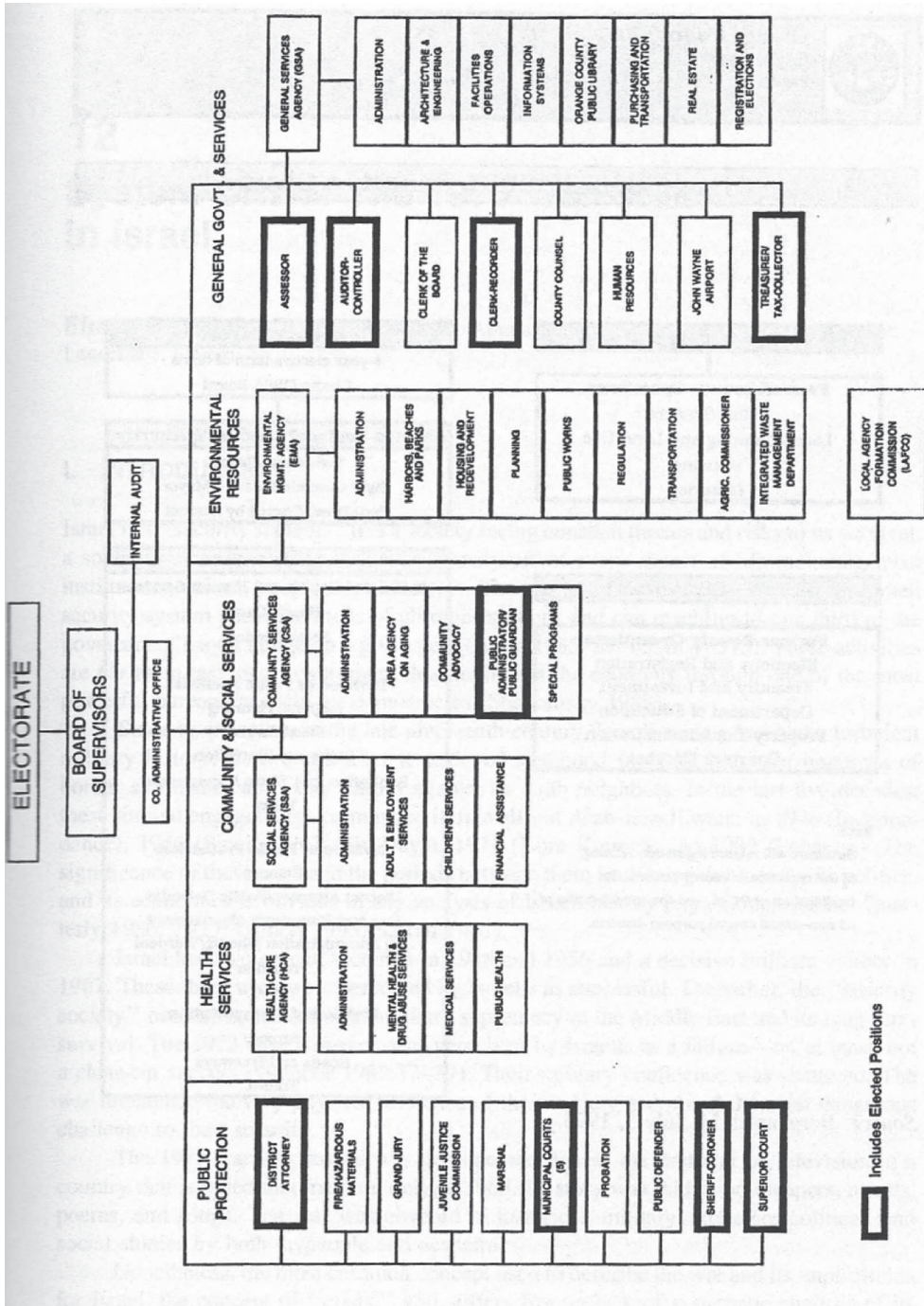


Figure 5.1 Current structure of Orange County, with a part-time, elected board of supervisors and a full-time CEO. (From Orange County, 1995.)

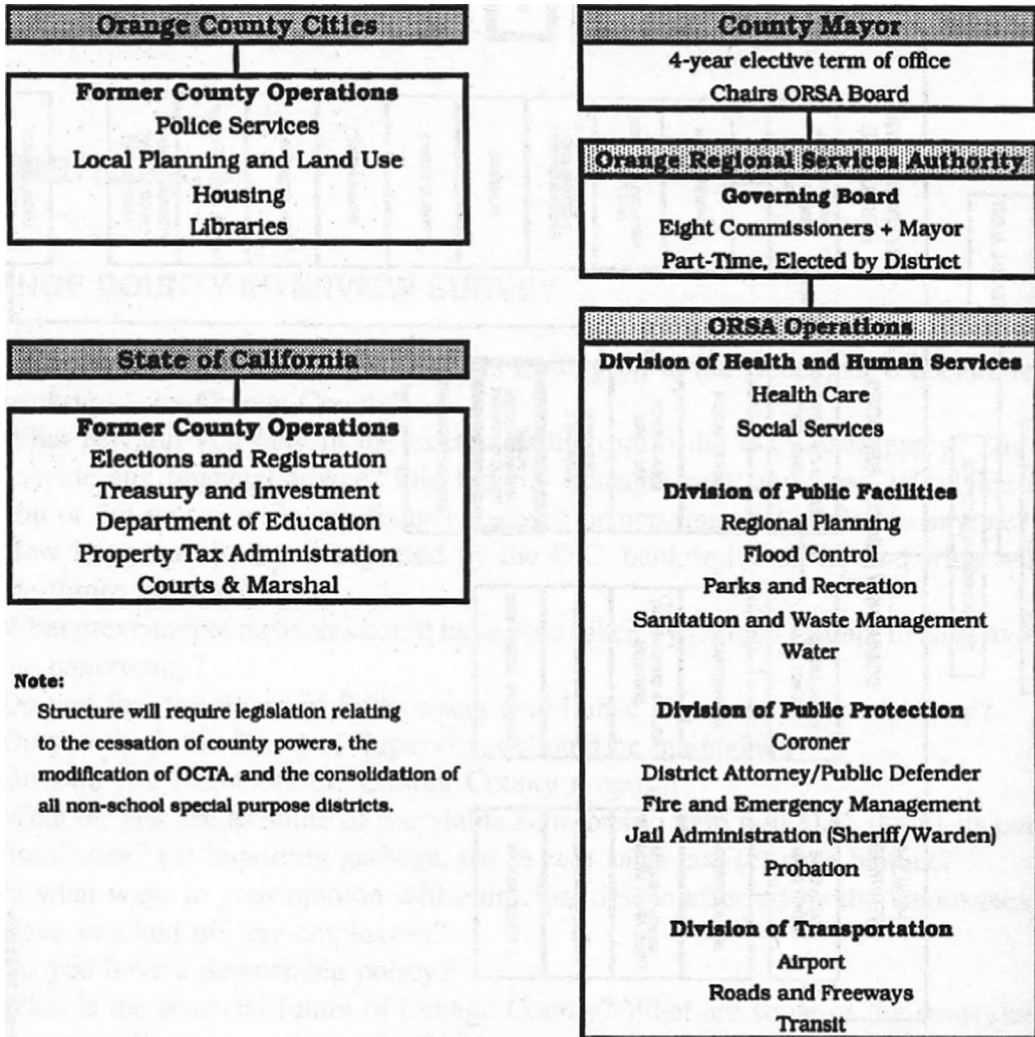


Figure 5.2 Proposed County structure, with a full-time appointed county executive officer. (From Bergeson, M., "Orange County 2001," 1995.)

In order to help other municipalities around the county from facing a similar financial situation as O.C., further research is needed in a number of areas. These areas include (1) a survey of numerous local governments' financial auditing procedures, (2) a survey of the types of investment policies in place in local governments, (3) a survey of numerous local governments to determine the level of accountability of elected and appointed officials and whether or not local government officials feel the government would run more effectively with fewer elected officials and more appointed officials, and (4) a survey of the number of local governments that have minimum requirements for elected officials to run for office and the effectiveness of the governments that have these minimum standards.

5.10 Summary

Some may view the O.C. bankruptcy as one of the most financially disastrous situations for local government in US history. However, it may also be regarded as a laboratory for experimentation in public policy, administration, and management. Beginning in 1978 with the passage of Proposition 13, California has taken the lead in reforming the way government conducts its business and provides services to its citizens. The O.C. bankruptcy is the result of many contributing factors such as (1) a lack of proper oversight by the board of supervisors, (2) fraudulent reporting by the treasurer–tax collector, (3) the lack of proper financial background of county officials, (4) a lack of disclosure of financial transactions between the county treasurer–tax collector and outside investment firms, (5) a lack of accountability by those responsible for ensuring the safe investment of county funds, (6) a lack of disclosure of key financial information to the investors, both within and outside of the county, and (7) perhaps inappropriate governmental structure.

While the causes of the bankruptcy are numerous, so are the components of the county's current recovery plan. The current plan, voted on May 8, 1996, clearly outlines the path for the county's economic survival. The plan calls for an internal reallocation of county resources together with the newly introduced zero-based budgeting strategy. These new approaches to financial management demonstrate the county's true commitment to economic survival. The county voters clearly displayed, on June 27, 1995, the less-than-likely chance of certain tax measures being passed to help solve the bankruptcy problem. At a time of financial crisis, voters become disillusioned with public officials and express their anger by opposing any additional taxes. The voters in O.C. feel that those who created the county's current financial situation must come up with a miracle solution to resolve the problem, one which does not involve increasing taxes. Thus, the current recovery plan meets the criteria set forth by the voters. However, what many voters do not realize is the small tax increase Measure R would have called for (\$50 per \$10,000 spent). This is much less than the amount of money it will now cost the county in legal fees and loss of business for private sector developers and realtors. One of the other long-term negative effects of voting down Measure R is the poor public image painted by the media of the county. The image is one of a jurisdiction that is financially irresponsible. The other long-term effects of the bankruptcy have yet to be seen. Some city officials within the county even feel that the county will never regain the confidence of investors (Ream 1995).

Some people may question the treatment of O.C. by Standard & Poor or the SEC, both of which had a direct relationship with the county by, respectively, providing consistently high ratings for the county's bonds and approving the county's handling of municipal bonds up to the time of the bankruptcy. However, as a spokesperson for Standard & Poor pointed out, "... we rely

on those providing reliable information...” (Martinez 1995: A10). In this case, the treasurer–tax collector was providing false information, which was not detected to be such by the rating agency or the SEC. Some critics argue (including the city manager of Santa Ana, Ream) that the county declared bankruptcy too early.

5.11 Conclusion

There are several lessons to be learned from the O.C. bankruptcy. One lesson is the need to restructure the county government by appointing a county executive officer to manage the day-to-day affairs of the county and either appoint or elect a part-time county board of supervisors. As suggested in Marian Bergenson’s proposal “Orange County 2001,” this new system would help improve accountability and oversight within county government through the day-to-day micromanagement of a county manager, leaving the responsibility for setting public policy to the board of supervisors. Another possible lesson of the bankrupt is the need for the SEC to create stronger national laws regulating the municipal securities market to prevent municipal governments from investing in high-risk securities, such as derivatives. It will take time to heal the financial wounds the bankruptcy has inflicted upon O.C. However, owing to the county’s strong economic base and numerous assets that include prime California coastal real estate and ideal weather, it will be hard for the county not to rebound. The combination of a more efficiently structured county government and a more tightly regulated municipal securities market is a key point this author has chosen among the many lessons to be learned from studying the O.C. bankruptcy.

5.A Appendix

Orange County Interview Survey

1. What were the main significant factors leading up to the December 6 declaration of bankruptcy by O.C.?
2. What part did you play in the events leading up to the O.C. bankruptcy? Did you provide any financial advice? Did the city manager seek any financial advice from you, or did you provide any financial advice or nonfinancial advice to anyone?
3. How has your city been impacted by the O.C. bankruptcy so far, and what will be the future impacts?
4. What preventive measures could have been taken by O.C. to have avoided the bankruptcy?
5. Do you feel the board of supervisors could have prevented the bankruptcy?
6. Do you think the board of supervisors should be maintained?
7. How do you feel about the charter county proposal?
8. What do you see as some of the viable solutions to help pull O.C. out of its current fiscal state? (a) importing garbage, (b) ½-cent sales tax, (c) state bailout?
9. In what ways in your opinion will municipalities be affected by the bankruptcy?
10. Have you laid off any employees?
11. Do you have a downsizing policy?
12. What is the financial future of O.C.? What are some of the strategies the county will use to avoid another bankruptcy? How will the county regain the confidence of investors?

13. Has the bankruptcy caused concern about raising taxes among the citizens within your municipalities or their economic well-being?
14. Have you or any friends of yours been laid off or had their salary reduced?
15. Could you give me a name of another individual who could provide me with information regarding the bankruptcy?

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**EMERGENCY
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Chapter 6

From Texas City to *Exxon Valdez*

What Have We Learned about Managing Marine Disasters?

John R. Harrald and Hugh W. Stephens

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6.1 Introduction

Harbors and navigable waterways are places of high risk for hazardous materials transportation disasters. For one thing, these are locations of large amounts of flammable, toxic, explosive materials. Risk is all the greater because differences in organization, procedures, techniques, equipment, and vocabulary between landside and waterside environments create a perceptual and

organizational void at the water's edge. Without a determined effort to bridge these differences, integrated contingency planning necessary for effective response to sudden-onset disasters typical of hazardous materials emergencies is extremely difficult.

Both of these factors, plus complacency about the possibility of a catastrophe, were present in two of the greatest maritime transportation disasters in US history. The first occurred in April 1947 when two ships loaded with ammonium nitrate fertilizer—the same substance used at the Oklahoma City and the World Trade Center bombings—blew up at the Texas City docks. The explosions and their aftereffects killed almost 600 persons, injured 3500 more, and inflicted property damage on the order of \$100 million (\$700 million in today's values). The second happened in March 1989, when the supertanker *Exxon Valdez* ran aground on Bligh Reef, rupturing several of the ship's tanks and disgorging 240,000 barrels of crude oil into the pristine waters of Prince William Sound, Alaska. In both cases, inept response efforts exacerbated the damage caused by the initial event. Such was the chaos after the explosion of the first ship at Texas City, the *S.S. Grandcamp*, that everyone overlooked the threat of the *S.S. High Flyer*, which also had fertilizer in its cargo. It caught fire and blew up 16 h after the *Grandcamp*. Although casualties from the second explosion were modest, serious additional damage was inflicted upon industrial facilities and residences in the vicinity of the docks. While no lives were lost when the *Exxon Valdez* went aground, inadequate response allowed the oil slick to spread over much of the sound and caused widespread environmental degradation, \$2 billion in cleanup costs, and billions more in damage settlements.

Measured by devastation and the shock and surprise of those at the scene as well as the general public, these were clearly disasters of the first magnitude. Different in many respects, the two nevertheless featured parallel failures in prevention and response. In neither instance did those on the scene appear to have been particularly concerned about operational risks and consequences of failure prior to their onset. Risk assessment and contingency planning for a serious emergency were absent at Texas City and only perfunctory at Valdez. Consequently, when an unusual concatenation of circumstances triggered catastrophe, the sudden crises were greeted with surprise, delay, and confusion, thereby exacerbating their harmful effects.

The question then arises: what was learned about disaster management in the 42 intervening years between the Texas City and *Exxon Valdez* disasters and do recent legislative initiatives embody effective solutions? This assumes some urgency when one understands that in the interim, public- and private-sector organizations have made considerable efforts to develop information and institute safety measures about the production, storage, and transportation of hazardous materials. Four major policy or administrative failures present in most disasters are at issue in these two marine disasters:

Antecedent complacency in a situation of acute exposure to hazards and consequent failure to monitor risk levels and institute basic mitigation measures.

Inadequate contingency planning, particularly toleration of fragmented jurisdiction among major stakeholders.

Ad hoc response and gaps and overlaps in agency efforts.

Deficient information management among major stakeholders and poor media relations between the stakeholders and the general public.

We begin with a brief description of the major features of the two disasters. Three criteria of preparedness and response are at issue. The first, awareness of risk, is designed to assess the relationship between the presence of hazards and recognition of vulnerability among those at the scene prior to the disaster. The second is contingency planning, including assumptions and the action plan in place to marshal organizational, financial, and physical resources for response.

Incident response is the final criterion, examining the accuracy, timeliness, and integration of activities when the crises erupted.

A description of events at Texas City establishes the baseline of comparison. After surveying what happened in the *Exxon Valdez* incident, we discuss the common features of both disasters in terms of vulnerability and risk and then of response. Vulnerability and risk address the probability of a disaster actually occurring and its impact. Response encompasses three stages, resource mobilization, integration of agency efforts, and production, the last designating the point in the response when stable patterns of action are achieved. Then, we briefly describe legislative initiatives and regulatory measures about oil spills since *Exxon Valdez*, which bear upon management of major disasters and an evaluation of the results. These demonstrate that many vital shortcomings about risk awareness, contingency planning, and crisis response discerned at Texas City and Valdez are not yet institutionalized in disaster management.

6.2 Texas City

6.2.1 Background Conditions

Texas City is located on the west side of Galveston Bay, some 10 miles north of the city of Galveston and 40 miles south of Houston. It has a deepwater port in a landlocked harbor and, in 1947, had three quays, two of which handled break-bulk commodities and one petroleum. Land communications were good. The Texas City Terminal Railway Company (Terminal Railway), which owned the docks, had 6 miles of railway connected to the main trunk lines between Galveston and Houston.

Increasing hazard levels from expanded petrochemical production was the reciprocal of steady economic growth, which began in the 1930s. Helped by government efforts to expand petrochemical production prior to the onset of World War II, Texas City was very much an oil town by 1947, home to four major refineries, two aviation gasoline units, two chemical companies, a boxcar transfer terminal, and a tin smelter (Benham 1987: 30). The population had mushroomed from 6,000 persons in 1940 to an estimated 16,000 after the war and might have been greater had not a housing shortage obliged many workers to commute from neighboring towns. In addition to petroleum products and bulk cargoes of cotton, grain, and tin ore, in mid-1946, the port began to handle large quantities of ammonium nitrate fertilizer produced at government ordinance plants in the midwest, destined for western Europe.

Production, storage, and transport of petrochemicals always carry the risk of explosion, fire, or toxic contamination. At Texas City, the physical proximity of docks, chemical production, tank farms, and residences created the potential for disaster. Although separate zones existed for industrial, residential, and commercial activities, most of the new facilities were built immediately inland from the waterfront (Stephens 1997: 10). The resulting congregation of facilities with large quantities of hazardous materials adjacent to the docks and part of the town's residential area dramatically increased the chance that a serious fire or explosion would initiate a devastating chain reaction. Moreover, some 25 blocks of residences and several tank farms were located within 4000 ft of dock 0, where the *Grandcamp* was moored, and the Monsanto chemical plant was within 1000 ft.

The prevailing social climate also enhanced risk and abetted the absence of preparations for a serious emergency. Direct evidence on this matter is elusive, but postwar Texas City appears to fit Paul Shrivastava et al.'s (1991: 322) description of a period of *munificence* that often precedes a

disaster, marked by a social and political environment emphasizing growth and opportunity at the expense of other concerns. At a time when much of the rest of the country was mired in a recession, it was variously described as *young and thriving* and a *boom town*. At issue was the indifference of experts as well as public complacency about hazardous materials risks in general and ammonium nitrate fertilizer in particular. Moreover, no federal agency, including the US Coast Guard (USCG), was enforcing safety standards for the movement of hazardous substances through US ports, including Texas. This was 40 years before Bhopal, an age of technological innocence, when hazardous materials production and transportation were not nearly as extensive as today and regulatory pressures were minimal (Wenk 1986: 17). Moreover, although fires had occurred at refineries and on ships, nothing serious had ever happened before.

6.2.2 Incident

Those who do not feel at risk are unlikely to prepare for potential trouble. Although some preparations existed for the annual hurricane threat, Texas City had no contingency plan for calamitous industrial accidents. Consequently, while shortfalls in response efforts are predictable under such circumstances, it is useless to search for weaknesses in assumptions of contingency planning or gaps and overlaps in organizational competence. Such response capability as did exist was highly fragmented; the municipal government and the Terminal Railway had no specific understanding about firefighting responsibilities or enforcement of safety rules, such as prohibitions against smoking at the docks. Refinery firefighting teams and the town's volunteer fire department of 29 men and 4 trucks had effectively fought fires at refineries and even in ships moored at the docks. But nothing was in place that could have quickly and accurately brought extensive resources to bear in a manner required to cope with sudden and unpredictable events caused by large-scale explosions and fires.

While it is important to identify precursor factors—such as high risk, complacency about hazardous materials, and an absence of contingency planning—the manner in which the Texas City disaster was triggered is important as well. Ammonium nitrate will explode only when subjected to extreme heat and pressure. This is precisely what happened on the morning of April 16, 1947, when a fire started among 880 tons of fertilizer contained in 100 lb sacks loaded in number 4 hold of the *S.S. Grandcamp*. When handheld extinguishers failed to snuff out the smoldering fire, in an effort to put out the fire by depriving it of oxygen, the ship's master ordered the hold sealed and steam injected into it. Within the confines of the hold, the rising temperature and pressure initiated thermal decomposition of the fertilizer and produced large amounts of combustible gas. At 8:30 a.m., a half hour after the fire was discovered, the hatch covers blew off and reddish smoke billowed out of the ship.

Soon thereafter, the volunteer fire department arrived and began directing streams of water onto the deck. Attracted by the unusual color of the smoke, a crowd of about 300 onlookers gathered at the head of the slip. The ship's turbine was undergoing repair at the time, and no tugs or fireboats were available to assist in moving the ship away from the docks or suppressing the fire. At 9:12 a.m., approximately an hour after the fire began, the *Grandcamp* disintegrated in a prodigious blast heard 150 miles away. A huge, black, mushroom-shaped cloud billowed 2000 ft into the sky. Fragments of the ship, some weighing several tons, scythed through stevedores and spectators while numerous pieces were hurled out to a distance of a mile. Pipes and tanks of flammable product were ripped open by falling shrapnel, starting secondary fires and explosions. Almost all structures within a half mile of the docks were turned into rubble.

At the Monsanto plant across the slip from the *Grandcamp*, 145 of 450 shift workers were killed outright. Flaming balls of sisal and cotton, also part of the ship's cargo, showered down upon refineries and homes. The *High Flyer*, a freighter at an adjoining slip with fertilizer in its cargo, was torn from its moorings by the force of the blast and drifted over to lodge against another ship, the *Wilson B. Keene*.

6.2.3 Response

Hazardous materials transportation disasters originating from fire and explosion commonly feature low predictability, rapid onset, and severest damage during the initial stages. Successful coping action therefore demands rapid, focused response. This is a function of contingency planning. The confused, ad hoc nature of response for the first 24 h starkly exhibits the awful costs of surprise and absence of preparedness at Texas City. Everyone within 20 miles immediately realized something awful had happened when the *Grandcamp* exploded. In Galveston, shock waves shattered glass and knocked people to the ground, and buildings swayed in Baytown, 15 miles distant. The huge column of thick, black smoke and refinery and oil tank fires served as a beacon for those from neighboring communities who immediately converged on Texas City. Despite a spontaneous and generous outpouring of assistance, including excellent law enforcement activities and medical treatment, and despite heroic actions by individuals and groups, consistent response efforts were not initiated for 24 h.

The lack of either a disaster plan or prearranged mutual aid was painfully evident. No concerted effort toward fire suppression was achieved for at least 48 h following the initial blast. The wonderful examples of personal initiative and heroism that marked the early hours of rescue and salvage work lacked the necessary direction in many cases (Tryon 1947: 2).

Particularly vexatious was the organizational void between land and marine activities. This void hampered integrated search-and-rescue amid the smoke and fires at the docks and, by hindering damage assessment and identification of secondary hazards, led to the explosion of the *High Flyer* 16 h after the *Grandcamp*. Recall that the force of the latter's explosion tore the *High Flyer* from her moorings in an adjoining slip, and it had lodged against another ship. Its cargo included not only ammonium nitrate fertilizer but also a larger consignment of sulfur. Smoke from oil fires and fumes from the sulfur prompted the crew to leave the ship at about 10 a.m. For the next 9 h, no one gave the ship much thought, perhaps because it was partially obscured by thick clouds of smoke. Whatever concern those on land had about the *High Flyer's* condition was not relayed to Coast Guard boats in the turning basin. No one noticed this threat until fires broke out in its holds at about 4 p.m., but 3 more hours passed before tugs from Galveston arrived and attempted to pull this ship from the slip. This failed, and at 1:10 a.m. on April 17, the *High Flyer* blew up at the docks in an explosion witnesses thought was even more powerful than that of the *Grandcamp*. Casualties were light because search-and-rescue workers were evacuated from the waterfront, but refineries and tank farms were showered with glowing shrapnel, collapsing more storage tanks and setting off synergistic reaction of fires.

Not until about noon on April 18 did response begin to take on a semblance of order, when municipal officials were able to assume direction of recovery operations, supported by the Salvation Army, Red Cross, and detachments from the US Fourth Army and nearby military bases. Progress was made in extinguishing fires at tank farms and, a day later, at the docks. Fittingly, a pall of black smoke hovered over Texas City for 5 days, until the last of the fires were extinguished and the immediate emergency was over.

6.3 Exxon Valdez

6.3.1 Incident

The *Exxon Valdez* ran aground on Bligh Reef just after midnight on March 24, 1989. The ship departed from the outbound traffic lanes as it left the port of Valdez to avoid ice from the Columbia Glacier. The Coast Guard Vessel Traffic System watch stander granted the deviation; after all, the *Exxon Valdez* was the only major vessel under way in Prince William Sound at the time. The Vessel Traffic System radar, which was the major means of providing a warning about collision, did not track the ship as it began deviating from accepted track lines. Having excellent resolution but relatively short range, this radar provided good coverage of the Valdez Narrows, perceived as the highest-risk area, but not of Prince William Sound. The human component of safety was diminished as well. As the ship began its unusual maneuver, the watch stander at the Vessel Traffic System began the process of changing the watch. The watch consisted of only one person instead of the usual two, a result of cost cutting by the Coast Guard. Moreover, no pilot was on the bridge of the *Exxon Valdez* as the ship traversed the inbound lane—the Coast Guard and the state of Alaska allowed the state pilot to disembark prior to Bligh Reef instead of the entrance to the sound at Hinchinbrook provided that a ship's officer qualified as a Prince William Sound pilot was on board. Captain Hazelwood met this requirement but was in his cabin catching up on paper work. In the event, the third mate on the bridge failed to alter course to the south in spite of repeated reports by the lookout of a red light (on Bligh Reef) off the starboard bow, and the *Exxon Valdez* was still accelerating to sea speed when it went aground on the reef.

Despite the fact that 25% of all crude oil supplied to the United States flowed through the trans-Alaska pipeline and was transshipped through the port of Valdez and Prince William Sound, the possibility of a catastrophic spill was not taken seriously. When notified of the grounding, the manager of the Alyeska Pipeline Service terminal, who had overall responsibility for oil spill emergencies, alerted his response team and then returned to bed. Complacency extended beyond this one person. As a cost reduction measure and with the permission of the state of Alaska, full-time emergency response had been downgraded several years before to a collateral duty of the team. The worst-case scenario envisioned in Alyeska's contingency plan was a 200,000 barrel spill released from a tanker over a 10 h period under ideal weather conditions. In contrast, the *Exxon Valdez* actually lost 240,000 barrels in 3 h, well beyond the imagination of anyone who shared responsibility for designing or approving this plan. The state had approved the plan despite its obvious lack of resources to execute even a minimal response. The parent oil companies represented in the Alyeska consortium were equally guilty of complacency. For example, an *Exxon USA* (1977: 17) article reads: "while exercising every precaution to prevent an oil spill [in Prince William Sound] Alyeska had detailed plans to clean up a spill should one occur." Plans did not include resources; there was only one barge to store recovered oil in Valdez and it was not in service when the ship went aground. As protection against harsh weather, booms and skimmers were stored ashore.

6.3.2 Response

Insufficient resources doomed response efforts from the outset. But, just as the absence of a planned organizational response condemned Texas City to 24 h of chaos, an inability to form a functioning response was the other major contribution to failure at Valdez. The Coast Guard, the state of Alaska, Alyeska Pipeline, and Exxon all had contingency plans prescribing an organizational structure that was to be formed and procedures to be followed in event of a serious emergency. The plans of the state and Alyeska assumed that the latter's response force would coordinate

response efforts to any spill in Prince William Sound. Coast Guard plans assumed that the Coast Guard's predesignated on-scene coordinator (OSC), the commanding officer of the USCG Valdez marine safety office, would assume this role and would supervise Alyeska's spill response operations. This was congruent with the national contingency plan (NCP) for all oil spills within US jurisdiction. The NCP creates a complex support system for the federal OSC: Environmental, scientific, and technical support is to be provided by the National Oceanography and Atmospheric Administration (NOAA); Coast Guard technical expertise is available from the National Strike Force. Additional federal and state support can be arranged through the interagency Regional Response Team (RRT) or the National Response Team (NRT).

None of the major organizational elements embodied in federal or Alyeska plans were executed. Unanticipated events quickly obviated any hope that the plan would prove viable in any important respect (NRT Report 1989; Alaska Oil Spill Commission 1990; Harrald et al. 1990). Exxon's crisis management team, headed by Frank Iarossi, the president of Exxon Shipping, was assembled and dispatched to the scene within hours of the spill. Despite the fact that none of the existing contingency plans anticipated that the affected oil company, not Alyeska, would assume the overall management function, the Exxon team assumed responsibility for oil spill response and salvage of the *Exxon Valdez* when it arrived the day after the disaster began. Relations were further occluded when the Coast Guard raised the level of its presence by dispatching Captain Glenn Haines, chief of the 17th Coast Guard District's Marine Safety Division and the chairman of the RRT for the Alaska Region, to relieve Commander Steve McCall, the predesignated OSC. Further escalation of rank followed when Captain Haines was replaced as OSC by Rear Admiral Ed Nelson, the 17th District commander. After several weeks of negative media evaluation, President Bush directed Admiral Paul Yost, commandant of the Coast Guard, to go to Valdez and take charge of the federal response effort. He eventually turned over responsibility to Vice Admiral Clyde Robbins, commander of the USCG, Pacific Area.

Other elements acted in similar fashion. Coast Guard plans for Valdez anticipated that in the event of a major spill, state and federal activities would be coordinated through the RRT, Alaska being represented by its Department of Environmental Conservation (DEC). Like the haphazard nature of group contributions at Texas City, Governor Cowper and DEC Commissioner Dennis Kelso came to the scene, while the state of Alaska created its own independent on-scene organization. The Alaska Division of Emergency Services set up a command post in Valdez on March 25, but this was never used by the state's DEC and was eventually abandoned. As other state agencies asserted jurisdiction, Governor Cowper created a *mini-cabinet* in Juneau to coordinate activities. The RRT actually met in Valdez within 24 h of the spill but never functioned as an effective support mechanism for the federal OSC.

The federal OSC organization underwent additional change when Vice Admiral Robbins assumed command upon Admiral Yost's departure. Exxon and state organizations were also evolving and determining their relationships with each other. It is important to note that none of the organizational structures and interrelationships that evolved following the spill resembled what had been contemplated in preexisting contingency plans. The net result of organizational turmoil was a delay of 3 weeks before a stable, functional decision-making organization evolved. But by then, the opportunity for effective response to the oil spill had passed. The complexity of the tripartite arrangement between federal, state, and Exxon officials obviated timely and accurate decision making. Frank Iarossi has since publicly criticized the concept of *crisis management by committee*. The fact that an internal Coast Guard report (Sherikon 1989) identifies over 16 significant formal external relationships and 16 critical formal relationships just within the Coast Guard itself testifies to the confusing organizational web that emerged at Valdez.

6.4 Vulnerability and Risk

Emergency planners are often justifiably criticized for preparing for the last major disaster. Unfortunately, when low-probability, high-consequence events are at issue, history is not often a valid guide to hazards and the vulnerabilities they create. Low-probability events that have not occurred must be envisioned by means of creative vulnerability assessment. For instance, we now understand our vulnerability to significant oil spills from tankers. Nonetheless, we find it difficult to focus on other equally and perhaps more probable technological disasters, such as release of toxic materials from maritime incidents and tank ruptures at storage and transshipment facilities located in harbors.

Consider for a moment the nature of risk. Risk has two components: the probability of occurrence and the impact of the event. Managing risk for low-probability, high-consequence events is extremely complex. It includes both preventive measures focusing on reduction of the likelihood of occurrence and mitigation measures focusing on minimizing the impact of the event if it actually occurs. Inconsistencies in public perceptions of risks are an additional problem. That is, if an event has not occurred, people tend to focus on the low probability and dismiss the risk and its impact, thereby ignoring the expense of efforts to avoid or mitigate a disaster. After a low-probability event occurs, what Wenk (1986) terms *the politics of risk* sets in: the public switches its focus to the impact of the disaster and acts as if it were inevitable, professing to understand low-probability causal chains that were previously ignored or overlooked.

Both the Texas City disaster and the *Exxon Valdez* oil spill demonstrate that maritime risk should be managed in a broad systems context capable of including both landside and water-side activities. At Texas City, locating oil storage facilities and refineries near the waterfront added unnecessarily to the potential impact of an accident involving a powerful explosive like ammonium nitrate fertilizer, which originated in the maritime environment. At Valdez, storage tanks receiving oil from the pipeline were capable of holdings only a few days' throughput. This amounted to inadequate buffering, because the Coast Guard Captain of the Port (COTP) could not close the port to tanker traffic under adverse maritime conditions without effectively shutting down the pipeline and disrupting the production and flow of north slope oil. Since approximately 25% of the US supply of crude was flowing through Valdez, a shutdown could have had a profound and severe impact upon the national economy as well. In other words, port closure was not something a midlevel Coast Guard officer could easily do; in fact, when the COTP did close the port because of adverse weather, he quickly received a call from the secretary of energy. Needless to say, that particular COTP never did so again. In sum, the close proximity of the docks to industrial operations and residences at Texas City and tightly coupled oil-transfer arrangements at Valdez created what Perrow (1984) terms *the catastrophic potential of a high-risk system*.

Unlike Texas City, where a sense of risk and preparations for a serious emergency were virtually absent, the initial system established in Valdez did embody a significant vulnerability assessment. It included a mandatory Vessel Traffic System, separate lanes for incoming and outgoing vessels, pilotage requirements, and extensive pollution response regulations. But, as time passed without disaster, the focus of concern shifted from the possibly serious consequences of a spill to the lower probability that one would actually occur and the high cost of maintaining preventive systems. Deterioration set in when the Coast Guard, the state of Alaska, and private-sector entities began ignoring the possibility of a serious spill in Prince William Sound and focused their attention on the port of Valdez and the Valdez Narrows.

Texas City was vulnerable because no one realized the explosive potential of ammonium nitrate fertilizer and basic preparedness and response functions were absent. In the *Exxon Valdez* case,

system vulnerability was enhanced because major stockholders failed to perform as expected. Alyeska fell short in preparing to combat a major oil spill in Prince William Sound, and the state of Alaska acquiesced to this critical breach of conditions for the operation of the pipeline/tanker link between the north slope and west coast refineries. There was no plan to specify an operational response organization or set up unambiguous functional relationships between the Coast Guard, the state of Alaska, and the oil companies. For its part, the Coast Guard's oil spill response capabilities were severely diminished by budget cuts and redirection of assets to the war on drugs during the 1980s, while research on pollution response as well as funds for development and acquisition of material disappeared.

In sum, Valdez and Texas City are instances where hazardous products were moved through areas with a high potential for severe emergencies and where complacency, abetted by prosperity, increased risks. The fact that complacency at Texas City derived from ignorance about the explosive potential of ammonium nitrate fertilizer and at Valdez emanated from the potential impact of an accident to its low probability made little practical difference; in both situations, the prevailing sense of vulnerability was diminished and preparedness undermined in turn.

6.5 Response

Like the disaster at Texas City, the *Exxon Valdez* spill was an unanticipated, sudden-onset technological disaster. In such instances, successful coping actions require immediate, focused response efforts. In neither case was there any warning prior to the incident triggering the disaster. But requisite organizational structures and resources were not in place, causing widespread confusion initially and only a remedial, reactive response thereafter. At Texas City, hundreds of people were allowed to congregate at the end of the pier, only a few hundred feet from the burning *Grandcamp*. In the confusion that followed its explosion, the threat of fertilizer in the cargo of the *High Flyer* was overlooked until even remedial action was impossible. After the *Exxon Valdez* ran aground, confusion reigned; organizational response was slow and poorly focused as large numbers of responders deployed along the sensitive shoreline of Prince William Sound. Ad hoc remedial measures, such as the hot washing of beaches, ultimately may have done more harm than good.

These two instances of maritime crises—and others besides—demonstrate that major ports must have the ability to mount a rapid, integrated, multiorganization response supervised by a predesignated individual. For an oil spill, the local Coast Guard COTP fulfills this role as OSC under authority of the NCP. During the initial period following the crisis, OSC is faced with three critical requirements: (1) mobilizing resources, (2) forming the response team, and (3) directing initial response actions. If successful, the response quickly passes through three other stages: mobilization and initial response, integration, and production. The success of the mobilization effort depends upon the adequacy of the plan and the ability of the unit to immediately execute its tasks. Effective notification and mobilization in a plan requires that response scenarios be based on realistic vulnerability assessments and allocation of appropriate resources for each scenario of the disaster. The organizational system uses feedback from the external environment (initial assessment) to formulate resource requirements. These resources must be acquired and mobilized within the time constraints of the external event—that is, the triggering incident. Feedback mechanisms must already exist if the response organization is to perform the initial evaluation effectively. The fact that activities must bridge differences in equipment, organization, and orientation between landside and waterside environments in all three phases necessarily complicates matters.

Integration, the second stage of response in a crisis, encompasses the period required for responding forces to arrive on the scene and integrate particular activities. Bruce Tuckman (1965) points out that all groups involved in response pass through several stages: orientation, internal problem solving, growth, and productivity and control—or, in his terms, *forming*, *storming*, *norming*, and *performing*. Given the sudden eruptions of crises at Texas City and Valdez, the elapsed time for the entire integration stage was too long to be effective, consuming 2 days in the former instance and a week in the latter. A similar delay in organizational integration was a major reason for the tardy federal response to Hurricane Andrew (Carley and Harrald 1993). Although the elements of preplanning, training, and exercising critical stakeholders were lacking at Texas City, even though nominally present at Valdez, these were not sufficiently viable to support a rapid, integrated response by the several stakeholder organizations.

Mere specification of desired organizational outcomes will not ensure integrated action during a crisis. Several conditions may prevent or limit integration, all of which were present in the two case studies: task complexity, organizational incompatibility, and political incompatibility. Let us briefly explain each of these.

Task complexity inhibits coordination during the available time when sufficient resources or capabilities are not yet available. Given the importance of *some* response, this may lead to the formation of ad hoc organizations that engage in experimental problem solving (Dynes and Quarantelli 1968). Task complexity is rife when firefighting, search-and-rescue, salvage, and pollution responses encompass both land and maritime environments. Differences in skills, organizational orientations, and legal jurisdictions are potential impediments. A fundamental drawback to integrated response in the United States is that expertise for these tasks resides in a variety of formal organizations. For instance, in the maritime environment, the Coast Guard has responsibility for rescue and pollution response, but salvage is left to the private sector. Maritime firefighting is a shared local, state, and federal responsibility. The Texas City disaster stands as a prime example of both impediments and criticality of integrated firefighting that spans the landside–waterside divide. Salvage was the major issue after the *Exxon Valdez* went aground; this was better understood by Exxon Shipping and the Coast Guard than by state and private environmental organizations. During the *Mega Borg* oil spill in the Gulf of Mexico off Galveston, the lack of adequate firefighting and salvage resources as well as the location and control of these resources became public issues.

The second major impediment to integrated response is organizational incompatibility. This may assume one or more of several dimensions based on differences in culture, geography, or functions and technology. All are likely to be present in emergencies at ports, navigable waterways, and estuaries. The ability of military units to communicate well with each other and with uniformed state and local police but not with other civil groups or private organizations during Hurricane Andrew illustrates the influence of organizational cultural norms. This is not a new problem. The fact that it is overcome only with difficulty is demonstrated by the inhibiting presence of organizational incompatibilities at Texas City in 1947 and again in Valdez in 1989.

A third issue affecting integrated response is political incompatibility. The point here is that responding organizations may not operate according to the same processes of the decision-making criteria. In an extreme case, decision authority may be withheld from participants by the parent organization. A more typical example would be conflict that could arise between organizations oriented toward centralized, autocratic decision making that are suddenly obliged to cooperate with other stakeholders commonly operating in a decentralized mode. This extends to the difficulties that spill response groups, port safety, and security are likely to encounter under the pressure of an emergency. At Texas City, this type of incompatibility obviated meaningful cooperation

among a variety of organizations with a stake in port safety, including the Coast Guard, army engineers, dock operators, ship captains, shipping agents, and stevedores. Decision making for the organization created to respond to the spill created by the sinking of the *Tenyo Mam* at the entrance to the straits of Juan de Fuca explicitly included the Makah Indian tribe because its lands were affected; not surprisingly, the tribe's decision criteria and process were significantly different from those used by federal and state response teams (US Coast Guard 1991).

The third and final stage of response is production. In the case of pollution, this is reached when response organizations stabilize and attain the capability to operate routinely in formulating and adjusting tactical plans on a short-term basis. The response phase is not actually terminated at this point, but the system, task environment, and information flows are stabilized. Successful outcomes are possible but not assured. In order to achieve success, the dimensions of success and measures of effectiveness must be defined and broadly accepted by participants and observers. This implies that the manner in which success is defined is critical to any assessment of preparedness and response. Its definition during *Exxon Valdez* was, in effect, abdicated to the media, meaning that success became a moving threat and responders were unable to counter the resulting perception of failure. For weeks following both crises, neither of these efforts achieved a routine, consequently missing opportunities for effective initial actions that might have limited damage.

6.6 Legislative Initiatives

The Texas City disaster, together with concerns about sabotage during the Korean War, led to the creation of the Coast Guard port safety program by President Truman in 1950. This assigned the Coast Guard COTP significant powers over the movement of vessels in the port under his jurisdiction. These responsibilities were extended by the Ports and Waterways Safety Act of 1972. None of this, however, enhanced federal maritime firefighting or salvage capability. It also failed to resolve a major shortcoming inherent in the Texas City disaster—response efforts impaired by jurisdictional problems between different levels of government when emergencies encompass both landside and waterside facilities.

Legislative action and organizational change stemming from the Exxon Valdez incident was of similar character. The Oil Pollution Act of 1990 (OPA 90), the formation of the Marine Spill Response Corporation (MSRC), and legislation by coastal states were designed to effect major changes in oil spill response in the United States. Response organizations are now able to mobilize more and better equipment and provide more trained personnel at the site. The MSRC, a private-sector initiative funded by major oil transporters, will invest approximately \$1 billion in oil spill response equipment stockpiled at various points and deployed under the direction of one of five regional centers. The Coast Guard has augmented its response capability by creating the NRT and stockpiling its own equipment at various sites. The creation of an independent national oil spill response organization, the National Response Corporation, to compete with the MSRC was announced in November 1991.

Under the aegis of OPA 90, local area and regional contingency plans set higher and more comprehensive planning requirements for transporters—those who store oil and for governmental entities as well. This act requires that local area or port teams be created to coordinate federal, state, and industry plans executed locally. The Coast Guard and the Environmental Protection Agency (EPA) have revised the NCP to reflect OPA 90 requirements. The former agency has drafted regulations specifying the required content of industry and local area contingency plans.

One by one, coastal states are drafting their own oil spill legislation that will create their own unique spill response organizations.

These initiatives mean that responding organizations have access to an unprecedented stock of resources and support from a complex array of plans and organizations for ensuing spills. The question is, however, whether responsible agencies have given sufficient consideration to organizational matters, which are complex but critical in mobilizing and integrating resources at a spill scene with sufficient rapidity. In addition to neglecting jurisdictional and functional differences between land and marine environments, these do not deal forthrightly with inconsistencies between the NCP and other federal crisis management plans and neglect lessons derived from theoretical research about organizational design for crisis decision making.

6.7 Conclusion

Texas City and *Exxon Valdez* are two disasters separated by a considerable period of time and by differences in the nature of the event. The preparation and response of organizations involved have four common characteristics:

The first is *complacency* in the face of acute exposure to hazards. The combination of petrochemical operations in close proximity to docks handling ammonium nitrate fertilizer created a veritable powder keg in Texas City, yet plans and resources required for disaster response did not exist. With respect to the *Exxon Valdez* incident, over 25% of the total crude oil supplied to the United States made its transit through Prince William Sound. Millions of private and public dollars were spent on oil storage and transshipment facilities in Valdez, to build the oil tankers and to establish the Coast Guard Vessel Traffic System. Plans were written and drills held, but these were based on the mistaken assumption that a massive oil spill would never happen. When the oil spill did occur, Alyeska's response was as inadequate as the efforts of Texas City's volunteer fire department.

The second characteristic was the adverse impact of *fragmented jurisdiction* on the response efforts. As discussed earlier, the fundamental dichotomy at Texas City was a failure to attain a modicum of integration between landside and waterside functions and responsibility necessary to coordinate response efforts. During the *Exxon Valdez* affair, it became painfully evident that the NCP could not resolve roles and responsibilities among federal, state, and private-sector groups. A unified response effort was never organized; the response that evolved was conducted by coordinating committees throughout.

The third characteristic of preparation and response was *poor information processing and management*. In neither disaster did the responders accurately assess the situation during the phase of maximum damage. Information transfer between organizations was slow, informal, and distorted. As a result, different portions of the respective response efforts were operating with different mental models of the problem. Information transmitted to the public by responders also came in a slow and fragmented manner. In both disasters, the media obtained their own information and formed their own view of the event, which was transmitted to outsiders converging on the scene; as a result, it had a significant impact upon response efforts.

The fourth and final characteristic of both events was the *ad hoc nature of the response*. This was probably inevitable, given the preexisting conditions of complacency and fragmented responsibility. These ensured that responders would not be prepared, would not have adequate plans for the situation they confronted, and would not be able to communicate with each other. Contingency plans for an oil spill did exist at Valdez, but they quickly proved unrealistic and were discarded.

At least 24 h passed after the explosion of the *Grandcamp* before an effort to coordinate response even began at Texas City. However ingenious, spontaneous organizations, strategies, and tactics failed to achieve the degree of coordinated activity required for effective action.

It would be nice to believe that OPA 90 and revisions in the NCP have ushered in a new era in maritime disaster response. The results to date are mixed. Two major oil spills have occurred since the *Exxon Valdez*, suggesting that, under certain conditions, successful coordinated response in the maritime environment is attainable. The *American Trader* spill occurred prior to OPA 90 and the *Morris J. Berman* spill came 5 years after the act was passed.

The US flag tanker *American Trader* grounded on one of her anchors, spilling approximately 9500 gals of Alaska crude oil into the waters off Huntington Beach, California, on February 7, 1990. Unlike the *Exxon Valdez* response, federal (Coast Guard), state, and corporate (British Petroleum) response efforts involving over 1300 persons were closely coordinated and organizationally grounded within the Incident Command System (Card and Meehan 1991; Rolan and Cameron 1991). OPA 90, it was hoped, would encourage the evolution of coordinated response on this scale.

The grounding of the tank barge *Maurice J. Berman* 200 yd off Punta Escambron, Puerto Rico, several years later yielded different results. Although the spill response was successful and the unified command system prescribed by OPA 90 was established, organizational deficiencies severely hampered the effort. The federal OSC observed that “the lack of coordinated planning and dialogue among various sectors of the response community before the incident continues to hamper the collective ability of responders to come together quickly and effectively in an emergency situation” (Ross 1995).

Perhaps the most significant conclusion is that there was little difference in the outcome of an event where there was no preparation (Texas City) and where preparation was based on false premises (Valdez). Particularly in technological disasters where warnings are brief, onset is rapid, and most damage occurs in the early stages; successful coping will turn upon realistic and careful risk and vulnerability analysis as well as upon the presence of organizational viability.

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***Part II: Macro and Micro
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Chapter 7

What Disaster Response Management Can Learn from Chaos Theory

Gustav A. Koehler, Guenther G. Kress, and Randi L. Miller

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7.1 Disaster Characteristics That Disorder Organizations

Major disasters have a low probability of occurring, but when they do, they can have devastating consequences. Designing response structures for such events is a difficult task, particularly when public resources are limited. Typically, the effort to organize a disaster response structure involving multiple public, private, and nonprofit agencies is hampered by a number of unpredictable factors. One or more of the following factors may apply in an emergency response situation.

The type of disaster and its magnitude that could occur at any time are unpredictable. Clearly, disasters such as earthquakes and hazardous materials releases are inherently unpredictable. Such disastrous events are somewhat akin to Taleb's "Black Swan" (Taleb, 2007). When looked at from a local perspective, they are typically outside of day-to-day expectations, given their rare occurrence, either they will not happen today or they can never happen here. Even so, when they occur, their impact is extreme. Afterward, we think we can explain what happened even though the event itself is unpredictable. And while hurricanes, tornadoes, civil disturbances, and floods are somewhat more predictable, the exact time when, for example, casualties will occur or when medical transport is needed remains unknown. Recent research suggests that some disasters such as terrorist attacks and certain types of social conflicts may follow a power law, suggesting some as yet unidentified internal links across scales (Adrianai and McKelvey, 2007; Bohannon, 2009; WordPress, 2009). In other words, common small events and rare large events may be connected in unknown ways.

We suspect that even larger-scale disasters that are fundamentally different in their geographic structure and magnitude, involving multiple and diverse "Black Swans," may be emerging as global warming affects the planet. Up until now, disasters have been relatively local. Global warming disasters, however, occur at multiple points around the globe. Their scale as connected networks involves atmospheric changes, changes in ocean currents, dust storms, etc., via the global warming process, that manifest themselves very differently and yet in a connected way, locally. This suggests a very different and much more complex problem with predictability. A further dimension associated with climate change involves the very sensitive financial, travel, food, water, and other global networks associated with globalization. Sensitivity to initial conditions and propagation across multiple networks can produce Black Swan-like events (Homer-Dixon, 2006).

Where a disaster will occur is often unpredictable. The exact location of a disaster cannot be predicted, and the way it will geographically progress is unknown in advance. For example, the path of a tornado or the location of a civil disturbance cannot be precisely predicted, often causing considerable variation in the number and severity of injuries. We have also seen this situation in the case of recent historic floods in Pakistan and in Colorado.

How a disaster will unfold in geographic space over time is often unknown. The rate at which a disaster extends itself geographically over time can affect the generation of injuries and deaths and severely hamper response and recovery (Koehler, 1993). It often spans and destroys established political, neighborhood, and other boundaries. New, unexpected boundaries may be established as shown in the pre- and post-Katrina pictures of New Orleans or of the Tsunami that hit Honshu, Japan (Koehler, 2011). Furthermore, each local area has its own fast or slow timing imposed by redefined boundaries relative to the whole. Even more importantly, an already fragile infrastructure or local response system, when combined with poor planning, can increase the magnitude of the local impact (Comfort, 2006).

Equally important, global-scale multidisasters draw down local and global resources in complex and unexpected ways. This makes it difficult to determine when the disaster phase of an event is over or how its boundaries might have changed. When were the Haiti and Katrina disasters over? Where is the boundary between the flooding and cholera disaster in Pakistan? How do we compare and simultaneously organize our responses to multiple, diverse disasters occurring within very different geographic, political, social, and economic boundaries such as massive fires and Arctic ice melting? All of these events may give rise to economic collapse, very large migrations of people, and even wars.

The perception of threat by people living in the disaster area is related to the type and distribution of injuries, and the pattern of their arrival (least injured first, followed by more severely injured in bursts)

in space and time is often unknown. Particular types of disasters have specific injury profiles. Such profiles are dynamically interrelated with perceptions of at-risk population movements at different times of the day (Guastello et al., 2008). For example, an earthquake produces lacerations and crush injuries. A hazardous materials incident can produce inhalation injuries. A riot can injure many people, with the least injured arriving first at a hospital exhausting supplies, followed by the more critically injured (Koehler, 1993). But lacking knowledge of the space–time distribution of where the disaster occurred and the rate at which it is proceeding makes it difficult to predict the profile of injuries, particularly if, for example, an earthquake or a Tsunami and a hazardous materials release occur simultaneously (Koehler, 2011). This complex situation is compounded by the varying patterns of movements of people (young, old, before or after work, etc.) over a 24 h period by week day in a city (Janelle, 2002).

Which elements of the emergency response system will be damaged, how they will be damaged, and the resulting delay in their response is unpredictable but can have profound unexpected effects on the response. For example, medical resources such as personnel, supplies, ambulances, hospital beds, and communication links can be overwhelmed, damaged, or distorted. Their location, distribution of response units, and availability are often not congruent with the type, volume, and distribution of injuries. Furthermore, the initial starting conditions of any one agency, such as staffing levels of a casualty collection point, affect the way its own structure emerges and how it relates to other agencies (Koehler, 1992; Paul and Lin, 2009). These factors take on new characteristics under global multi-disaster conditions. Here, the problem of coordinating multiple jurisdictions and the timing of their lifesaving response elements, donor fatigue, allocation of emergency transport resources, and so on, become problematic. Triage of disasters as a whole may emerge.

Self-organizing efforts by citizens, responders in the field, and other emergency organizations at the state, federal, nonprofit, and private sector levels may create unexpected communication paths and response structures. Following a disaster, people in the area organize themselves face-to-face to rescue neighbors and perform other immediate disaster response activities. Responders, hospital staff, fire personnel, and others will be repairing their disrupted and damaged systems and creating new and often unplanned organizations for delivering disaster relief services. Volunteer organizations and other private response groups may suddenly appear and demand that people's needs be immediately met. Additionally, an expected response may not materialize or resources may not be available; this situation appears to be the case in the early stages of the flood disaster in Pakistan.

Emergent disaster-wide social networks such as twitter and other mobile sources are almost instantaneous sources of information, rumors, rapid crowd organizers, etc., creating a new communication layer. More than 4 billion people around the world now use cell phones, and for 450 million of those people, the Web is a fully mobile experience (Bughin et al., 2010). Mood maps of twitter users using Geographic Information Systems (GIS) have been generated for the United States, showing the useful application of this technology (Biever, 2010). Such maps could be very useful for identifying various population stressors such as the need for food, water, shelter, and level of satisfaction with the response. Twitter provided very rapid, local updates about what was occurring on beaches and with pets during the 2010 Gulf Oil disaster, and in the streets, very early updates on injuries in the streets following the Haiti earthquake (<http://twitter.com/nytimes/haiti-earthquake>; Barnes, 2010). The distribution and use of cell phones relative to collapsed building and injury concentrations have the same problem as all news reporting media have, which is an unknown level of selection bias relative to non-tweeting areas. It is also difficult to determine how racism and religious fanaticism may fit into and define a response. For example, the killing

of response workers in an effort to control response supplies for political purposes can change a response's effectiveness. Here, a small disruption can suddenly worsen one of many simultaneously occurring global disasters.

Information technology serves as an almost invisible backbone for supply chains of various kinds and is used in just-in-time production, warehousing, and delivery systems, all increasing their vulnerability to disruptions and capacity to respond (Dozier and Chang, 2007). Hospitals and medical supply production houses do not maintain large and costly inventories of supplies. Instead, they are tied together by complex supply chains and logistical systems that are often regulated by complex computer systems. This suggests that supplies may be in shorter supply than one might think and difficulties with delivering them may be more complex. Virtual network management skills may be important to managing the disaster response supply chain to and within the disaster (Henegman and Greenberger, 2002).

Differences in perception between disaster response organizations and disaster victims may generate dysfunctional consequences for the overall performance of the disaster response. Kirschenbaum (2003) argues that disaster response organizations tend to focus on their own welfare and survival rather than doing their best to assist the people most affected by the disaster (Quigley, 2004).

Information about the entire emergent disaster response structure or even parts of the response (including how it extends across the community, city, and operational area, as well as the status and organization of the regional, state, and federal responses) is incomplete, particularly if other global disaster events are occurring simultaneously. A disaster response structure is *emergent* because it did not fully exist prior to the disaster. The response involves the birth of new units or the restructuring of old ones at the work group, organizational, interorganizational, community, regional, or even global level that are more or less adaptive to a particular circumstance within the disaster(s) (Comfort, 1994a, 2010; Drabek, 1987; Koehler, 1995). It is difficult to identify what and where the new structures are or how old ones have changed, as well as to identify the form of intergroup and interagency connections. As noted, this situation can be compounded by the emergence of new twitter and other social networks with varying degrees of reliability.

Preexisting strains between organizations may be exacerbated. Preexisting strains between organizations due to competition, organizational placement, routine underfunding and understaffing of disaster preparedness, and other factors may make interorganizational coordination more difficult (Comfort, 2006; Drabek, 1989).

Because of initial starting conditions and varying resource demands, critical activity rates within and between organizations drive each other and the overall response in unpredictable and complex ways. A disaster response depends on tight and effective coordination between many different public and private organizations all evolving and moving at varying rates and different scales (Guastello, 2010; Koehler, 2003). For example, citizen self-organizing rescue efforts, ambulance companies, law enforcement, hospitals, pharmaceutical supply houses, surface and air transport, military forces, and federal, state, and local government agencies may be included in any disaster response. The rate of victim rescue affects how quickly transport vehicles must be identified and dispatched, which in turn affects how many injured people are waiting for care in hospital emergency departments, emergency department staffing, and so on (Koehler, 1992). The interaction of these factors is driven by the availability of communications, perceptions of how the system itself is organized and responding (such perceptions can lead to demands that are also disruptive [Dozier and Chang, 2007]), health care personnel and supplies, as well as by whether transport can move necessary resources to where they are needed (Comfort, 1994). This situation is even more difficult to conceive of when trying to route multiple responders at sea and in the air to multiple locations around the globe.

The various ways in which a disaster disrupts both individual organizations and collective efforts to develop a disaster response system point to several critical issues in disaster and emergency management:

1. The best efforts of disaster managers to develop a disaster response system at whatever scale and wherever in a multi-event setting may achieve relatively poor results because of the following:
 - a. Managers may think that no one has been here before, that their challenge is unique with no known management principles to guide them or, conversely, demonstrate competency addiction by repeating legacy mind-sets and behaviors that are disconnected from the immediate challenges (O'Hara-Devereaux, 2004), and that the real issue is improving top-down management (Reinhart and Rogoff, 2009).
 - b. The problems they face at the onset of the disaster are often ambiguous, unclear, and shifting.
 - c. Information is unavailable, unreliable, problematic, and subject to multiple, competing interpretations.
 - d. Resources are limited, not immediately available, and are being used up at unknown rates.
 - e. Lacking a clear problem definition as to where the most injured are located, a profile of the injuries, and measures of success relative to how the entire response is proceeding makes it difficult to systematically prioritize resources during the earliest part of the response.
 - f. Attempts to organize may actually be counterproductive due to incomplete knowledge about the nature of the disaster and the availability of resources.
2. Simple relationships, even deterministic ones, appear to generate indeterminate behaviors because of varying response rates—the disaster's time ecology between individuals and organizations.
3. The application of simple rules (e.g., all messages requesting assistance must come to a specific message center and not go directly to response organizations) can generate complex results (e.g., message delivery is slowed increasing problems with obtaining resources in a timely manner) and disrupt supply chains and logistics.
4. Small changes appear to have an amplifying effect across the entire response, resulting in large unexpected changes later on.
5. Multiple-layered informational, social, economic, and other formal, informal, or IT-based networks may interact to produce emergent, unexpected problems that are tangential to the actual destruction caused by the disaster. These events may help to refine a response but may also sidetrack or redirect scarce resources and information-handling capacity.

Due to some or all of these factors, the planned emergency response system will probably not be the one that emerges. This situation is probably made worse if multiple disasters are occurring at the same time. The one that does emerge will, most likely, have a tendency to be locally self-organizing, somewhat unpredictable in its interorganizational linkages, and likely to succeed or fail in unpredictable ways.

Managing disasters is indeed a daunting task as recent disasters including Hurricane Katrina, the Indian Ocean tsunami, the earthquakes in Haiti and Chile, the oil spill in the Gulf of Mexico, and others clearly show. Many of the factors discussed previously were present in these disasters. Can chaos theory, the study of complex deterministic nonlinear dynamical systems (Overman, 1996), provide insights as to how and why these organizational phenomena occur? If so, are there

strategies that management can adopt that may improve the nature of the disaster response? This chapter addresses these questions by first looking at how chaos theory helps us understand the process that causes disaster organizations to become disordered. Second, this chapter discusses appropriate strategies for the management of nonlinear events such as disasters. Third, it arrives at key lessons disaster response managers can learn from chaos theory. After a review of the limitations of chaos theory for disaster management, this chapter concludes with a presentation of options for future administrative and legislative action in California and elsewhere.

7.2 Workplace Rules, Fields of Action, and Organizational Morphogenesis

Disaster workers are in constant motion at various locations as they simultaneously apply various management systems (e.g., the Incident Command System [ICS] and the Standardized Emergency Management System [SEMS] in California and the National Incident Command System [NICS] at the federal level) and develop strategies and tactics to organize and implement their response. How leadership emerges and its characteristics at the onset of a disaster are critical to what follows (Guastello, 2002). Generally, they are applying policies, work processes, work behaviors and attitudes, or *workplace rules* within a *field of action* (Kiel, 1994). Workplace rules refer to rules for interorganizational coordination and communication such as with an emergency operations center (EOC). The field of action is defined as the physical workplace and the external environment as they dynamically interact to form a nest time ecology. Nested refers to complex interactions between individuals, organizations, and the unfolding of the disaster that time out the field of action. Variations in capacities, the patterns of interactions (proximity and activation), and the criteria for the selection of actors and strategies all change as the field of action changes (Axelrod and Cohen, 1999). The field of action is dynamic, multidimensional, and highly complex. It initially tends to be highly disorganized or in a *high state of entropy* (Guastello, 2010). In the case of a disaster, the field of action is influenced by the initial conditions that an organization finds itself in following the often abrupt onset of a disaster. Kiel (1994) tells us that

It is the interaction of the [workplace] rules of motion with the field of action that determines the direction and result of motion in the workplace. The dynamic created by the interaction of the 'rules' and the 'field of action' lead to agency outputs and performance. (p. 50)

As the field of action changes and as emergent leadership responds to it, the organization's functions and accompanying work rules that are driven by available resources and information change as well, which in turn change its structure. In fact, as chaos research shows, it is the relationship between available resources, or the lack thereof, in the field of action that can severely disorganize an organization. Organizational survival and the emergence of the response system are related to these self-organized adaptive activities (Jantsch, 1980; Marion, 1999). Often the emergent structure stabilizes long enough to provide some range and level of services before changing back to its pre-response form (Thom, 1972).

Our earlier discussion of what happens to an organization following a disaster and its efforts to form a disaster response system, as well as the limits of rational management, could be interpreted to mean that there are no rules or characteristic stages that define the disaster management process. Furthermore, we do not fully understand how interagency structures emerge when faced

with a disaster situation (Drabek, 1987). Recent social network analysis may provide guidance on how to approach this problem and on how to manage various components of the disaster response network (Magsino, 2009). While there is a large literature that carefully describes and characterizes organizations and interorganizational behavior at various points in this process, there is no general theoretical explanation for the process of disaster organization emergence, structure, stability, reintegration into the day-to-day system, and cross-system interaction. In what follows, we hope to show that chaos theory, which we have already drawn upon to describe a field of action, may throw some light on the processes associated with the emergence of disaster response organizations.

The development of a time-based, process-oriented map using GIS systems to visualize how organizations change under extreme conditions, such as those prevailing in a disaster, already is hinting at deeper or more fundamental aspects of the organizational change process in disaster situations (Johnson, 2000). Workplace rules and the field of action create unique variations that emerge from these deeper processes. In a way, the problem is analogous to how an individual organism grows. While each individual grows differently, they are also a member of a particular species and exhibit a general body plan. Their individual growth process (morphogenesis) obeys very specific rules that guide growth from an egg to an adult and on through death (Abraham, 1985; Koehler, 2003; Lincoln et al., 1982).

These deeper rules and their interactive timing guide the formation of organs, bones, etc., so that functioning but different and adaptable individual organisms emerge. Is there a similar set of organizational morphogenic rules that map the process of how an organization is disorganized and then reorganized? Can we look below the surface features of a disaster and find more general principles that can be used to speed the response along? Are there similar rules that apply to the “morphogenesis” of large-scale response systems (Quarantelli, 1987)? The term *morphogenesis* will be used to refer to this deeper set of organizational response system dissolution/reforming rules. We will assert, for the sake of discussion, that such morphogenic rules exist for disasters at different scales and present some preliminary empirical evidence of how they might work. Of course, just like poor computer programming can lead to badly functioning applications, so too can morphogenic processes lead to poor outcomes.

Our discussion has sidestepped for the moment what a global warming disaster response system would look like. Actually, we cannot say until we are able to model events globally with overlapping networks of various kinds as they are being disrupted by multi-casualty incidents, disasters of various types, and the collapse of various water and other systems. This also extends to a well-founded theoretical discussion of response structures as global complex systems.

In summary, our hypothesis is that effective disaster response management involves the emergence of leadership that creatively applies morphogenic and workplace rules within the disaster field of action. In so doing, an effective disaster response pattern emerges (self-organizes to a significant degree) in space and time to meet a qualitative objective such as saving lives. These principles would seem to apply to climate-driven or interpenetrated disasters as well.

7.3 Chaos Theory and the Rules of Organizational Morphogenesis

Disaster response organizations and response systems are dynamical systems. A dynamical system consists of two parts: a rule or *dynamic*, which specifies how a system evolves, and an initial condition or *state* from which the system starts. Some dynamical systems, such as those being discussed here, evolve in exceedingly complex ways, appearing to be irregular and initially to defy any rule.

The next state of the system cannot be predicted from the previous one even though there may be deterministic conditions that limit the possible responses to certain characteristics (Peitgen et al., 1992), which may be disaster specific (Guastello, 2002).

In mathematical theory, the change from order and predictability into unpredictability or chaos for dynamical systems is governed by a single law. Furthermore, the *route* between the two conditions is a universal one. According to Pietgen et al. (1992), “Route [of this law] means that there are abrupt qualitative changes—called bifurcations—which mark the transition from order into chaos like a schedule, and universal means that these bifurcations can be found in many natural systems both qualitatively and quantitatively” (p. 584). Put another way, chaos is a type of nonlinear behavior emerging along a universal route. At a certain point along this route (*close to the edge of chaos*), organizations become highly sensitive to initial conditions and may abruptly change. In chaos theory, sensitivity to initial conditions is also referred to as the *butterfly effect* so called because a small change (e.g., the flapping wing of a butterfly) can cause unforeseen, large-scale changes in a system over time (Glick, 1987). As suggested, this route should also be examined on a global sphere with multiple events of various types occurring. Is there synergy generated that could increase the severity of an event or improve the response?

The effect of a disaster on organizations and response systems and the form(s) they take appear to be influenced by the initial conditions they experience following the disaster. Having said this, we still do not know if such organizations or systems move from a relatively stable state into a chaotic one or if they are simply adjusting their behavior within a given and predictable set of possibilities consistent with each organization’s work rule (Holden, 1986). The two conditions are very different and require different management strategies; in the earlier case, the existing management strategy is useful; in the latter, a new one is necessary to deal with an emergent process and accompanying structure (Comfort, 2007). The application of chaos theory and related catastrophe or sudden change models to other social phenomenon can be helpful in clarifying this issue (Bar-Yam, 2004; Brown, 1994; DiLorenzo, 1994; Forgues and Thietart, 1994; Gregersen and Sailer, 1993; Guastello, 2002; Kronenberg, 1994; Poole et al., 2000). If it cannot be empirically shown that at least some disaster response organizations and response systems come close to or enter into chaos or exhibit one of the four forms of change of what are called *cusp catastrophes*, then disaster management has little to learn from chaos theory. More to the point, do the *single law* and *universal route* apply to a disaster response or are we just using an interesting metaphor?

By applying the logistic equation (a mathematical formula for the unfolding of complex growth processes) to appropriate disaster response data, it is possible to determine if a disaster organization or response system traces the universal route from order to increasing disorder to chaos (Morris, 2007; Priesmeyer and Cole, 1995). Priesmeyer and Cole (1995) were the first to provide a detailed discussion of how the logistic equation is applied to a large number of disaster phenomena to produce what is called a logistic map. A logistic map models the development of complex chaotic behaviors analogous to the logistic equation. Using disaster exposure data provided by Bosworth and Kreps (1986) and Priesmeyer and Cole (1995) show that disaster organizations follow the logistic map in their initial response. This finding was replicated by Morris, who also found that once the response settled down after a week, a more orderly structure emerged (Morris, 2007). The logistic map shows that as the level of activity increases and the environment becomes more turbulent, the organization moves from a relatively steady state through a bifurcation point and on to the edge of chaos and, following the effects of initial conditions, goes on to self-organize. Work by Guastello has identified 22 catastrophe-related studies that show that disasters demonstrate rapid, *cusp*-related changes (Guastello, 2002). The empirical evidence seems to support the view that chaos theory and analytical techniques do describe organizational responses immediately after the

event and may trace self-organizing processes following bifurcations. At this point, social network analysis and other complex systems tools provide further insights on how to track and influence the now partially self-organizing response (Bar-Yam, 2004; Magsino, 2009).

If the environment becomes even more disordered, requiring the commitment of even more resources, the organization is forced to move through various structural states until chaos sets in. Prediction of the next organizational structure becomes progressively more difficult. In terms of individual or interorganizational interactions, a series of ever-increasing self-reinforcing *errors* are made by participants, deviating from established workforce rules and their relationship to the disaster's field of action (Koehler, 1995). These continuously repeated errors become amplified and redefine the functions of the organization, which in turn redefine its structure. The errors increase the organization's sensitivity to small changes in the environment (sensitivity to initial conditions), which in turn cause large changes in the organization's structure. Thus, errors increase the rate of variation, which through interactions selects a particular form that may be functional or dysfunctional in its response to the disaster (Axelrod and Cohen, 1999). From a global perspective, and from not knowing where the boundaries of a disaster are, such organizational failures may occur at multiple places and times.

To summarize what happens to management efforts at and following a bifurcation point,

- The relationships between work rules, the field of action, and the environment become more and more unpredictable, sometimes leading to a chaotic disorganization at the beginning of the response
- Problems of varying magnitude and the efforts to address them (*errors*) may generate large structural changes in the organization (Farazmand, 2003)
- The organization's functions and structures may lock onto one of the two or more functional or dysfunctional states relative to disaster response efficiency or may oscillate between them

Eventually, bifurcations and accompanying oscillations become so complex that they cannot be distinguished from chaotic conditions.

When chaos occurs a...system does not retrace prior identifiable sequences of behavior and does not evidence obvious patterns in its behavior. Chaotic behavior thus appears extremely disorderly since patterns over time, a symbol of orderliness, do not appear to exist. Chaotic behavior simply skips from one identifiable point to the next, yet never extends outside clear and distinct boundaries. (Kiel, 1995, p. 189)

Priesmeyer and Cole (1995) suggest, however, that disaster systems do *not* enter chaos. Instead, they tend to exist at the edge of chaos. Guastello (2002) provides additional support for the view that sudden changes occur at the edge of chaos; at this point, the field of action overwhelms the workplace rules—a *catastrophe*—that severely disrupts the organization's structure.

At or near the boundary of chaos, it appears that the ordered structure of a disaster response agency loosens, potentially making new behavior possible. It is at the edge of chaos that sufficient fluidity is achieved by continuous *error*, allowing for new work rules and an evolving field of action to emerge and be absorbed into a new but not necessarily more adaptive organizational structure (Kaufman, 1993). Organizational changes traced by the logistic map do not necessarily lead to a rational emergent process or structure; they simply undergo certain characteristic changes at certain points that workers and managers must respond to. Interestingly,

such changes often can lead to structures with an increased level of organization that are more complex and are capable of accomplishing more work than the previous ones. Kiel (1989) suggests that “this is due to its increased capacity to attract, utilize, and organize available energy for its creation and maintenance” (p. 545). The work in evolutionary theory and simulation studies supports the view that organisms at the edge of chaos tend to be highly adaptive (Kaufman and Goerner, 1994).

It may be that this new or adaptive response structure emerges from a *phase transition* at the edge of chaos. There are two types of phase transitions: first order and second order (Waldrop, 1992). A first-order phase transition involves a sharp change from one physical state to another. An example is the rapid transformation of water to ice. The change is very abrupt and well-defined. A second-order phase transition takes more time to accomplish and is less precise. Once a second-order phase transition starts, no clear-cut structure remains or immediately emerges, but there are lots of little structures coming into and going out of existence. Efforts to establish a *better* order or to select a particular organizational structure among many possible ones are management’s task. This structure is reinforced by what is called a path-dependent process; that is, once the structure begins to aggregate, there is a tendency to direct resources toward that aggregation rather than to other alternative ones (Arthur, 1990; Arthur et al., 1987). Both of these concepts—phase transition and path-dependent processes—are important to understand how large, geographically extended structures may emerge.

Drawing together what has been said about the edge of chaos,

- At least during the first 24 h after an event, disaster organizations may exist at the edge of chaos depending on the field of action and available resources, a position that allows maximum adaptability
- Very small changes or *errors* in organizing and managing the response can have large organizational consequences as time goes by
- The accumulation of errors could lead to a second-order phase transition characterized by a period of disconnected organizational fragments that may eventually come together to form the new organization or system
- More complex and adaptive structures may emerge from a phase transition, but they are not necessarily more efficient
- Path-dependent processes may play an important role in reinforcing an emergent organizational structure

Although the logistic equation is very simple and carries little information about the individuals, organizations, and systems we are interested in, it seems to map the essential information about how these systems become disorganized and why they take the form that they do. Both Priesmeyer and Cole (1995) and Morris (2007) show that disaster responses are clearly nonlinear and at the very edge of chaos; therefore, nonlinear tools and chaos theory are useful for developing disaster management techniques. Guastello’s (2002) empirical catastrophe-based analysis supports our general approach as well.

7.4 Chaotic Systems Management Theory

Recent research indicates that management techniques appropriate for organizations prior to a bifurcation point do not work well once an organization reaches this point or moves to the edge of

chaos (Comfort, 2007; Farazmand, 2009). The emergency response to Hurricane Katrina in New Orleans demonstrates this point. According to Farazmand (2009),

Routine crisis and emergency situations can be managed with normal emergency management capacities, but once passed into chaotic and complex crisis stages, almost all those capacities become useless. Managing complex, chaotic, and high level crises requires different sets of knowledge, skills, and preparation that involve decision making, central and yet flexible organizational structures, and a leadership capacity to stay on top of the crisis that is unfolding with dynamic changes. (p. 402)

Prior to the bifurcation point, the variations occurring in the environment fall within the organization's change capabilities. The management task at the bifurcation point is to dampen the disrupting, and often quite local to the disaster, structural oscillations. The challenge at the edge of chaos is how to creatively make sense of the big picture, continuously scan the environment, seek coalitions with other responders to innovate, avoid getting stuck in competency addiction, learn rapidly, make decisions fast, and execute with discipline in order to effectively recouple the organization via a second-order phase transition (O'Hara-Devereaux, 2004). Kiel (1995) tells us that

Most importantly, during times of high instability such as disasters and occasions when emergency services reach peak levels of activity it is essential to recognize that stability can only be regained by developing strategies that are themselves unstable. In short, we must match the instability of these environments with management practices and organizational strategies that are dynamic and fluid. (p. 2)

There are at least three ways for leaders, following O'Hara-Devereaux's, Kiel's, and Comfort's suggestions, to deal with chaos:

- *Alter organizational parameters so that the range of fluctuations is limited.* In this case, management tries to reduce the amount of change going on within the system by reducing the effect of critical behavior and other factors on the system. The goal is to reduce uncertainty, increase predictability, and avoid a competence lock-in so that management goals can be achieved. However, this approach is unlikely to work for an organization at the edge of chaos since the number of factors that are affecting the organization may be very large, and their relative importance to the emergence of the new organizational structure cannot be predicted.
- *Apply small perturbations to the chaotic system to try and cause it to organize.* This approach requires some understanding of how the various parameters of the organization's system, particularly its operation as a time ecology involving multiple groups, work and what the effect of a small perturbation might be. A highly unstable system may require a small effort—a nudge involving either a higher response priority or making resources available—to cause self-organization to begin. Appropriate, often direct, personal lines of communication rather than the control of hierarchical structures characterize this approach (Comfort, 1994). Adequate communications provide timely information about the progress of the disaster and about the current state of local efforts. The nudge can be as simple as a single person taking charge and making decisions (Weick, 1985).
- *Change the relationship between the organization's workplace rules and the evolution of the environment's field of action.* This requires continuous tracking of the relationship between critical conditions in the environment and key organizational parameters. As changes occur,

organizational parameters are adjusted in a continuous feedback process. For example, the relationship between the number of injured and available transport is closely watched so that as one increases or decreases, so does the other. Clearly, this involves projecting current resource and other defining conditions into the future. This approach could be a way of refining the second possibility earlier. In this case, self-organizing process is consciously shaped to bring the emergent structure more into line with environmental conditions and management goals.

For organizations at the edge of chaos, a combination of the last two options may be useful. As we have noted, the aggregation of organizational fragments at the edge of chaos into a new response structure may be initiated by an unexpected or unpredictable event. Kiel (1994) suggests that "...[A]s with variation beyond the control limits in quality measurement systems, that variation should not be considered a problem in management systems but rather an opportunity to learn why the variation occurred" (p. 22). According to Axelrod and Cohen (1999), variation and interaction produce contextual patterns that lead to continuous evolution and selection of strategies.

In this case, the disaster response manager is looking for variations driving the self-organizing process—the fluctuations—in a direction that appears to meet his/her immediate goals. Such a fluctuation can be either positive (something is being built) or negative (there is a silent area that has not reported). This phase transition or evolution of a response organization or extended response structure to a more adaptive one is a learning process. Good information about variations in the environment and the capacity to learn and visualize based on that information are key manager attributes. These skills include the capacity to *see* beyond the immediate present and construct a longer-term future horizon that may serve to reduce resource waste through continuous short-term adjustments. Such skills are necessary to build in variation and to construct and adjust work rules relative to the field of action for optimal performance under changing environmental conditions (Axelrod and Cohen, 1999; Guastello, 2010; O'Hara-Devereaux, 2004).

Kiel (1994) suggests that "we practice variation by perhaps using diverse teams to try diverse methods on essentially the same disaster or emergency problem" (p. 23). Relatively autonomous, *messy*, or multidiscipline work teams in the field may be able to identify and use relatively large amounts of data to do problem solving and create individual or coordinated response structures that respond to the immediate needs of their clients, be they victims or other response organizations. Conklin (2007) provides guidance on how to deal with messy teams. Teams should be *messy* or unstable in the sense that their membership is drawn from across functional areas constituted to solve a service delivery problem. According to Kiel (1994), "This suggests less of a focus on traditional structuring by functional area and instead consideration of where functional units converge to create outputs and services" (Hammer and Champy, 1993, p. 200). Teams drawn from a single functional area (e.g., medical but not transportation) may tend to define the issue too narrowly and have an overly rigid view on how to address it.

Sensitivity to initial conditions and the inability to predict exactly what form an organization will take at the edge of chaos suggest that it is impossible to predict which pattern for organizing the response is best. Provocative research cited by Loye (1995) finds that groups do a better-than-average job of predicting future events. The research suggests that groups are able to create a chaos *gestalt* that is able to predict a likely outcome. Messy groups, particularly since they are composed of individuals drawn from each element of a problem, seem particularly well-suited for developing and implementing options beyond the edge of chaos (Forgues and Thietart, 1994).

The creation of relatively autonomous, *messy* groups to solve problems in the field suggests a very flat, decentralized disaster management structure. A multilayered, hierarchical structure will tend to restrict information flow at each point as it climbs upward, concentrate and restrict decision making away from the field, and reduce innovation and flexibility. A flat structure allows for the fluid and rapid flow of information, particularly if multiple information linkages are possible such as was the case in Maharashtra, India. Experiments by Hershey and colleagues demonstrate that a flat organization tends to produce the least disorder in information flow resulting in higher efficiencies than hierarchical organizations (Hershey et al., 1990).

These suggestions appear consistent with the four factors that increase the resilience and adaptiveness of the complex system that extends across the disaster. They are (1) a capacity for creative innovation among organizational units that interact as a system to achieve a common goal; (2) flexibility in relationships between the parts of a system and the whole; (3) interactive exchange between the system and its environment; and (4) a crucial role for information in increasing either order or chaos, regularity or random behavior within the system (Comfort, 1994, p. 158).

7.5 Key Lessons for Disaster Managers

Several key management lessons for public disaster response managers emerge from the application of chaos theory to disaster management:

- *No general theory of disaster management as a set of prescriptive rules is likely.* Generally, the implication of chaos theory is that *no grand theory of disaster management* is likely to appear. By extension, no grand theory of disaster management will appear that applies to all disasters and all environments, particularly in varying social time contexts (Kiel, 1994). However, *surprise management theory* holds great promise for the advancement of a general theory of crisis management. By drawing on catastrophe theory, chaos theory, and complexity theory generally, as well as on system dynamics and nonlinear random event theories, surprise management theory attempts to address the dynamic, turbulent, and unpredictable nature of disasters and disaster response systems. According to Farzmand (2009), surprise management theory embraces the nonroutine and unexpected, it constantly changes and adapts to new circumstances, and “it demands cutting edge knowledge, skills, and attitudes beyond the comprehension of most people in routine governance and administration” (p. 407).
- *All levels of the disaster response should be flexible and adaptive.* The capacity to develop a self-organizing response involves the whole system from top to bottom.
- *Managers should look for the unusual, the variation, and the fluctuation that indicates that a new form is emerging* (Comfort, 2007). It is necessary to be open to learning and therefore adapting to what is needed in the new environment. This style of decision making relies on rapid, adequately networked communications and on an “exploratory, experimental process based on intuition and reasoning by analogy” (Stacey, 1992, pp. 13–14). Overall, disaster strategy implementation may be more successful when it involves a series of *nudges* directed at reinforcing favorable fluctuations in the field and collaboration with other response efforts rather than implementing an overall, highly structured plan.
- *Support disaster infrastructure formation processes that enable the response to rapidly organize itself.* Managers need to quickly identify the infrastructure processes that contribute to the emergent response. The logistic map and the associated rules of morphogenesis or the type

of *culp* catastrophe may point to the kinds of *disorder* that will occur. On the other hand, the literature suggests that there are rules that may contribute to the emergence of large-scale complex systems. Infrastructures that support the response process should support a pattern that is likely to help local *messy* groups. For example, the provision of a horizontal, deeply redundant communication system with sufficient capacity or the immediate mobilization of large numbers of personnel and supplies and transportation assets based on the disaster profile might be such an *infrastructure-like* process that contributes to the emergence of a disaster-wide response. Consistent with a flat structure and local decision making, *messy* groups should be able to draw on this infrastructure and avoid hierarchical approval structures.

- *Self-correcting processes that track environmental changes relative to response infrastructure and “messy” group efforts are important.* Continuing success involves creative interaction with what is emerging in the environment. Building on existing strengths to support the response is important. However, this effort should be flexible enough to avoid the negative possibilities of path-dependent processes or competence lock-in that tend to reinforce existing operations rather than being flexible enough to respond to emergent needs.
- *Strategies should be incremental and process oriented, with decisions quickly made and execution tracked so that they speed the self-organization of the response.* Due to the large number of interactions and feedback loops, it is very difficult to predict the detailed course of the response or to develop a comprehensive strategy. “But, on an incremental or local basis, the effects of feedback from one time period into the next are often perfectly clear. This is a powerful argument for planning strategies that are incremental rather than comprehensive in scope and that rely on a capacity for adaptation rather than on blueprints of results” (Cartwright, 1991, p. 54).
- *Managers should take the role of catalyst to cause self-organization to occur.* By having access to information and communications and by making it available to key trained responders, it may be possible to speed the effective formation of local response networks.
- *Management values provide the deepest source of order in an organization.* “A commitment to service, a desire to excel, a drive to improve, and a dedication to having open organizations that let democracy flourish are essential management values in a world of increasing complexity” (Kiel, 1994, p. 218). It may be that the level of employee commitment to change and their ability to cooperate and form “messy” teams may reduce the time an organization is disorganized (Guastello, 2010; Kiel, 1989).
- *Reward employees for creativity.* Successful adaptation often involves making second-order phase shifts. Because the effect of sensitivity to initial conditions and the effects of choices made cannot be predicted, the creation of different visions about what should be done should be encouraged. No single organizational vision for the entire disaster is possible in such an environment. Attention should be given to which skills are needed to make a system emerge. For example, effective communications and information exchange skills appear to be essential here. Employees should be rewarded for risk taking and experimentation that create different options and for making shifts. Managers should focus on “...changing agendas of strategic issues, challenges, and aspirations” (Stacey, 1992, pp. 13–14).
- *The politics of the disaster response need to be addressed.* The politics of the disaster response should minimize the ongoing stresses and strains between organizations to prevent unnecessary fractures in the overall response. This approach involves top-level managers dealing with the politics of coordination and consensus building across organizational and political jurisdictions (Stacey, 1992).

7.6 Limitations of Chaos Theory for Disaster Management

The application of chaos theory to disaster management has a number of significant limitations:

1. *The question of how helpful chaos theory is for disaster management needs further empirical investigation.* As shown, the application of chaos theory to disaster management has some preliminary empirical support. The concepts discussed here make metaphorical sense and seem to be consistent with disaster management experiences. However, several questions remain. For example, (1) how do we know when an organization is at the bifurcation point; (2) when does an organization actually enter chaos or pass through a bifurcation point; and (3) can these be rigorously defined and empirically observed? Analytical tools developed by Poole et al. (2000) as well as computer simulations are useful ways for empirically answering these questions and for predicting how these factors may apply to varying disaster conditions (see, e.g., the modeling work by the Pacific Disaster Center at <http://www.pdc.org/iweb/modeling.jsp?subg=1>).
2. *Every response agency that is responding to a disaster does not come to the edge of chaos.* Some organizations adapt using existing management systems. Thus, different management systems apply to varying organizational situations throughout the disaster area.
3. *Management flexibility as a response to chaos has its own costs* (Kaufman, 1985):
 - a. Resources are needed to maintain the capacity to act in different ways on short notice. When a disaster occurs, reserved resources, if immediately committed, could make a significant difference. However, early resource exhaustion can also have unintended consequences for the longer-term disaster recovery.
 - b. Technical expertise and functional specialization may be particularly important for certain types of disasters such as hazardous materials events. Under these circumstances, generalists may simply not know what to do.
 - c. An overcommitment to flexibility can result in rigidity, particularly when decisive action in a single direction is required. Overly flexible organizations can also be indecisive and not be able to make critical decisions quickly.
 - d. The formation of *messy* groups may weaken important bonds between workers (i.e., friendship, self-interest, habitual behavior) that hold the organization together.
 - e. Leadership that constantly revises its direction may find itself challenged, resulting in increased disorder due to the concomitant decrease in trust.
4. *Management skills may not be the answer as to why response organizations are successful.* It may be that sensitivity to initial conditions and fortunate relationships with other organizations have more to do with a successful response than disaster management skills (Comfort, 2007; Guastello, 2002; Kaufman, 1985).
5. *Computer chaos modeling is not the same thing as creative risk taking by disaster responders and cannot replace chaos management techniques.* Efforts to simulate the course of a disaster and to use the information to manage it may restrict the creativity of individuals to develop the most appropriate local response. Complex predictive models have many problems with validity and prediction that temper their applicability even though they may be useful for investigating how sensitive critical elements might be to initial conditions (Oreskes et al., 1994). Experienced, politically disinterested responders are particularly good at seeing emergent patterns.
6. *Chaos theory does not address many other organizational and interagency problems that condition the emergence and effective operation of disaster response systems.* A review of the disaster research sighted in this chapter shows exactly how complex a disaster response is.

7.7 Administrative and Legislative Options

Based on the preceding discussion, the following are potential options for administrative and legislative action in California and elsewhere. As they are rather general in nature, they may also be applicable in other states, as well as at the federal level and internationally.

7.7.1 Research and Evaluation

- *The science of complexity research, which includes chaos theory and catastrophe analysis, may be a useful avenue to further disaster research and should be encouraged with research grants.* Another promising avenue for further research on disaster response management includes network analysis and information sharing (Choi and Brower, 2006; Kapucu et al., 2009).
- *Design a computer-based disaster simulation program that could be used to investigate the sensitivity to initial conditions of key components of the response for various types of disasters, from the multi-casualty to the localized disaster to simultaneous sets of global warming-related disasters, and use it to train responders and response managers.*
- *Encourage researchers to further validate (1) Priesmeyer's and Morris' findings that a disaster response is chaotic for various disasters and different types of public, private, and nonprofit organizations at the state, operational area, city, and field level and (2) Guastello's "cusp" evidence that disasters go through.* Such research should seek to link existing sociological, psychological, and other organizational studies of disasters to chaos theory and catastrophe analysis.
- *A high priority could be given to the collection of time series data during a disaster response.* Time series data are important for understanding how a disaster response organizes (see Comfort's work as cited, which greatly depends on such data).

Undoubtedly, increased government support for research will make disaster response management more evidence based. The importance of making disaster response management more evidence based has been underscored by Moore et al. (2009).

7.7.2 Communications and Steering

- *Inventory and coordinate state, local, and private emergency communication systems.* Various levels of government, private agencies, amateur radio operators, social networking sites, and others collectively represent a potential network that could provide the necessary communication links to cause the rapid formation of a disaster response. Often elements of these communication systems have failed, been overloaded, or cannot intercommunicate. These limitations and failures need to be identified and eliminated. Disaster exercises that bring up and stress elements of the entire system and run according to disaster response plans should be conducted. Providing communications to messy groups and coordinating them into a net could be included.
- *Inventory and describe social networking systems such as Twitter that have become a significant overlay in any geographic area providing totally new positive or negative perspectives on the disaster, who is affected, and the progress of the response.*
- *Consideration could be given to parallel social systems, much like those in India, that connect key decision makers, charities, and resource storage areas, allowing local responders to obtain the supplies they need with a minimum of higher-level regulation.* Highly centralized communication systems for ordering, coordinating, and delivering resources may not support the rapid emergence of large-scale disaster networks.

- *Explore the applicability of emerging communication technologies in disaster management settings.* The peer-to-peer communication system developed by the California Institute for Telecommunications and Information Technology (Calit2), which relies on cell phone users as human sensors, can generate first-hand reports from the disaster area. Other systems worthwhile exploring include ImageCat's technology for estimating losses after a disaster, RapidSMS, which can provide real-time data in emergency situations, and UNICEF's Internet-based Bee system for use in remote areas (Underwood, 2010).
- *Explore the likelihood of cyber attacks or criminal exploits during a disaster response.* Recent newspaper accounts show that cyber attacks are being carried out by hostile governments, terrorist groups, and criminal organizations. The potential for such attacks and how they might disrupt a response should be investigated and planned for.

7.7.3 Statutory and Regulatory Review

- *Statutes and regulations that limit cross-jurisdictional decision making, coordination, and resource sharing should be identified and reviewed to determine if they hinder the formation of response networks.*

7.7.4 Disaster Management

Many disaster response agencies have attempted to deal with the diverse response problems identified in here. A review of recent initiatives, which are continuing, by California is instructive. The California Legislature has attempted to deal with the disruptive effects of disasters on response organizations. Emergency Medical Services (EMS) and other state and local government response agencies are required by statute (Section 8607 of the Government Code) to use the SEMS when responding to emergencies involving multiple jurisdictions or multiple agencies. Local governments must use SEMS to be eligible for state reimbursement of response-related personnel costs. This legislation was passed to address interagency coordination and other response management problems occurring during the 1991 East Bay Hills Fire in Oakland. Generally, law enforcement, fire, and other response organizations had problems organizing themselves in compatible ways, making it difficult to identify or coordinate similar functions and resources.

SEMS seeks to address interagency coordination problems by providing a five-level hierarchical emergency response organization (field, local government, operational area, region, and state) that facilitates

- The flow of emergency information and resources within and between involved agencies at all five organizational levels
- The process of coordination between responding agencies
- The rapid mobilization, deployment, use, and tracking of resources

This hierarchical structure uses the ICS, the Multiagency Coordination System, the state's Disaster and Civil Defense Master Mutual Aid Agreement, the Operational Area Satellite Information System, the Response Information Management System, and a specific designation of operational areas to integrate the disaster response. Each agency organizes itself around a set of common ICS-defined functions (command/management, operations, planning/intelligence, logistics, and finance/administration), specifies objectives that it seeks to accomplish (management by objective

is required), and uses preestablished systems to fill positions, conduct briefings, obtain resources, manage personnel, and communicate with field operations.

The preceding discussion of the applicability of chaos theory to disaster management suggests that a number of state-related management options should be evaluated to determine their response utility for ICS and SEMS:

- *Integrate SEMS and ICS training with chaos management training options.* As management systems, SEMS provides a common command and control structure, while the ICS specifies a nomenclature for each unit. Both SEMS and ICS are analogous to the command and control structure of military organizations. Commanders at headquarters or in the field are not told how to *tactically* coordinate with other units or how to arrange the units into an effective formation on the battlefield to win a particular engagement. Tactics and the deployment of forces are battle specific. Similarly, SEMS and ICS help to organize the various components of a disaster response. They create an adaptive priority setting and resource management structure, but do not define which tactics might be most useful for organizing individual components into an overall response system for a *particular* disaster. As pointed out by Bailey (2009), command and control approaches to the management of disasters do not work. The California Emergency Management Agency has moved in a similar direction by decentralizing its operations away from the State Operations Center (SOC) to Regional Emergency Operations Centers. As noted earlier, it is what is unique about a disaster that disrupts the response. Disaster managers should be trained in skills that increase their ability to adapt to rapidly changing situations.
- *Identify and evaluate various critical interorganizational interfaces and rates of interaction that regulate the response infrastructure's self-organizing process.* Agencies' ability to self-organize and mobilize resources is directly related to how quickly the response emerges. Relationships to be examined might include: SOC interactions between public and private responses and resource agencies; between resource agencies; state/region interactions; region/operational area interactions; setup of critical local operations and their support; and operational area/emergent field operations and their identification and support.
- *Consider reducing the number of layers of government required to approve the allocation of resources and personnel and allow existing and emergent organizations in the field to request and approve the distribution of state and other resources locally.*
- *Consider developing and training a new group of field responders who would be seen as information brokers.* Their purpose would be to identify locally emergent groups, determine inadequate communication linkages, consider the need to coordinate resources, and other similar functions. They would be dispatched with the appropriate communication equipment immediately following a disaster.

7.7.5 Disaster Response Training

- *Disaster scenarios should be scripted to emphasize the progress of the disaster by showing emergent fluctuations, process problems, and disaster infrastructure issues relative to the demands being serviced by EOCs close to the disaster.*
- *Field exercises should be linked to EOC operations and emphasize communications, self-organization processes to address unexpected problems, formation of "messy" groups to deal with process problems, and the like.* The emphasis would shift to supporting self-organizing processes and disaster infrastructure issues.

- *State and operational area EOC strategy setting could involve tracking the emergence and efficiency of the response infrastructure relative to localized incremental goals and needs.* By attending to the emergence of the response infrastructure and how locally set priorities and resource allocations are shaping these responses, it could be possible to quickly improve the operation of the emergent processes and structures.
- *State and operational area EOC status reports, including GIS and laptop-based mapping systems, could emphasize the emergence of disaster infrastructure and overall fluctuations across the disaster area.* There would be less focus on individual functional area accomplishments and more emphasis on process, emergent organizations, and the implications of localized strategies and resource use rates.
- *Disaster managers and responders could be trained to visualize the whole of the response, do process mapping, form “messy” groups, engage in-group problem solving, and be functionally cross-trained.* The overall goal of the suggested modifications in disaster training would be to produce a creative generalist who is able to visualize large portions of the response, understand the role of process in developing infrastructure, and capable of forming and working in messy groups to solve problems.
- *Disaster response managers could be trained to resolve likely interorganizational disputes, differences in social timing, political turf, and other issues that could seriously disrupt a response.*

7.8 Conclusion

Recent natural and human disasters, and the manifestation of serious shortcomings in the ways public and private organizations have responded to them, reinforce the need to rethink and significantly improve disaster response management. Traditional command and control, top-down, and linear approaches to disaster management are no match for the daunting challenges typically present in large-scale disaster situations. As a result, the performance of disaster response systems has often been poor, resulting in unnecessary human suffering and environmental degradation. Clearly, new pathways to high performance in disaster management have to be opened up in order to enhance our capacity to respond to disasters more efficiently and effectively.

The need to move disaster management to significantly higher levels of performance becomes even more paramount as we witness the emergence of megadisasters such as the floods in Pakistan and China and the fires in Russia. Megadisasters like these, which appear to be related to global warming, can be expected to become more frequent. The scale of megadisasters is so large and the causes so deep and complex that often little can be done to mitigate such events or to address the cascading results. It has to be understood that megadisasters are very different from the kinds of disasters disaster research has focused on. The latter tend to be geographically contained and somewhat limited in their impact. Clearly, the scale of a response to a megadisaster must be massive.

This chapter examined the applicability of chaos theory to disaster response management. Along with previous researchers, we show that chaos theory can indeed provide valuable insights into disaster response management. Furthermore, given the emerging consensus among researchers and practitioners regarding the utility of chaos theory for emergency response management, public managers and elected officials are advised to use the lessons learned from chaos theory to inform administrative and legislative action aimed at the promotion of research on the use of chaos theory in emergency response management, the elimination of counterproductive statutory

and regulatory barriers, and the development of training programs that reflect important principles of chaos theory. Although the application of chaos theory, and complexity theory generally, is still in its infancy, the research reported here will hopefully advance the development of a more evidence-based theory of emergency response management.

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Chapter 8

Psychology of Evacuation and the Design of Policy

*Lessons from Hurricanes Katrina,
Ike, and Sandy*

William Lee Waugh, Jr. and Jasmin R. Ruback

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Effective evacuation policies and programs are essential for communities along the nation's coasts. There are 2700 miles of barrier islands from Maine to Texas (Leavenworth, 1986), many barely above sea level and many with limited egress, such as Galveston Island in Texas and the barrier islands of the Carolinas and Georgia. There are also thousands of more miles of low-lying coastline, some sparsely populated like the Louisiana delta but some very heavily developed like the coastal communities of New Jersey and New York that were severely damaged by Hurricane Sandy in 2012. Many of the islands and much of the coast are vulnerable to storm surges brought on by hurricanes and even lesser storms. Hurricanes Katrina and Sandy clearly demonstrated the vulnerability of communities on the Gulf and Atlantic coasts, but sea level rise is also increasing the vulnerability of communities in Alaska and on the Pacific Islands (U.S. Global Change Research Program, 2009: 12). More communities are at risk due to the changing sea level, and the population is increasingly concentrating in coastal communities.

Evacuation of the islands and coastal communities has historically been problematic for officials who had little lead time to organize orderly evacuations, particularly when there were few bridges and/or ferries to the mainland or to larger islands or the topography itself was low-lying and prone to flooding. Residents of the Gulf coast, in particular, often had to travel considerable distance to find high ground. A recurring nightmare of emergency managers still is having large numbers of evacuees trapped on congested highways or housed in facilities vulnerable to wind and water in the path of a major coastal storm. The Hurricane Ike experience in Texas was just such a case. Traffic slowed to a crawl as people left the coast seeking shelter farther inland. Gas stations along the major traffic arteries ran out of gas and restaurants closed so that staff could evacuate. Lead times have greatly improved in recent years, and residents have much more accurate information on the level of risk posed by storms. The response to Hurricane Sandy demonstrated the value of the longer lead time as airlines cancelled flights, mass transit systems shut down, and officials issued early warnings to residents needing to evacuate or simply find shelter. Government agencies and private firms staged response units to assure quick lifesaving efforts and the restoration of lifelines, particularly power utilities. The responses were not perfect, particularly in terms of the restoration of power to residences and businesses, but they were much faster than might have been the case a few years prior to the storm.

Studies of evacuation behavior have revealed the obstacles that officials face when they try to move people to safety. Prior to Hurricane Katrina, the focus was on the need to convince residents of the level of risk posed by storms and to persuade them to leave their homes and possessions. Past evacuations had shown that roughly 20% of the population would choose not to evacuate. The reasons were fairly well known (Sorensen and Mileti, 1999). The lack of necessary resources (e.g., automobiles, money, medication), the need to remain with parents or other family members who could not evacuate for health reasons, the refusal to leave pets, and the underestimation of the severity of the threat were common. The point is simply that officials should expect that a significant percentage of the population do not evacuate despite dire warnings and even *mandatory* evacuation orders.

Also, fortunately, quite a bit is known about evacuation behavior and how to plan and implement an evacuation now. After each major disaster operation, the attention of emergency managers focuses on the *lessons learned*. Emergency response and emergency management agencies hold debriefings to gather information on the strengths and weaknesses in the disaster operations so that they can reduce errors and improve performance during the next emergency. After-action reports identify problems and, for larger disasters, white papers and government commissions examine the decisions made and the actions taken. In that manner, policies evolve and programs become more effective—or, at least, that is the theory. Policy design should follow that incremental process of trial and error and it is, in fact, what happens for the most part. However, policies are often based on the assumptions of individuals about cause–effect relationships and human behavior or on the predisposition of organizations to make particular policy choices. Organizational cultures may encourage poor policy choices. As the Katrina disaster demonstrated, the officials making decisions may not be those schooled in emergency management and knowledgeable about how people behave in emergency situations. For example, evacuation decisions are social decisions. People may not hear the evacuation order or may not feel that it applies to them. They see their neighbors load their cars and leave. Their mothers call. They hear from friends on Facebook or Twitter or LinkedIn or via text message. Warnings are affirmed and reinforced and it becomes clear that the risk is real and they will be in danger. Communication requires the receipt and understanding of messages. Information is essential. The presumption that people will panic if officials fully explain risks is a case in point. Panic is rare if people have full information and can make choices for themselves (see, e.g., Waugh and Tierney, 2007). Even understanding the demographics of the population can help us to form strategies for emergency management. For example, we know

- Single women with children tend to evacuate
- Women, more than men, prepare for disaster
- Younger, white, and married individuals are more prepared for disaster
- More females in a house means more social influence to leave
- Women are more likely to receive communications about risk
- Having evacuation experience is a good predictor of future evacuation, whereas disaster experience is not

In terms of the design of evacuation policy, it may not be based upon the best science or even a good understanding of the demographics. A frequent criticism of emergency management policies has been that some agencies have cultures based upon command and control that are ill-suited to civilian disaster operations. In effect, authorities assume that they need only to issue warnings loudly and clearly and order evacuations forcefully when the level of risk or probability of disaster reaches a predetermined level. They expect that civilians will respond appropriately. As has been the experience in recent disasters, that is seldom the case. Trusted information sources are essential. Indeed, it may not be enough that authorities provide reasonable justification for their orders. Emotion, social connections, and a variety of other psychological variables affect crisis decision making and should be both anticipated and addressed in the design of evacuation policies. Authorities are often surprised by the lack of attention to their warnings and the tendency for at least some residents to put themselves at even more risk rather than to follow evacuation orders. To some extent, the problem is a familiar one in that some people will always respond in a manner contrary and often opposite to that which is desired. Experienced evacuation planners know that some people will head south when the evacuation route heads north. Some people hear *hurricane* and think *good surf*. They also know that some people will stock their coolers with beer and wine

and invite friends and neighbors to their *hurricane parties*, even when there is a mandatory evacuation order. Cutting off alcohol sales is now a common practice when hurricanes threaten. The Katrina disaster also taught people that they may not return within a few days to take care of their pets, the evacuation may take them far from home and family, the evacuation will disconnect them from the social networks on which they depend, and emergency shelters may be unsafe. To the fears of losing their possessions, there are added fears of crime, disease, and humiliation. The experience of the Katrina disaster, even for those who only watched on television, was frightening. The challenge now is to allay those fears and get residents to trust that they will be safer leaving than they will be staying in their homes.

Evacuation is not new. However, the lessons of the past often are not learned and, in fact, sometimes were misguided to begin with. Coherence and consistency may also be lacking in the plans and how they are communicated to those to be evacuated. Hierarchical approaches may conflict with the orientations of other emergency management personnel and organizations and, thereby, reduce the effectiveness of disaster operations (Waugh, 2009). To be fair, some agencies, too, have been criticized as being too *scientific* and failing to consider how to help the public and emergency managers understand the information that they provide. The National Weather Service (NWS) is now assessing the information that it provides to the public, emergency managers, and the media to assure that the level of risk is understood and that people take appropriate protective action. While the professionalization of the field is encouraging emergency managers to develop political and management skills, as well as technical skills (Waugh and Streib, 2006), the learning process takes time. The current emphasis on dealing with the *whole community* encourages attention to differences in culture, be it ethnic or organizational, and encourages communities to take full advantage of their resources. Relying on governments to respond will not be enough in a large-scale disaster. The first responders are more likely to be friends, neighbors, and family rather than local emergency response agencies. Involving the community and getting buy-in is essential. Collaboration requires effective communication and a willingness to share information and authority.

This chapter examines the problem of designing effective evacuation policies to minimize the risk of human casualties in hurricanes and the fit between current evacuation policies, changing populations, and the social psychology of evacuation. In other words, how should public officials go about designing an evacuation policy that is sensitive to individual and collective decision processes concerning whether, when, and how to evacuate and, at the same time, have a policy that is flexible to take into account the concerns that the policymakers themselves have (i.e., budget, old information). Policy recommendations are drawn from the comparison of expected individual and collective evacuation behaviors and the expectations of emergency management decision makers. It is important to note that any policy suggestion in this chapter must first be pretested and evaluated on the specific region or population before implementation. The literature and cases upon which the analysis is based are largely American, and there would certainly be significant differences in behavior and policy in another culture and even from one region of the United States to another. Understanding the demographics, the culture, and the situation is essential.

8.1 Evacuation Research

Evacuation is very complex and involves many types and levels of interaction among individuals and collectives within the threatened area and among *civilians* and emergency managers. This complexity is paralleled in the researchers who have attempted to explain the phenomena of how

individuals decide whether to flee or fight a storm. Researchers in geography, political science, economics, psychology, communications, and sociology are some of the analysts who have addressed this complicated issue. Disaster research is increasingly multidisciplinary and involves a variety of methodological approaches. From an empirical standpoint, some of the research leaves much to be desired (i.e., it is not peer reviewed, has research design flaws, is defined differently, is measured differently). However, from an open-minded theoretical standpoint, this combination of fields and methodologies has an advantage. The advantage is apparent when the same finding (e.g., families will evacuate only when together) occurs across all of the studies.

First, we will examine the research literature that has focused on individuals and evacuation. The individual section is divided into two parts, stable and unstable research findings. Stable means that the research result has been found in a significant number of studies. Unstable means that the research results differ in many studies. This categorization is not a value judgment. Unstable results are not negative and they usually deal with oscillating variables. These topics may be new to the evacuation field, need updated information, or need more research. The sections are summarized by policy suggestions. The stable results we discuss first are gender, family, risk perception and stress, the psychological effects of predictions, hurricane knowledge and terminology, social influences, and prior evacuation and experience. It should be noted that evacuation has been a subject of interest among disaster researchers for decades. Much of what is known about evacuation behavior has been affirmed by multiple studies and assessed in light of new experiences.

8.2 Gender Differences

Gender differences appear consistently in the literature with women being more likely to evacuate and have evacuation intentions (Riad, 1997). Women are more likely to perceive a disaster event or threat as serious or risky (Howe, 1990; Cutter, 1992; Fothergill, 1996; Riad, 1997). Women are more likely to receive communications about risk, due to their social networks, and to respond with protective actions, such as evacuation (Fothergill, 1996). There is some indication that women more than men prepare their families and communities for disasters (Fothergill, 1996).

8.3 Family

Family variables have been important components of evacuation (Drabek and Stephenson, 1971), most likely because families tended to evacuate as a unit (Perry, 1979). Consistent with past research, Riad and Norris (1998) found that individuals who had intentions to evacuate had family who wanted to leave. Drabek (2010) concludes that families generally will not evacuate until they have all family members together or, at least, account for all members.

8.4 Risk Perception and Stress

If people do not feel as though they are at risk, they will not evacuate. Many of the evacuation models of decision making have focused on risk perception as a key component (Perry and Lindell, 1991). In an analysis using a combined sample of subjects from Hurricanes Hugo and Andrew, both category 4 hurricanes, Riad et al. (1999) examined the reasons people gave for not evacuating and found that 33.2% of the sample believed that the hurricane was not a serious threat and 25.4%

were confident in their safety. Riad and Norris (1998) found that high perceived risk was one of the most important variables in predicting evacuation intention.

Sociologists have a long history of examining warning messages. Individual decision processes prior to evacuation are usually based upon the nature of the warning (e.g., source, credibility, ambiguity), confirmation (i.e., finding a second source of information or repeat of initial warning by a credible source), and then mobilization (Drabek, 1994: 127–146). For detailed discussions on warnings, see Nigg (1995) and Sorenson and Mileti (1988). These warnings or fear communications get people to assess the severity of the threat, the probability that the threat will hit, and the efficacy of a coping response. If the communication is confusing, anxiety may increase (Maddox and Rogers, 1983). Fear-inducing threats increase motivations to affiliate (see Cottrell and Eply, 1977). In Riad (1997), individuals who were more anxious (66.7%) intended on evacuating. Similarly, individuals who were the least anxious (67.5%) did not intend on evacuating. Individuals with medium levels of anxiety were split evenly on evacuation intention.

Actions to increase the level of anxiety, to increase the credibility of the warning, should increase the likelihood of evacuation. The practice of police asking individuals for the name of their next of kin or asking them to fill out a toe tag form might achieve the desired effect. That would be a worthwhile research topic. Does asking this question ever change people's minds? Another study could be to talk to the police about these individuals, as they are often the last people to see them alive. A challenge for policymakers and researchers is how to come up with a way to ethically and safely increase risk perception thereby increasing evacuation compliance, without unreasonably scaring the individuals.

8.5 Psychological Effects of Predictions

Keeping in mind the interdisciplinary nature of this chapter, it is pertinent to mention research conducted in social and cognitive psychology. This massive body of literature has shown that individuals depend on heuristics and when making predictions under uncertain conditions (e.g., a hurricane warning), and this reliance can sometimes lead to correct decisions but can lead to incorrect systematic errors (Kahneman and Tversky, 1973). Often, we try to adopt shortcuts that seem to simplify complex problems. Fiske and Taylor (1991) said that we are cognitive misers because we conserve cognitive energy by ignoring relevant information, fall back on learned behavioral patterns, or accept the *good enough* option (Aronson, 1992). These shortcuts can produce prejudice, bias, and a feeling of superiority that may extend to controlling damage from nature. Heuristics are often used when we do not have time to think carefully about an issue, when we are overloaded with information that we cannot process the information fully, and when we have little other information. Theoretically, this can explain some of the responses we see to evacuation orders; however, empirically it still needs to be tested.

The following example from the floods in Grand Forks shows how individual heuristics and scientific predictions can give people too much of a sense of control. Some researchers have called this *misplaced concreteness*. In Grand Forks, a prediction for the Red River to crest at 49 ft was interpreted as certain and the river crested at 54 ft. The dikes protecting the city had been built up with sandbags to contain a 52 ft crest. There was no prior experience because the river had never gotten this high before. The citizens were surprised when they saw the water coming down the street. Whether the problem is climate change, earthquakes, droughts, or floods, the tendency to overlook uncertainties, margins of error, and ranges of probabilities can lead to damaging misjudgments (Stevens, 1998).

8.6 Knowledge and Terminology

Individuals often do not know what the terms watch and warning mean. A problem arises when even though most individuals are aware of a threat heading their way, many do not understand hurricane terminology. Most individuals use the media to keep informed. In one study, as many as 99% of 210 individuals surveyed used the radio or television to keep informed (Riad, 1997). These numbers are not retrospective because these individuals were asked about their evacuation intentions while under a hurricane warning. From another part of the sample, the pre-post sample ($n = 96$), 97% updated themselves often and 50% of individuals did not know what a *watch* was and 15% did not know what a *warning* was. Three people out of four knew about Bertha at least 2 days in advance (Riad, 1997). A problem with news coverage of hurricanes, however, is that the focus tends to be on the eye of the storm rather than the surrounding winds. There can be severely damaging winds, including tornadoes, hundreds of miles from the storm's eye. Today, people receive weather information and news via the Internet, cell phones, and other media and there is less reliance upon newspapers, broadcast television, and radio. Those listening to Internet or satellite radio may not get local weather reports and news at all.

The NWS's regional Integrated Warning Teams program is trying to address those communication problems, and warnings have been issued since 2012 that make it very clear that there is risk to life associated with specific storms. Communities have added, repaired, and/or expanded warning systems to increase the likelihood that alerts will be heard and understood. A warning that there is an *elevated risk of severe weather* simply does not convey the risk. Too many people were ignoring tornado and other severe storm warnings. Evidence from the Joplin, Missouri, in 2011 and Tuscaloosa, Alabama, tornadoes in 2010 forced the reevaluation of risk communication.

8.7 Social Influences and Support

In emergency situations, people look to others to help them with their decision-making process. Even victims of crime often talk to someone immediately after the crime, and this interaction seems to have a large effect on their decision to report or not to report the crime to the police (Greenberg and Ruback, 1992). This stable research finding extends to evacuation decision making. The greater one's contacts in the community, the more one is likely to receive information regarding a threat (Perry, 1979). Consistent with this notion, Drabek and Boggs (1968) found that having a small social network was a characteristic of individuals who did not evacuate. Riad et al. (1999) found that social support that includes access to a network was a predictor of evacuation as well. Decisions regarding evacuation and other disaster responses are influenced significantly by the kinship support network (Drabek, 1969; Perry et al., 1981; Bolin and Bolton, 1986).

Social psychology has examined affiliation under stressful conditions. For more information, see Festinger's (1954) social comparison theory that argues that we need to see other people's behavior to clarify our own. Another important person to see is Schachter (1959) who said "misery doesn't love just any kind of company, it loves only miserable company" (p. 24), meaning that people want to affiliate in order for them to have emotional comparison, cognitive clarity, and support. Riad (1997) found that Blacks were more likely to affiliate than Whites and they affiliated for emotional support.

Individuals also use others to interpret warnings. Drabek (1997) has six social constraints that impact how messages are processed. These are prior disaster experience, proximity, source credibility, family structure, observation of the threat, and interaction with others.

If social influence is this powerful, it needs to be examined as a way to encourage individuals to evacuate. It is theoretically possible that something as simple as a phone call could encourage individuals to evacuate. This may also be an intervention point to calm highly anxious individuals and help them with their decision-making processes. From a policy perspective, phone calls could be an easy intervention point. The Community Alert Network (CAN) is an organization that provides community call down systems that alert the public to hazards by automatically ringing their home phones and/or sending e-mail messages. This computer-generated system can call thousands of individuals in an hour. The message usually contains the voice of a recognizable authority figure, specific instructions; if the individuals want to speak to a person, they can contact the operator. The CAN network has responded to many different types of situations (e.g., hurricane evacuations, plant explosions, Amtrak derailments, prison escapes, chemical plant leaks, flood warnings). This automated system could be manipulated to be more personable (i.e., customize for neighborhoods). In the past, CAN has found that some individuals do not want to be called.

8.8 Prior Evacuation and Experience

Prior evacuation more than prior experience has been shown to be a predictor of future evacuation (Riad et al., in press). In another study, Riad (1997) found that those who had prior evacuation experience (52.6%) perceived more risk, were more prepared, had higher levels of efficacy, were more likely to say that others would influence their decision to evacuate, and were more likely to have evacuation intentions. Individuals who have prior evacuation experience have an evacuation repertoire because they know what to do, how to act, feel as though they can accomplish the action, and perceive enough risk to intend to evacuate to begin with (Riad, 1997).

Now we are going to examine some of the more unstable findings from the evacuation literature. These variables are ethnicity, resources, territoriality, children, age, and pets.

8.9 Ethnicity

Different ethnic findings are reported in the evacuation literature (Perry, 1981; Riad et al., 1997). Different population subgroups may have different rates of evacuation (Moore et al., 1963). An important ethnic difference in one study was that the White population was less likely to evacuate than the Black population (Riad, 1997). Early studies suggested that Blacks were more likely to evacuate because they possess larger kinship and community networks than Whites (Perry, 1979). There is some evidence that ethnic groups link and integrate their elderly, which helps in evacuation (Quarantelli, 1985). Perry and Lindell (1991) interviewed 182 evacuated flood victims and 123 evacuees from a train derailment carrying hazardous material. In a regression analysis controlling for perceived risk, specificity of warning content, warning confirmation, source credibility, and possession of a plan, ethnic group membership was not a significant factor in explaining evacuation compliance. However, Riad et al. (1997) found that both Latinos and Whites were more likely to evacuate than Blacks. Ethnic differences could be confounded with resources especially if lower-income individuals tend to evacuate because they live in less sturdy housing. Policy needs to take into account different types of cultures living within an area.

8.10 Resources

Individual resources were not important predictors of evacuation intentions (Riad, 1997). Socioeconomic status, physical stress, and efficacy were unrelated to evacuation intentions. The study that looked at the reasons for not evacuating for Hurricanes Hugo and Andrew found that not having a car and not having money only accounted for 0.9% of the population that did not evacuate (Riad et al., in press).

8.11 Territoriality

Sometimes, individuals may experience conflicting motivations in that although they perceive risk, it may be for their territory rather than for themselves. Wachtendorf (1999) believes that individuals who are defending their property are in fact protecting their sense of identity. Riad et al. (in press) mention that individuals who do not have other social ties may use their property as a means to reduce stress. Of course, this hypothesis still needs to be tested. Owners were less likely to have evacuation intentions and tended to be more concerned about looting (Riad, 1997). The same study showed that individuals who lived in Savannah were more attached to and proud of their homes. These individuals were less likely to have evacuation intentions.

Individuals who had evacuation intentions appeared to be less embedded in the community (Riad, 1997). As mentioned before, some individuals may be more attached to their home/community than others. It is possible that individuals who are more embedded in the community find it harder to leave.

Officials need to assure safe and quick return of evacuees. A new fear after Hurricane Opal was that residents would not be allowed to reenter quickly enough. One emergency manager believed that home owners should be allowed in quickly to fill out a tag letting officials know what is wrong with the property (e.g., gas leak). His logic was that home owners know what is wrong with their homes quicker than anyone else. In Riad (1997), community-level officials said that their citizens did have trouble returning home after Hugo. They also believed that not allowing individuals in quickly may cause people not to evacuate in the future and that *reentry* is a constant issue. It depends on the damage to the areas hit when they deem it safe for individuals to return home. Quick reentry and a way to reduce looting or the fear of looting would also encourage those individuals who are territorial and reluctant to leave.

8.12 Children

Relocation or evacuation decisions are often related to concern for children, as well, even if parents do not feel threatened enough themselves to evacuate (Kirschenbaum, 1996). Moreover, having children encourages preparedness (Turner, 1986), so that people are better prepared to leave. Given the concern for child safety, it is suggested that warnings be communicated through children, via school, to assure that the risk heeded and to encourage parents to prepare for evacuation.

8.13 Pets

In recent years, considerable attention has been paid to the *pet factor*. Because shelters seldom accepted house pets, residents often chose to stay home with their four-legged *children* rather than

to leave them alone in the house or apartment. Riad et al. (in press) found that only 1.6% of their sample gave having to take care of a pet as a reason for not evacuating. After a train derailment and spill of hazardous material evacuated the town of Weyauwega, Wisconsin, Heath (1998) found that 32.4% of households that did not evacuate all pets attempted to rescue their pets before the spill was contained and the area was considered safe. Some of the most heart-rending pictures from the Katrina disaster were the pets left to fend for themselves. Owners frequently expected to return to their homes within a few days.

From a policy standpoint, rural residents are apparently much less likely to view their pets in the same way as more urban and suburban residents. This lesson received enough attention that several organizations specialize in pet rescue operations following disasters and more and more emergency shelters are arranging with local veterinarians to provide facilities for pets in or near the shelters for their owners. Protocols are also being developed to facilitate the reunion of owners and pets separated during disasters. This is a clear way to encourage evacuation and it also is important for reentry.

8.14 Individual Research Summary

Consistent and stable findings should help make policy recommendations. However, it is not that simple; there are hundreds of variables that can be addressed that could influence individuals to make a positive evacuation decision. These variables exist at both the individual level (i.e., prior evacuation experience inducing future evacuation) and the community level (i.e., significant number of new residents who do not have evacuation experience). The community influences can intervene and influence individual evacuation decision making. Evacuation research is never concluded. As cultures and communities grow and change, scientists need to constantly be aware of how old research findings and new theories and findings could influence positive evacuation and make policy suggestions. On the other hand, policymakers should pay more attention to evacuation research and assign it a priority in high-risk areas. Here are some community variables and issues we should keep in mind when designing evacuation policy and conducting evacuation research.

8.15 Population Growth

Along the mainland, there are many more miles of populated lowlands with similar exposures. For decades, experts have expressed great concern about the potential devastation of a major hurricane in south Florida and, in some measure, their fears were realized when Hurricane Andrew came ashore in 1994. But, the storm could have been far more devastating had it hit Miami Beach or the densely populated areas to the north more directly. This issue needs to be examined with more of the population moving and vacationing along coastal communities. For example, casinos on the coast of Mississippi not only brought new employees who may not have evacuation experience from hurricanes but a great deal of tourists as well. The casinos were severely damaged by Hurricane Katrina in 2005 and they became a major focus of the recovery effort because they represented thousands of jobs and much of the revenue for communities along the coast. Casinos, resorts, and even small towns with motels along interstate highways that may become large population centers at night or on the weekend need to have staff trained to respond to disasters and to direct the evacuation of guests. The impact of Hurricane Sandy on the hotels and casinos along the

New Jersey coast, particularly those in Atlantic City, is still being assessed. The economic impacts are devastating for businesses already suffering from the recession.

The most obvious way to minimize risk is to reduce the number of people living in the most hazardous areas and, thereby, reduce the need for mass evacuations. However, restricting development on barrier islands and along beaches is easier to recommend than it is to implement, as South Carolina officials learned when they tried to implement a beach management program following Hurricane Hugo (Waugh, 1990; Mittler, 1993). There are indications, however, that higher-density development in the coastal communities along the Gulf of Mexico is less vulnerable to flooding than low-density development (Brody et al., 2011). Those findings may help guide redevelopment in the New York and New Jersey communities devastated by Hurricane Sandy in 2012.

8.16 Consistent Evacuation Policy

One problem with evacuation policies is that there is no consistency among them between states. The power to order evacuations depends on whether the community has a centralized or decentralized emergency management system. A study comparing government evacuation decision making in Georgia and South Carolina illustrates this point.

South Carolina had a centralized emergency management system, meaning that power and authority came from the top down. The governor got recommendations from both the local and state emergency managers when deciding whether to issue voluntary or mandatory evacuations. However, the governor had the final word on the evacuation decision. One respondent commented that the procedure changes depending on who is in office. Some governors, more than others, feel it is their responsibility to take care of the state and not leave the evacuation decision to local counties. Another respondent stated that she believed the centralized system of South Carolina cut down on confusion both with local residents and tourists.

Georgia, on the other hand, operated with a decentralized system, meaning that the local emergency officials in conjunction with the county commissioners and other elected officials are in complete control. The state emergency agency was available as backup support. The local and state officials were accountable only within their agencies and the local emergency management did not report to the state. The person in charge of making the final evacuation decision was the chair of the county commission. However, the governor could override the decision of the county commissioner if necessary. The point of this illustration is that evacuation policy was by no means consistent, and when there was discrepancy between states and issuing evacuation orders, the inconsistency leads to confusion.

State and local emergency management systems have changed considerably since 9/11 and the storms of the past two decades. There are national standards for emergency management programs, that is, the Emergency Management Accreditation Program (EMAP) standard and the National Fire Protection Association (NFPA) 1600 standard, which require effective alert and warning systems and evacuation plans. Not all states comply with the standards but over half the state, representing well over half of the US population, have accredited programs (see www.emaponline.org). Moreover, responsibilities for issuing evacuation, quarantine, and other emergency orders have changed significantly, but there are still practical as well as legal problems with issuing mandatory evacuation orders because they are not easy to enforce. Rather, states and communities are developing policies to refuse to rescue people who choose not to evacuate because to do so would put the lives of emergency responders at risk. In some cases, the rescues

might be billed for the cost of the rescue. The point is that officials are more willing to include in the warning that those who choose to stay will be on their own until the storm passes or rescuers can be safely deployed.

8.17 Media Influences

Many individuals rely on reporter's interpretation of the threat. The National Hurricane Center does an excellent job of informing individuals with updates on many different shows from the news to the weather channel. However, many of these good influences are undone by reporters who may inadvertently encourage individuals to go surfing or to have hurricane parties. Social psychology has long shown how the media influences us. For a complete discussion on the topic, see Aronson (1992). When reporters show a family who stayed during a hurricane, others think they may safely do so next time as well. This could especially occur with individuals who are not experienced with evacuation.

A case example of the media influence was seen when Hurricane Hugo hit South Carolina in 1989; the reports of damage in the Caribbean gave impetus to residents to evacuate the barrier islands relatively early. Still, many coastal residents held *hurricane parties* and remained in the storm's path. The coverage of approaching storms by local and national news media, including the impressive use of satellite photography and other meteorological technologies by television weather people, may not convey information to residents in a manner that they can understand. In fact, the medias focus on the *eye* of the storms, rather than on the leading edge of the storm system with its high winds (including tornadoes) and precipitation, may delay evacuation decisions.

Not all media coverage is negative of course. Much of it is very useful. Haas and Trainer (1974) found that a hurricane preparedness program increased the public's perception about hurricanes because of media contact. Auf der Heide (1989) says that the media can act as a friend by providing information to the public (e.g., warning information, disaster information, preparedness information) and the media can stimulate donations and mitigation and possibly reduce injuries. A good example of news coverage can be found on a videotape of the Channel 4 news team of WTVJ, during Hurricane Andrew. This news team has been credited with saving lives and other reporters should view it. The *media as foe* however can distort facts and provide bad examples. It may be a good idea for reporters to examine the disaster literature to understand what effect they could be having on the public. One suggestion is for disaster researchers to hold a conference with the media to discuss some of these issues. The NWS's efforts to bring together NWS scientists and administrators, emergency managers, the media, and social scientists may help overcome the communication problem and assure that the public gets the information it needs to protect itself. YouTube videos of amateur storm chasers and individuals exposing themselves to wind and flying debris to take cell phone pictures have provided impetus for the effort.

8.18 Technology

The common wisdom and operational imperatives for hurricane evacuation have evolved as predictive capabilities regarding landfalls, tidal surges, and wind speeds have improved. Computer models, historical experience, and simple logic can identify the major risk areas and provide probabilities of damage. Fortunately, the worst fears of the experts were not realized during the Hurricane Andrew disaster. But, they might be realized in the next major storm. The NWS and

Federal Emergency Management Agency (FEMA) have identified high-risk coastal communities and are assisting local governments in developing mitigation strategies, including evacuation plans. NWS Special Program to List the Amplitude of Surges from Hurricanes (SPLASH) and Sea, Lake, and Overland Surges from Hurricanes (SLOSH) models have been used to plan evacuation routes. Some local communities also use HURREVAC and the Inland Wind Computer Model. New Orleans is on the list and Hurricane Katrina in 2005 did mirror the *Hurricane Pam* exercise conducted the year before (Waugh, 2006). A hurricane landfall in or near New York City was also anticipated.

The National Oceanic and Atmospheric Administration's (NOAA) and Dr. William Gray's annual forecasts for the hurricane season provide at least some early information on levels of hurricane and coastal storm activity. The NOAA forecast is based upon several computer models. (In fact, the ultimate NOAA landfall prediction for Hurricane Sandy was based upon a European model of the storm track.) Gray's forecasts for the hurricane season are based on rainfall in western Africa; El Niño current in the Pacific Ocean, westerly equatorial stratospheric winds, and barometric pressures in the Caribbean in the spring give decision makers some notion of the level of general threat each year. But, the forecasts give little guidance regarding specific landfall locations. While hurricanes have landfall cycles, tending to move from the East Coast to Mexico and Texas over a period of decades, the risk to particular communities is still hard to assess. Based on the history of landfalls, however, there is growing concern about the risk to south Florida and to communities along the East Coast. Probabilities of landfalls are based on aerial surveillance, barometric pressures west and north of the storm path, and other factors. The probabilities of landfalls were added to hurricane warnings in 1983 to encourage voluntary evacuations and to better communicate increasing risk. As noted earlier, landfall predictions may not give enough time for mass evacuations and alternative plans may be necessary, such as vertical evacuations or moving people into tall structures that are strong enough to survive the storm, like hotels and hospitals and government buildings.

8.19 Mitigation

Operational strategies have also evolved as building standards, land-use regulations, and public education have increased the survivability of coastal populations. One of the early *lessons learned* was from the devastating Galveston hurricane in 1900, which killed approximately 6000 residents; the town was literally raised and a seawall was built. Those actions were relatively progressive for the time and have served reasonably well, although storm surges have breached the wall and caused flooding in recent years and the limited points of access to the island still make evacuation difficult (Waugh, 1990). In some cases, such as the catastrophic cyclone in Bangladesh that killed over 300,000 in 1970, mitigation strategies were difficult to find. Low-lying lands with little or no cover for threatened populations afforded little opportunity for government to intervene to reduce risk. Poor farmers had little choice but to cultivate in high-risk areas. Evacuation was complicated by the dispersed rural population, the inaccessibility of many farms and communities, and the lack of an effective warning system. The solutions were improvements to the warning system and the construction of platforms above anticipated flooding to provide shelter.

Prior to Andrew, experts had expressed concern about the tremendous population growth and the nature and extent of development in south Florida and pointed out the greatly increased exposure of lives and property. There were also concerns that residents were unfamiliar with severe

storms and unappreciative of their danger. As the Andrew experience confirmed, in many cases, coastal communities lacked effective land-use regulation and lacked effective enforcement of building codes. Even when standards were adequate, they were not enforced effectively (Waugh and Hy, 1996). Prior to Hurricane Katrina, experts had questioned the likelihood of the New Orleans levees surviving a strong hurricane. Indeed, that the levees broke and flooded the city was not a surprise to those in the emergency management and scientific communities or even to those that had read the *National Geographic* magazine or the *American Behavioral Scientist* articles on the vulnerability of the city (see Waugh, 2006).

Another concern with building codes and land-use regulation is that often policies are established in response to a disaster event. These policies seem to last for a while and then revert. For example, after Hurricane Camille, a category 5 storm hit in 1969, there were new building code regulations that prohibited a building to exceed three stories. That regulation changed and there were multistory hotels built all along the Mississippi coast when Hurricane Katrina made landfall. This is not the first time mitigation efforts to minimize damage have taken a step backward. Project Impact, that is, the Disaster Resistant Community Program, begun in the 1990s to encourage communities to invest in hazard mitigation was terminated by the Bush administration as its success in reducing losses was being demonstrated (see, Rubin, 2010).

8.20 Emergency Management Responsibility, Resources, and Power

Hurricanes are not a seasonal issue (e.g., preparedness needs to be done ahead of time) nor are they only a coastal issue (e.g., inland flooding). Regarding information and education on preparedness, the emergency managers said that this is their job when there is no threat. One state official said she speaks to anyone anytime, but she feels as though they listen only right before the hurricane. The common wisdom in the profession of emergency management is that disasters create a *window of opportunity* to rethink and revise policy and that *window* closes within a few years when the disaster fades from the collective memory. Hurricane Katrina, however, changed the national agenda. It is the exemplar for poor decision making and poor preparedness at the local, state, and national levels. There was enough blame to go around. The political costs for the poor response are still being felt (Waugh, 2006, 2007, 2011).

The Hurricane Andrew experience provides a good example of emergency management resources and how they can be improved. While one hurricane was threatening, officials traveled to the migrant labor camps to warn migrant workers. Emergency management was not confident that the labor workers were receiving the information through the normal designated channels. However, when they drove up (in a sheriff's car), all of the workers ran into the woods and the officials went in after them trying to explain (in English) that they were not there to arrest them. Since then, the problem was fixed because officials have access to someone who speaks Spanish and they do not arrive at the migrant labor camps in a sheriff's car (Riad, 1997). These types of examples show how knowing a vulnerable population is at risk can sometimes not be enough without the correct resources. Policy decisions not to let immigration officials check evacuees and others seeking disaster assistance have been common in recent disasters to assure that all seek assistance who need it.

Emergency managers have a lot of power during an event but many do not have enough power or resources during non-disaster times to engage in policy decision-making issues that could affect issues like resources to facilitate evacuation. During disasters, they are the authority and everyone

listens to their instructions. “During operations we make it happen, the authority and power is often more than enough.” However, regarding preparedness ahead of time (e.g., requiring businesses to have plans), they have no authority or control (Riad, 1997).

8.21 Vertical Evacuation

Given the limited lead time in the best of circumstances, officials in low-lying communities are having to opt for vertical evacuation and *hardened* facilities, such as schools or hotels, which can accommodate large numbers of people. Moving entire populations out of harm’s way is simply not feasible given limited time, the potential for flooding well inland (particularly along rivers and creeks and across lowlands), the danger of leaving evacuees exposed to high winds along the evacuation route, and the logistics of moving large numbers of people. In a study to determine people’s attitudes about vertical evacuation, Ruch et al. (1991) found that 80% (n = 508) of individuals in Galveston and 84% (n = 492) of Tampa said they would use vertical evacuation, although 20% of Galveston and 16% of Tampa said they would not use it. Most of these individuals felt their home was safer or they would opt for horizontal evacuation in the case of a major hurricane.

8.22 Functional Needs

The identification of functional needs populations from children to the elderly to those with mobility or sensory issues has become the focus of attention for FEMA and other agencies. Current policy is to integrate such populations into the regular planning, rather than to have separate annexes for each group. Some accommodations are relatively easy. For example, if the wheelchair-bound need higher bunks in order to move more easily from chair to bed, it is easier to simply buy higher beds for all. The creation of *special needs registries* presents a number of problems in terms of updating information and the privacy of those on the registry. Making transportation, housing food programs, and other services flexible enough to accommodate those with functional needs, that is, Americans with Disabilities Act (ADA) compliant, is preferred to having special programs that may or may not work. Currently, there are efforts to develop battery packs and other resources for individuals who cannot evacuate because of health issues, such as needing special medical equipment or having compromised immune systems that prevent them from being housed in shelters (see, e.g., Risoe et al., 2013). During Hurricane Sandy, there were residents who could not leave their buildings.

8.23 Legal Issues

Local officials, including emergency managers, can be held legally liable for exercises of their discretion. They are protected from legal liability if implementing state or federal law. Some states do protect local officials, but the threat of suit still affects decisions. Officials in Florida, for example, have been sued by hotels and restaurants, as well as individual residents, when evacuations have proven unnecessary. Even though it appears that the storm is about to make landfall in the community, the decision to evacuate while there was still time to do so can be challenging because hotels and restaurants lose customers and suffer financial loss. To be sure, people can be injured in evacuations and there are financial costs in terms of food, shelter, gasoline, and so on. Nonetheless,

officials can be caught between the threats of lawsuit and chance that lives will be lost. Before Hurricane Sandy, Governor Christie used every resource he had to encourage his citizens to take protective action. Some did and some did not. What more could have been done to encourage evacuation and when? Recent court cases against emergency management officials suggest that in the future they may be held more accountable for their role in making sure warning messages reach individuals and that their plans include all segments of the population. The fact that there are national standards for emergency management makes it more difficult for officials to profess ignorance of hazards or have poor emergency plans.

8.24 Collective Evacuation Decisions

As Thomas Drabek (1994) concludes, evacuation decisions by tourism executives are characterized by the same process of warning, confirmation, and mobilization. However, while business executives have a similar decision process, it is made more complex by the involvement of customers, staff, and the business owners and general managers to whom the executives are responsible. Inquiries and expressions of concern by customers may be met initially with passive reassurance, referrals to local emergency management officials, or proactive recommendations for evacuation. The executives tend to rely more heavily on confirmation by local emergency management officials, rather than the media, and are more likely to exhibit denial in the absence of a mandatory evacuation order. Managers of hotels and restaurants are understandably concerned about lost revenue and fear legal liability for their recommendations to customers. The managers are caught between the option of simply waiting for customers and staff members to make evacuation decisions on their own and the option of closing the facility and thereby forcing them to leave. For the firm, evacuation is generally an owner or general manager decision but the decision may be made for them if customers leave and/or substantial numbers of the staff join their families and/or choose to evacuate.

Customers are concerned about the loss of deposits, changing their travel plans, and whether to seek shelter or return home. They often have little understanding of the hazard itself or usually have no knowledge of local emergency procedures, even though provisions may have been made to move them to secure facilities through vertical evacuation, designated public shelters, or accommodations in other more secure hotels.

8.25 Evacuation Policy

Ideally, emergency managers would have a systematic means of (1) assessing disaster risk, (2) communicating the danger to residents credibly, (3) assuring that residents pack appropriately and secure their homes and businesses, and (4) providing guidance and support for an orderly evacuation along safe routes to safe shelters. Evacuations should be implemented early enough to minimize risk but not so early as to increase the costs to businesses unnecessarily or to overtax the shelter and food programs. To the extent that the evacuations can be phased, with the residents in the most dangerous areas leaving first, risk can be reduced and the evacuation itself can be managed better. All of this presupposes effective planning, preparation, and implementation of the plan, with appropriate involvement by community leaders.

The reality of evacuation decision making is that warnings may not be heeded or will be heeded by some but not all, the level of risk may be difficult to judge and communicate credibly, communication with all residents may be difficult or impossible, some residents may evacuate without packing

needed medicines and other supplies, and some residents simply may not have the means to evacuate. Also, evacuations can be expensive and dangerous. Quite apart from the costs of shutting down coastal businesses, evacuees incur costs for food and lodging and fear losses from looters.

Evacuation is physically demanding and may pose health risks to the elderly and infirm as well as increase the likelihood of accidental injury and death. Damage and distress from not evacuating can be avoided. Despite the common elements in all or nearly all hurricanes, evacuation policies have to be designed for the particular demographics of the community and the geography, as well as offering flexibility to accommodate the peculiarities of each storm. We need to have updated information on both individual- and community-level factors in order to encourage evacuation.

8.26 Conclusions: Designing an Effective Policy

Designing a policy that accommodates the psychology of evacuation, as well as minimizing the exposure of people to hazards, is a challenge. In order to meet those conditions, policymakers need to do the following:

1. Address the reasons why people may choose not to evacuate, such as evaluating the strength of intended shelters and identifying most secure shelters (even if they do not offer adequate protection) and accommodating evacuees with pets.
2. Address the reasons why people may delay evacuation decisions, such as providing frequent situation reports and recommending decision points for evacuation preparation and actual evacuation.
3. Facilitate the social process of decision making by including families and community groups in discussions of risk and, as much as possible, organizing evacuations by neighborhood and/or social grouping.
4. Focus attention on risk to children, the elderly, and other functional need populations from the disaster and from a lengthy recovery process (e.g., days or weeks without electricity).
5. Choose spokespersons who can communicate clearly and with appropriate emotional content the risk to individuals, families, communities, etc., rather than persons who simply convey factual information without giving cues concerning how it might be interpreted.
6. Remind hospitality and other business owners of the OSHA requirement (29 CFR 1910) that each firm has a written disaster evacuation plan, assists in the development of plans, and facilitates the integration of individual firm plans into the community evacuation plan.
7. Maintain and encourage social support networks. Evacuation is also part of the recovery process, and, therefore, keeping families together and, to the extent possible, recommending that neighbors and others within particular communities be housed together in shelters would reduce stress and aid in the psychological recovery of individuals.
8. Update behavioral and transportation analyses more often.
9. Use scientific and technical information, including probabilities of landfalls and other events, judiciously to inform the public and the media concerning risk and the potential need for evacuations.
10. Provide a credible, but reasonable, assessment of the risk that individuals and families may be taking if they do not comply with evacuation orders.
11. Emphasize the uncertainty of events (e.g., flood level, wind speed, etc.) *and* the limits of individual and community precautions, so that individuals understand that the level of risk is unpredictable and their own resources and capabilities may be inadequate.

12. Educate the public and the media concerning disasters, based upon the kinds of information that they are likely to use in making their preparedness and evacuation decisions, such as interpreting weather broadcasts.
13. Communicate the warning through a credible and trusted source, preferably a known local person or agency, and do so directly and personally.
14. Build upon past disaster experience, particularly experience with evacuation itself.
15. Consider differences in ethnic groups, particularly the size and cohesiveness of families, when issuing evacuation information and orders.
16. Include information on protecting property from looters, providing for the reentry of residents to their communities as soon as possible following the disaster and involving owners in damage assessment to the extent possible.
17. Use schools, daycare centers, and other facilities for children in communicating risk and evacuation procedures to parents to reinforce their concern about the safety of their children.
18. Involve the media in the emergency communication system so that they understand the information that they receive and communicate it effectively to the public.
19. Build upon past disaster experience, particularly experience with evacuation itself.
20. Assure that the evacuation program is linked to pre-disaster recovery planning so that evacuees can return in time to participate in the setting of recovery priorities or can participate by other means.
21. Prepare to help those who cannot or choose not to evacuate—and there will be a significant percentage who will not leave their homes and businesses.
22. Assure that emergency shelters are safe and reasonably comfortable and show those facilities to those who may be evacuated in future disasters to allay fears associated with crime, sanitation, and the loss of family and other social links, including pets.

Attention to those issues should increase the likelihood of compliance with evacuation orders and the effective implementation of evacuation plans. Of course, attention should also be paid to the need to invest more resources in state and local emergency management efforts, including evacuation planning; restrict development in hazard-prone areas, for example, floodplains, to minimize exposure to risk; spend the time and money to rebuild correctly (i.e., putting power lines underground and make infrastructure less vulnerable to disaster) to mitigate future disasters; and base evacuation and other emergency plans on the largest number of residents and visitors or guests that might be expected and anticipate that they will have little understanding of the hazard and the risk that it poses. The psychology of evacuation includes both the application of knowledge about hazards and risk-reducing behaviors and normal human responses to uncertainty, fear, and excitement. Just as hurricanes and other hazards may be somewhat unpredictable, people may well behave in ways contrary to their own interests, as well as the interests of policymakers. No matter what emergency managers may wish, some people will evacuate into the teeth of the storm, rather than away from its danger.

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Chapter 9

Role of Technology and Human Factors in Emergency Management

Francis R. Terry

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9.1 Introduction

The late twentieth-century technology has unquestionably made the conditions of peacetime human existence more bearable, more prosperous, and more enjoyable. Developments in pharmaceuticals and medical care as well as in food production, communications, and transport are some of the most obvious areas in which technology has made vast impacts on the majority of people's lives over the past 50 years. Yet, accidents, emergencies, and disasters continue to plague human existence. Indeed, our perception of them may well have been heightened by the very technology of communications that also brings to us a wider range of information services than ever before.

On the other hand, the application of modern technology on an industrial scale carries with it the risk of catastrophic malfunction, leading to an emergency of some kind. An emergency is defined here simply as a *sudden critical juncture demanding immediate remedial action*. In seeking to prevent emergencies in an industrial context, which is the main focus of this chapter, we can distinguish between

1. Failures of the technology itself, that is, a physical inadequacy for the intended purpose, which arises at some point as a consequence of weakness in design, poor manufacture, build up of stress or wear in the course of operation, or a variety of other possible causes
2. Failures of control, that is, a defective or inappropriate interaction between human beings and the technology

It is possible for emergencies arising from technical failure to be safeguarded against in a variety of ways—for example, by employing *fail-safe* principles in design or backup features such as triplication. Indeed, the standards of performance expected from modern industrial technology are typically very high, since people are understandably reluctant to trust machines to *think* and the potential for accidental injury and death may be considerable. Much greater reliability and confidence levels are demanded from technology than we normally require from our fellow human beings.

9.2 The Need for Institutional Frameworks

Failures of human control are much more problematic. *Control*, incidentally, is taken to include the conceptualization, design, and initial application of technology as well as the operation of it in practice. As Graumann (1974) has written, any technological device, whether a simple instrument or a complex computer system, is an *agendum* that, owing to its specific technical features, presents itself with a specific demand structure that has been incorporated into it by its designer. Man (woman)/machine interaction can therefore be viewed as a virtual social interaction between the operator and the machine's designer. Such interaction can be conceptualized as a communication process (Quintanilla 1987), subject to the same uncertainties of understanding and defects in comprehension as other, more direct forms of communication. Thus, however mechanized or automated a device may be, there is inevitably at some point a human interface with it, and this is a potentially dangerous source of weakness.

As in the case of physical failure, there are remedies that the technology itself can provide that may help to guard against such dangers. *Intelligent* systems can eliminate misuse, mindless error, or inconsistent decisions, thus helping to reduce the chance of an emergency, but the system may still be vulnerable to eventual failure through inadequate maintenance (Flin 1996). Despite significant advances in psychological research (see, e.g., Rasmussen et al. 1987; Hockey 1996), the human/machine interface remains a critical problem area in the prevention of emergencies.

Society's response to this problem has been to evolve institutional frameworks and social mechanisms that seek to prevent or mitigate the effect of failures of the human/machine interface as well as the effect of failures in the operation of the machinery itself. Institutional frameworks may be imposed externally, in the form of independent inspectorates or audit bodies, or they may be located in-house (Health & Safety Executive 1991). Their functions constitute a form of regulation. The trend in Europe is for in-house organizational units to assume increasing importance

in the prevention and control of emergencies—for example, through safety management systems. Instituting a safety management system would typically involve consideration of

- Organizational structure
- Management and personnel standards
- Training for operations and emergencies
- Safety assessment
- Design assessment
- Procedures for operations, maintenance, modifications, and emergencies
- Management of safety by contractors to the organization in respect of their work
- Involvement of the work force in safety
- Accident and incident reporting, investigation, and follow-up
- Monitoring and auditing of the operation of the system
- Systematic reappraisal of systems in the light of experience internally and across the industry more generally (Cullen 1988)

Despite the comprehensive appearance of such a system, a failure in any one or more of the functions listed could allow a problem at the human/machine interface to trigger an emergency. Even if institutional frameworks and social mechanisms worked with the precision and reliability that we expect of the technology itself, there would still be problems.

9.3 Regulating Behavior at the Human/Technology Interface

We can demonstrate this by examining how the behavior of an operative is regulated at the interface with technology in a particular case. In the railroad industry, failure of the correct interaction between human actors on the one hand (locomotive engineers, dispatchers, and signalers) and control technology on the other has the potential for very serious accidents and emergencies to arise.

The response of railroad organizations is, first, to operate a recruitment and training policy designed to ensure that all staff are fully trained and tested for competency before commencing their duties. At the initial selection stage, the recruit is tested for his or her capacity to absorb and retain the necessary training, to carry out routine tasks consistently, and to respond appropriately in the event of an emergency. The selection process includes medical and possibly psychometric tests. Subsequent training is designed to ensure that the required competencies can be deployed in a wide range of working conditions and situations.

For the locomotive engineer, for example, it would comprise the following:

- Knowledge of the traction equipment, including operating characteristics and fault diagnosis and treatment
- Train handling knowledge, that is, understanding the characteristics of operation with particular loads
- Route knowledge, including locations of signals and stations, crests and bottoms of grades, turnouts, and sidings
- Knowledge of all relevant rules, special instructions, and procedures (Health & Safety Executive 1993)

Once the engineer is employed, a further set of institutional checks is maintained on his performance. Health status has to be monitored regularly and training has to be refreshed or

updated. Performance on the job is monitored in various ways, to ensure compliance with current standards, and this may be through random inspection, self-reporting of incidents, or simulator driving, to name some examples. Safety officers, safety drills, welfare services, and support services all have their part to play.

One particular source of risk in the railroad context (though it is also present in many other industries) concerns fatigue. There is widespread acceptance in the industry, enshrined in all manner of directions and rules, that the number of hours spent at work is positively correlated with fatigue and that this, in turn, leads to an increasing risk of accident. On the British railroad system, no employee is allowed to work more than 12 h in any day or 72 h/week and he or she shall not work more than 13 days out of 14. The pattern is similar across other European countries, with additional restrictions imposed on locomotive engineers' hours—a maximum of 9 applies in the UK case. Nevertheless, fatigue is still identified as a major cause of accidents and emergencies.

The problem is partly that there is no generally recognized definition of fatigue and there are few objective measures of it. Indeed, as Dyer-Smith (1997) observes, we could substitute *stress*, *boredom*, or *lack of motivation* for the word *fatigue*, and the same supposed relationship between hours of work and proneness to accidents would hold good. A review of recent literature on accidents, however, reveals that they do not necessarily increase in frequency the longer an operative works. The study of bus drivers by Pokorny et al. (1981) showed that there is a concentration of accidents in the third and fourth hours of work. A study by Hamelin (1987) of truck drivers suggests that risks are actually highest in the first 4 h of duty unless the total work period exceeds 12 h. Wharf (1993) found a distinct peak of *signal passed at danger* incidents among railroad engineers in the second hour of duty. Folkard (1996a,b) found a similar peak in a more general review of industrial injury rates.

It is hypothesized by Dyer-Smith (1997) that the explanation of the 2–4 h peak lies in the interaction of *engagement* and *habituation*, two effects that he describes as individually linear but acting in opposite directions. When an operative starts duty, he or she is usually mentally alert and concentrates on the task in hand; in other words, engagement is high. If the task, such as driving, is familiar and routine, habituation sets in over time. Given predictable stimuli, says Dyer-Smith, performance of the task demands diminishing mental resources as responses become virtually automated. We can all think of behavior patterns that become routine and mental processes that lose none of their effectiveness by becoming unconscious. The 2–4 h peak could be attributable to the fact that while engagement is falling off, automatization is not yet at maximum efficiency. Within this *window*, the potential for failure in the human/machine interface is heightened.

It is difficult to know what implications this research has for the design of institutions and procedures concerned with preventing accidents and emergencies. At the least, we could say that an awareness of the 2–4 h peak might caution operatives in safety-critical areas to be especially on their guard. Technological aids to vigilance might be improved. Further research might illuminate the risks at work from boredom and fatigue and approaches might be found to meet them.

The conclusion from the argument so far, and it is a somewhat depressing one, is that while technology itself—along with institutional frameworks of regulation, inspection, monitoring, etc.—is a considerable insurance against emergencies arising from failures at the human/machine interface, it cannot guarantee perfect safety. As a result, much interest in emergency management focuses on the containment of risk. In other words, having been forced to accept that somewhere along the line failure may sooner or later occur, we seek to quantify the risks and minimize them wherever possible.

9.4 Living with Risk

It is important to note that risks may be *tolerated* as the price of securing certain benefits and that this may be done in the belief that the risks are being controlled. The knowledge that nearly 4000 people die every year in road accidents across the United Kingdom, with injuries to many more, does not discourage people from incurring the risks associated with driving. To say that we tolerate a risk does not mean that we ignore it or regard it as negligible but that it is a factor that needs to be kept under review and further reduced if possible. If we say that a risk is *acceptable*, on the other hand, it means that, in relation to life or work, we are willing to take it more or less as it is. A woman who wants a child will not change her mind if she learns that the average chance of death due to pregnancy and childbirth is around 1 in 10,000.

We may define *risk* as the chance that some event that affects us adversely will occur. To take a risk means deliberately incurring that chance, while estimating a risk involves defining the adverse event precisely and establishing a means of calculating how often it is likely to happen in particular circumstances. When we use the word *chance*, we usually mean the probability of something happening. *Risk*, then, may be defined as *the chance of an adverse event happening and the consequences of that event taken together*. Before continuing, we need to consider three further points.

First, there is no such thing as a total absence of risk. Whether we exploit modern technology to the full or abhor it, we continually experience various kinds of risk, even by remaining at home. One may fall downstairs and break a leg. In performing other kinds of activities, we would experience other types and levels of risk. Second, we should remember that however remote a risk may seem, it could nevertheless occur. The chance of being struck by lightning in the United Kingdom is about 1 in 10 million, but it still might happen to any one of us. Remote risk is therefore not the same as no risk at all. Finally, as individuals, our chances inevitably vary according to a whole range of factors, such as where we live, how fit we are, how old, and how observant.

In normal conversation, the word *risk* is quite often used to emphasize the consequences rather more than to the probability. If we see a driver speeding through an intersection at the moment when the traffic lights change to yellow or red, we might say “that’s risky”—meaning not so much that there is a high *probability* of a collision but that it will have dangerous *consequences* if it does happen. We should therefore include a third component in estimating risk: the *severity* of the consequences. This third aspect becomes more and more important as the number of people potentially affected by any given risk increases.

It is possible to draw a distinction between risks that we *voluntarily* incur as a result of individual choice and risks that are imposed on us *externally* by governments, commercial firms, and other agencies. There are also significant risks from natural causes, and public bodies may take action to control these risks—for example, in London, where the local authority constructed a barrage across the river Thames estuary to reduce the risk of flooding when there is a freak high tide.

9.5 Institutional Frameworks and Risk Control

Regulatory institutions may seek to control risks that are voluntarily incurred if enough people are affected by them. Thus, local and national governments make road improvements in an effort to reduce the risk of accidents. But institutional frameworks have a major, and often a more problematic, role in seeking to manage the risks from applying modern technology in an industrial context. These risks may have implications that are quite as severe as those that are voluntarily incurred or stem from natural causes. They include risks from the siting of nuclear and chemical

plants, refineries, dams, defense installations, and certain types of waste repository. Even though there may be compensating benefits from the existence of such facilities, which contribute in some way to a better life for all, society demands that they are regulated in the interests of controlling risk. Table 9.1 shows a comparison of the risk of death from all causes as against certain categories of accident arising from the application of industrial technology on a large scale.

We might note in passing that most people apply quite different criteria to involuntary risks as compared to voluntary ones. They expect the former to be reduced to much lower levels and they often believe in an implicit right to know how risks from potentially hazardous technology are being controlled. The presence of risk can vary considerably according to location, and the benefits may be unevenly distributed: a decision to construct a nuclear power station, for example, imposes risks on people nearby, but the availability of cheap power may be spread over a much wider area. Risks may be shifted in time: for example, tolerable risks at present may be traded against higher levels of risk in the future. A balance has also to be struck between saddling industries and businesses with an excessively heavy framework of supervisory institutions, allowing those same industries and businesses to fall below what the public considers a tolerable level of risk (Royal Commission on Environmental Pollution 1976).

Against this background, it is all too easy to assume that regulatory institutions should be composed of highly qualified experts, taking decisions on behalf of citizens who are busy with their own lives and prefer to believe that the risks from industrial applications of technology are negligible or who are not interested in finding out exactly what the risks are. On the other hand, however competent the experts may be and however small the statistical risks of an emergency, public perceptions are inclined to be different. Creating institutional frameworks necessarily implies placing a degree of trust in officialdom to act on the citizen's behalf; and that trust has to be maintained consistently with public perceptions (Starr 1985).

It may be argued that regulatory institutions, as well as the industries exploiting modern technology, have a responsibility to inform and educate the public even if they are not particularly interested or concerned about risk (Slovic 1986). But even then, public expectations about the level of risk that can be tolerated will differ according to the hazard involved, while individuals' knowledge and feelings about risk will quite legitimately vary. Opinions about the value of benefits obtained will also vary, and ethical views of certain activities may differ too. In a democratic society, such factors have to be given due weight in emergency management.

9.6 The Case of Nuclear Power

In the United Kingdom, debate about such issues has surfaced periodically in response to actual emergencies or the fear of potential emergencies. One example in this second category is the question of whether or not to construct further nuclear power stations. In the early 1980s, the former nationalized electricity undertaking, the Central Electricity Generating Board (CEGB), puts forward proposals for a new nuclear station on the coast of Suffolk in eastern England. The station was to be of the pressurized water reactor (PWR) type widely used in the United States but relatively untried in the British environment. Public consultation was extensive, leading to a wide-ranging public inquiry spread over 2½ years. The report of the inquiry, conducted by Sir Frank Layfield, an eminent judge, was submitted to the secretaries of state in 1986; the approval to construct was subsequently given and the station is now working.

The public inquiry was the largest and most expensive of its kind, bringing together leading scientists, lawyers, environmentalists, and officials to give and to hear testimony. The report

Table 9.1 Some Risks of Death Expressed as Annual Experiences (UK Figures)

<i>Dying from All Causes</i>	<i>Risk as Annual Experiences</i>
Average over whole population	1 in 87
Men aged 55–64	1 in 65
Women aged 55–64	1 in 110
Men aged 35–44	1 in 578
Women aged 35–44	1 in 873
Boys aged 5–14	1 in 4,400
Girls aged 5–14	1 in 6,250
Dying from cancer (average over whole population (Great Britain))	1 in 374
Death by all violent causes (accidents, homicides, suicides, others—average over population of Great Britain)	1 in 2,700
Death by accidents (all Great Britain)	1 in 4,200
Death by road accident (average over population of Great Britain)	1 in 10,204
Death by gas incident (fire, explosion, or poisoning—average over population of Great Britain)	1 in 1,100,000
Death by lightning	1 in 10,000,000
Death by industrial accident (deep-sea fishermen on UK-registered vessels)	1 in 750
Extraction of oil and gas	1 in 990
Extraction of minerals and ores	1 in 3,900
Coal extraction	1 in 7,100
Construction	1 in 10,200
Agriculture	1 in 13,500
All manufacturing industry	1 in 53,000

(continued)

Table 9.1 (continued) Some Risks of Death Expressed as Annual Experiences (UK Figures)

<i>Dying from All Causes</i>	<i>Risk as Annual Experiences</i>
Metal manufacturing	1 in 17,000
Instrument engineering industry	1 in 1,000,000
All service industries	1 in 150,000

Source: Central Statistical Office, *Annual Abstracts of Statistics*, HMSO, London, U.K., 1991; Health & Safety Commission, *Annual Report*, HMSO, London, U.K., 1991; Department of Transport Marine Accident Investigation Branch, *Annual Report 1990*, HMSO, London, U.K., 1991.

of the inquiry is one of the most compendious sources of information on all aspects of the development of nuclear stations. Among his recommendations, Layfield called for the Health and Safety Executive (HSE) to “formulate and publish guidelines on the tolerable levels of individual and social risk to workers and the public from nuclear power stations.” He averred that “the opinion of the public should underlie the evaluation of risk; there is at present insufficient public information to allow understanding of the basis for the regulation of nuclear safety” (Layfield 1986).

This was a remarkable recommendation on two counts: it acknowledged for the first time that public opinion as much as expert opinion had a place in the assessment of risk from an industrial facility, but it also implicitly criticized the promoters of the scheme for failing to raise public understanding to a point where it could sensibly formulate such an opinion. Layfield perhaps was overoptimistic. He seems to have believed that, with more information, a fair and rational compromise between promoters and objectors would be found. In reality, many objectors felt defeated but found themselves powerless to resist further.

9.7 Regulation of Risk

The HSE did nevertheless publish the guidelines that had been called for (Health & Safety Executive 1992a), and they deserve critical examination. They constitute an invaluable case example of how a regulatory institution seeks to control the risks arising from the application of a potentially dangerous technology. The HSE’s guidelines lay down a series of tests to be applied in regulating risks from industrial plants: (1) whether a given risk is so great or the outcome so unacceptable that it must be refused all together; (2) whether the risk is, or has been made, so small that no further precaution is necessary; or (3) if a risk falls between these two states that it has been reduced to the lowest level practicable, bearing in mind the benefits flowing from its acceptance and taking into account the costs of any further reduction. The injunction laid down in safety law is that any risk must be reduced so far as reasonably practicable or to a level that is *as low as reasonably practicable* (the ALARP principle).

Procedures like these conform to commonsense expectations, but they do not go very far in specifying how risk should be controlled in specific situations. On the other hand, it has to be recognized that not everything can be measured with the greatest degree of accuracy. Where a risk can be quantified, a definite standard of performance should be fixed; and where measurement is not possible, expert assessment or judgment is called for. In its application of these procedures,

the HSE puts the onus on employers to take responsibility: “At the core of any organisation’s activities for safety is the need to manage its own undertaking in an appropriate way” (Health & Safety Executive 1991). Although management is expected to take responsibility and be vigilant in identifying opportunities for improvement, the HSE may insist that there is a basic standard of achievement or a particular requirement to be met—even if the costs involved threaten the viability of the business concerned.

In considering the risks of large-scale injury and death from industrial plant, it is characteristic of regulatory institutions, including the HSE in Britain, to insist that the owners of the plant should carry out and submit for examination the basic assessment (Health & Safety Executive 1992b). The executive may then require additional measures to be taken. The assessment procedure recommended by HSE starts with the technology itself, by examining the overall design and reliability of the process and the risk of plant failures, which should so far as possible be quantified. Since it is not always possible to show how an overall design or an individual component will perform under extreme circumstances or in every situation, expert judgment may have to be relied on in deciding what reinforcement is needed to cope with the unexpected. Physical components may need to be strengthened or additional, backup components may be incorporated to provide *redundancy*.

Redundancy will not necessarily guard against design faults, which might be repeated in every component of that type; consequently, it may be necessary to rely on components that perform a similar function but are designed independently. We call this *design diversity*. HSE maintains (Health & Safety Executive 1992a) that design diversity can be very effective in the case of simple devices, since different versions almost invariably fail independently of one another. But in more complex situations, it appears to deliver only a modest level of protection from risk. For example, experiments on diverse computer software have suggested that there is a tendency for different designers, working separately on the same problem, to make similar errors. We note that even in these early stages of the assessment, human factors impinge on the application of the technology at every turn.

Next, the technology has to be examined in the physical context of the plant. This implies close scrutiny of the quality standards applied to design, construction, operation, and maintenance of the plant. Quality management is a subject in itself and, while important in the overall control of risk, is not discussed further here. We pass on to the organizational context, which covers the psychological and physical dimensions of work in the plant, together with the operational and management procedures above them. As the British HSE has expressed it, “While the ‘hardware’ of safety ... must be of a high standard, technical excellence is not enough and, on its own, will not ensure a consistent safety performance. In most high-technology industries... the underlying causes of accidents are organisational” (Health & Safety Executive 1993). Human beings are, of course, themselves a source of risk, as we have seen from the railroad industry example, but there are subtler aspects to be considered as well. Management may be able to motivate and lead the work force in identifying new risks or countering unnecessary risks (Barrett 1997). The importance of repeated analysis, communication, consultation, and reporting in dealing with risk-related issues (Misumi 1978) should be stressed.

9.8 Risk Assessments

Although all these approaches have value in minimizing the risks within an industrial plant, the external implications of failure have also to be assessed. Such an assessment can be considered at two levels—*individual* and *societal*. In the first case, the key task is to calculate the

risk to any random individual who lives within a defined distance of the plant or who follows a pattern of life that might expose him or her to the consequences of an accident. This entails, first, an estimation of the likelihood of a failure occurring in the plant at all. Data need to be collected and maintained on experience with similar plants and processes elsewhere and on the characteristics of those failure situations that have occurred in order to gain a picture of reliability.

The results of specific failures then have to be evaluated. How much toxic gas, radioactivity, inflammable substance, etc., would be released? How would these releases affect a hypothetical person at a particular location, either outdoors or indoors? What would be the effect of weather conditions? How would population density and transport patterns possibly multiply the effect on a single individual? Having examined the chances of harm from all significant causes of failure and preferably quantified them, an overall summation can be made of the risk from the plant. When such *individual risk* calculations have been made, they enable us to say, for example, that “a person who lives within a half-mile radius of the plant has a chance of x per year of being injured from a significant accident at that plant.” It is perhaps easy to forget that emergencies do not result only in death or survival: they may lead to a reduction in life expectancy relative to the norm as well as to immediate pain or suffering.

The consequences of a major emergency may go much wider than injury to individuals. For example, in the case of the Chernobyl nuclear accident, there were health effects internationally, and there were major disruptions to life in all its forms locally. Not least, there was a loss of plant and electricity production, which had considerable economic impact. Though less dramatic—certainly less newsworthy—than a mass killing at a single moment, large numbers of accidental deaths over a long period of time (and other deleterious effects from plant failures) are just as much a matter of public concern. These societal risks, as we call them, could in principle be evaluated just as individual risks are and assigned monetary values. It would then be possible to talk in terms of the costs of an emergency and perhaps to set this against a calculation of the benefits accruing in financial and other ways from the existence of the plant.

Such calculations would be fraught with problems and involve placing values on things that are not only difficult to estimate in themselves but also difficult to weigh with each other. Nonetheless, at the simplest level, we might say that no benefit, however large, would lead us willingly to accept the kind of costs produced by a calculation of the societal risks—unless the benefit took the form of avoiding some even greater misfortune. In making this comparison, we should, of course, have to estimate the probability of incurring the costs in question. The two factors can be combined by multiplying the costs likely to be incurred by the probability of their being incurred in order to produce a measure of *detriment*.

If such a measure were obtained, it would enable the relative detriment of pursuing different technological solutions to reach a particular goal to be compared. For example, it might enable us to evaluate the detriment from industrial activities that gave rise to the risk of accidents against the detriment from continuing with some more insidiously harmful processes. The comparison between nuclear and coal-burning power plants in ecologically sensitive areas is one obvious application that springs to mind. Unfortunately, we are a long way from common agreement on the methodology for performing such complex calculations. There are no recognized accounting or valuation standards that would apply. Estimation of the probability of remote events is an inexact science. The best we can probably do is to estimate what chance there is of a given number of people losing their lives from an emergency of a specified type and comparing this with other, similar risks that are ordinarily accepted or well known.

9.9 Conclusion

Technology has a seductive appeal for us. It offers the promise of comfort, prosperity, and many other enhancements to human existence. We recognize the potential for emergencies to arise from its application on an industrial scale, and a range of strategies is pursued to lessen such occurrences. In an organized society, it is also a rational and effective response to create institutions that regulate the risky area at the interface between technology and human behavior. Research, analysis, and experience of past emergencies have helped these institutions—whether internal units or external agencies—to understand the dimensions of risk and to implement appropriate preventive measures, controls, and sanctions.

Nevertheless, all the risks from utilizing technology on a large scale cannot be reliably contained. The potential effects of an emergency may involve a much wider field than the workforce on the spot: the public at large, sometimes over a wide area, may be vulnerable. This raises questions about public understanding and participation in the regulatory process and about the calculation of individual and societal risk from industrial plants and the like. There are clear limits to the extent of protection available to us in harnessing technology, and while those limits might be pushed further out by research and experience, the danger is that prevention of emergencies becomes an ever-growing bureaucratic exercise. Where the point of diminishing returns sets in—that is, where the costs of regulation exceed the resources of the operating organization—is not only a matter of economics but is, as we have seen, powerfully influenced by social factors.

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Chapter 10

Evolution of Emergency Management in America

From a Troubling Past to an Uncertain Future

Patrick S. Roberts, Robert Ward, and Gary Wamsley

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In the first edition of the *Handbook of Emergency Management* published in 2001, Robert Ward, Gary Wamsley, and Aaron Schroeder, contributed a chapter titled *The Evolution of Emergency Management in America: From a Painful Past to a Promising but Uncertain Future*. The chapter dealt with the development of emergency management in the United States and specifically the creation and changes that occurred within the Federal Emergency Management Agency (FEMA) from its inception in 1979 through the middle 1990s. We discussed the factors that plagued FEMA through the 1980s and into the early 1990s, including its near extinction at the hands of Congress, and its eventual resurrection under the leadership of James Lee Witt. Specifically, we examined

Witt's development of a network organizational system for emergency management that successfully established a partnership between federal, state, and local governments to deal with emergency management. Witt has been celebrated as a model public manager for clarifying FEMA's goals in the management of natural disasters, emphasizing mitigation rather than response alone, and for improving response times. Witt also linked the knowledge of the emergency management community with politicians by selecting experienced emergency managers as advisors and by making the case for a well-functioning FEMA with independent authority to the president and Congress (Roberts 2013, 70–113; Schneider 2005, Waugh 2006). However, FEMA's high number of political appointees relative to careerists leaves open the potential for subsequent presidential administrations to return to the practice of rewarding political operatives with little emergency management experience by naming them to positions in FEMA. Political scientist David Lewis (2007) found that programs administered by civil servants performed better on a range of measures including program design, planning, and financial oversight, than those administered by appointees.

At the time of this writing, 8 years have elapsed since we expressed both our positive impressions of what James Lee Witt was accomplishing in the development of FEMA and our continuing concerns over matters still left to be done. During those 8 years, profound changes have occurred to both emergency management and FEMA in the United States. We have watched as emergency management has been *drafted* into the War on Terrorism. The attacks of 9/11 led to the largest reorganization of the federal government since the creation of the Department of Defense in 1947. A new federal department has emerged known as the Department of Homeland Security (DHS). DHS has brought together under one cabinet level department such diverse agencies as the US Customs Service and the US Secret Service of the Department of the Treasury, the Immigration and Naturalization Service of the Department of Justice, the Animal and Plant Health Inspection Service of the Department of Agriculture, the US Coast Guard and the Transportation Security Administration of the Department of Transportation, the Federal Protective Service of the General Services Administration, and, last, but by no means the least, FEMA.*

Since FEMA's inclusion within DHS, we watched as FEMA's status and effectiveness within the federal government plummeted, and emergency management's mission was redirected away from natural disaster to a focus instead on terrorism. We also watched as unqualified political appointees were approved to oversee the administration of FEMA. We witnessed the shocking failure of emergency management to respond to the disasters of 2005, especially hurricane Katrina, and, once again, saw emergency management publicly disgraced, facing near extinction at the hands of Congress, and then FEMA reorganized in a new model. Finally, we witnessed the historic election of America's first African-American president, followed by the appointment of a seasoned emergency management veteran to once again take over the helm of FEMA, but only vague hints as to the future direction of the development of emergency management. It would seem that the misgivings we expressed in 2001 were well founded.

We would like to examine the events that have occurred between 2001 and 2009 in light of the issues we discussed in the first edition's chapter and to see what actions taken during those 8 years have most significantly affected emergency management's effectiveness. We would also like to examine the current changes to emergency management that have occurred as a result of the election of 2008 and discuss the likelihood of their success in improving emergency management in the near future.

* The Department of Homeland Security employs over 200,000 persons and is the third largest department within the federal government. For a listing of the federal departments and programs transferred to the Department of Homeland Security in 2002, see Appendix 10.A.

10.1 Nationalization of Disasters

Up to the 1970s, natural disasters were generally viewed as localized or regional events. However, by the time the nation entered the 1980s, natural disasters had become increasingly defined as matters of national concern (Ward and Wamsley, 2007; Roberts, 2013). American government underwent fundamental change during those years, including expansion of national authority and the collapse of a more robust federalism, as well as increasing partisan polarization (Dethick 2000, Fiorina, 2002). Beyond these general trends, three specific factors led emergency management to become an increasingly national policy issue. The first factor is the development of *live on the scene* media coverage of disasters, especially by the 24/7 cable news networks, which have heightened public awareness of disasters. The second factor was the use of natural disasters by presidents to advance their public standing and political agendas. The third factor was the politicization by local and state officials of the presidential disaster declaration process to shift costs for response and recovery off of local and state revenue sources onto national revenue sources (Schroeder et al., 2001; Sylves 2008, 76–108; Derthick, 2009).

During the 1990s, the process of increased federal involvement in disasters continued in terms of the granting of presidential disaster declarations. However, federal involvement in all aspects of disaster preparation, response, recovery, and mitigation also increased and was especially evident in the development of state and local government emergency management systems (Sylves, 2007). Two factors drove the increasing involvement of the federal government in the development of local and state emergency management systems.

The first factor was the dissolution of the former Soviet Union in December 1991, which marked the end of the Cold War and drastically reduced the possibility of all-out nuclear war between the United States and the Soviet Union. The end of the Cold War provided an opportunity for FEMA to reduce its emphasis on civil defense and continuity of government and concentrate the resources of the agency upon dealing with natural disasters and the development of emergency management systems (Ward et al., 2000).

The second factor was the realization by the Clinton administration, in the aftermath of the 1992 hurricane Andrew, that the existing system for dealing with disasters lacked the ability to prepare for and quickly respond to them. The limited federal funding for the development of local and state emergency management systems had created a wide variation in response capabilities, with some states able to effectively deal with disasters, and others only marginally able to respond. Additionally, FEMA's insistence on defining its role as *responder of last resort* was increasingly seen as too passive. Faced with the attention of the 24-hour news cycle, politicians needed FEMA to be a more proactive arm of government. Following Hurricane Andrew, FEMA and state governors restructured the agency's operations and authorities to be able to preposition resources before a disaster (FEMA 1993, 40; Wamsely and Schroeder, 1996).

The net result of these two factors, and a deluge of critical studies, was that President Clinton appointed a FEMA director with emergency management experience, a presidential promise that the director could veto any potential appointees proposed by the White House Personnel Office and a mandate to change the agency. Starting in the early 1990s, FEMA began to redefine its mission and became directly involved in developing all aspects of emergency management in a partnership with the state and local governments. The partnership that developed, though, was based on a principle of FEMA supporting and coordinating efforts at the local and state government levels, rather than the federal government exercising direct control over the emergency management systems. This partnership approach was successful in raising the quality of emergency management nationally, and by 2000, FEMA was being lauded as the most effective agency of

the federal government and *poster agency* for the Clinton administration's *reinventing government* program. Its director, James Lee Witt, was given cabinet level status and received praise from both the democratic and republican candidates for president (Sylves, 2007).

When the George W. Bush administration took office in 2001, there were some initial signals from the White House that the existing federal, state, and local government partnership in emergency management might be altered, but no specific changes were outlined (Claiborne, 2001). However, the events of 9/11 quickly dominated the agenda of both the White House and Congress and eventually led to a major extension of federal government authority within the national emergency management system. The passage of the Homeland Security Act of 2002, and the creation of the DHS as a cabinet office reporting directly to the president, inserted a layer of managers at the department level on top of FEMA's management structure. The DHS was concerned with developing its own management systems and with addressing the threat of terrorism. Further, Presidential Homeland Security Directives issued after 2002 codified this authority and further nationalized many aspects of disasters (Harrald, 2007).

The extension of federal authority was most evident in the replacement of the Federal Response Plan with the National Response Plan (NRP). The NRP significantly redefined the authority of the federal government in terms of all types of disasters. Most significantly, under the NRP, disasters could be defined by DHS secretary as an *incident of national significance*. Under this definition, the DHS secretary had broad authority to bypass state and local governments in the event of a disaster and assume a position of control over all aspects of response.* Federal authority over state and local governments was further reinforced through the adoption of the National Incident Management System (NIMS), which served as the operational mechanism for the NRP. All state and local governments receiving DHS grants were required to conform to NIMS and standardize their response systems under federally approved procedures (Harrald, 2007).

While the Homeland Security Act of 2002, along with the NRP and NIMS, served as the vehicle for further nationalization of disasters, it also had a profound impact on both defining disasters and establishing national priorities in terms of types of disasters. Both NRP and NIMS placed a heavy emphasis on dealing with terrorism, while sharply diminishing the importance of preparing for and responding to natural disasters. In many ways, this new emphasis on terrorism over natural disasters recreated the problems that plagued FEMA during the 1980s as it sought to deal with both civil defense and natural disasters. Just as the 1980s' emphasis on civil defense led to a decline in the capacity to respond to natural disasters, so too did the emphasis on terrorism lead to a decline in natural disaster response capability (Roberts, 2006).

The final result of this further nationalization of disasters during the first 5 years of the twenty-first century was both an increasing authority of the federal government over state and local emergency management and a subsequent reshaping of state and local government's definition of emergency management. Increasingly evident was a loss of control of emergency management at the state and local levels of government and dominance by the federal government in terms of establishing the mission, priorities, and capabilities of emergency management.

The movement of the federal government to a position of dominance within emergency management affected the partnership relations that had been built under the leadership of James Lee Witt. Specifically, it altered the nature of the organizational and professional relationships that existed. Was this change positive or negative? In order to answer that question, we would like to return to a discussion we had in the first edition of the *handbook* related to network organizations.

* It should be noted that in May 2006, DHS deleted the term *incident of national significance* from the NRP.

10.2 Network Organizations

As we explained in the first edition of the *Handbook*, network organizations tend to follow one of two traditional models, either a top-down approach or a bottom-up approach. A top-down approach to a network organization tends to be created in organizational climates where there is a fairly well-established central authority who traditionally has exercised control over subordinate levels of government. Top-down models, historically, are evident in European countries with strong central governments and in the United States during the evolution of cooperative federalism that existed from the administration of President Roosevelt up through the administration of President Johnson (Schroeder et al., 2001: 382–385).

In contrast, bottom-up network organizations are fairly new and have emerged since the 1960s and 1970s. The bottom-up model tends to shift control away from the central authority and devolves decision making and control to the local or subordinate levels of government (Kickert et al., 1997). The movement toward bottom-up networks began in Europe in the 1960s with the devolution of centralized approaches to government service delivery and in the United States with the new federalism approaches of the Nixon and Reagan administrations (Schroeder et al., 2001).

There is a third approach to network organizations, which we previously discussed in the first edition of the *Handbook*. It is referred to as the *network perspective* model. This model tends to locate authority within a network at a middle point between the central authority and the local authority. This model views the network as a cooperative system between central and local government, with the central government establishing national priorities and standards, but local governmental units having broad discretion in interpreting priorities and standards and meeting them within existing capabilities. As we explained in our previous chapter, a *network perspective* model, in the United States, tends to be a more successful approach to network building across different government jurisdictional boundaries as it recognizes the inherent rights of both the federal and state governments as established within the US Constitution (Schroeder et al., 2001: 385–389).

During the 1980s and early 1990s, FEMA tended to approach its relations with state and local governments from a top-down perspective when it came to matters related to civil defense. However, when it came to matters related to natural disasters, it tended to view the network as a bottom-up system. This dualistic approach reflected the prevailing view of federalism as manifested in the administrations of Ronald Reagan and George Herbert Walker Bush. Under this approach, civil defense was viewed as an integral part of the national government's constitutional authority in matters of *common defense*, that is, national security. Emergency management, on the other hand, was seen primarily as a *domestic safety* matter for state and local governments. The net result of this approach was the development of an extensive civil defense program under federal authority and a heterogeneous collection of emergency management systems at the state and local government levels, some of which were extensively developed systems (e.g., California and Florida), but other systems verged on total ineffectiveness (NAPA, 1993).

The Clinton administration, bolstered by the decreased threat of thermonuclear war after the fall of the Soviet Union, was able to focus on domestic policy. This provided an opportunity for the Witt administration of FEMA to focus the agency's efforts on developing a network perspective approach to emergency management, with the national government establishing standards and priorities, but with the state and local governments developing the means of complying with national standards while building upon their existing capabilities. Additionally, the Witt administration was able to use federal funds to improve state and local response systems where deficiencies were recognized. Federal funding for equipment, training, planning, and mitigation were provided to state and local governments, along with joint planning and response exercises

and regular meetings between various government representatives to assess movement toward meeting national priorities. Overall, the network perspective worked, and significant improvements were made in emergency management systems and disaster response during the 1990s (Schroeder et al., 2001: 410–411).

Under the George W. Bush administration, there was a return of the dualistic approach to emergency management that existed during the administrations of Ronald Reagan and George Herbert Walker Bush. Once again, matters related to national security, such as terrorism, operated via a top-down model, while matters related to natural disasters operated through a bottom-up model. During the period from 2002 to 2005, there were significant funding increases in capabilities related to national security, with additional requirements for standardization of systems, yet at the same time, there was a plateau in funding of preparations and response to natural disasters (OIG, 2006: 115).

However, the requirements for standardization of systems related to national security also profoundly impacted the development of state and local system's ability to respond to natural disasters. Since national security and natural disaster response were both encompassed in the NRP and NIMS, the national security aspects of these documents tended to trump the natural disaster aspects, forcing the latter to conform to the requirements set for the national security system. Additionally, an impression was developed by state and local officials that emphasis on terrorism over natural disasters was preferred by DHS (OIG, 2006: 117). Theoretically, natural disaster response systems were still developed locally; however, compliance with DHS requirements and preferences resulted in local systems based in and derived from national security systems rather than localized natural disaster systems. Possibly unintentionally, the end result was that a top-down network organizational approach was operational for both national security systems and natural disaster systems, completely eliminating the previous network perspective approach.

Objections to the emphasis on terrorism were voiced by the emergency management community. Emergency management professionals at the state and local governments, along with the professional associations representing them and researchers working in the study of disaster management, expressed concerns about the national security priority and standardized approach and its potential to degrade the natural disaster response systems (Hess and Harrald, 2004; OIG, 2006). However, officials of DHS and FEMA, pressured by both the Executive Office of the President and the Congress to produce a new terrorism-focused system quickly, ignored the expressions of concern (Harrald, 2007). By January 1, 2005, both NRP and NIMS were mandated in-force operational systems at the federal level of government, and all state, local, and tribal governments were required to modify their existing systems to comply with the requirements of NRP and NIMS by September 30, 2006, in order to remain eligible for DHS grants.

The unwillingness of the upper administrative levels of both DHS and FEMA to recognize the warnings being issued by the professional emergency management community occurred simultaneously with the return of another practice that had hindered FEMA previously, namely, the appointment of marginally qualified political appointees to oversee the administration of FEMA.

10.3 Political Appointees

In the previous chapter that we contributed to the *Handbook*, we discussed the use of political appointees to FEMA and the subsequent problems these appointees created that led to FEMA developing a reputation as a political dumping ground for minor political loyalist associated with the Reagan and George Herbert Walker Bush administrations. A recapitulation of the mistakes and

abuses that occurred under these political appointees during the 1980s and early 1990s is not necessary as they are widely known, and even legendary to a degree (Wamsley et al., 1996; Schroeder et al., 2001; Haddow and Bullock, 2006). Suffice it to say that by the time George Herbert Walker Bush decided, in 1992, to take authority away from FEMA to oversee the response to hurricane Andrew and place it in the hands of his secretary of the Department of Transportation, FEMA was already being referred to as a *turkey farm* for unqualified political appointees. Additionally, the use of political appointees without any background in emergency management not only led to a decline in FEMA's reputation with the Congress and the American public, it had also impacted the agency internally. As one congressional committee noted in 1992, a form of bureaucratic warfare existed inside the agency between the political appointees and the emergency management professionals (Dyne, 1992).

The lack of professional competency on the part of the management of FEMA most likely would have led to the abolition of the agency in 1993 by the Congress. The fact that the Congress did not act can be attributed to a decision made by President Clinton to appoint a person with a qualified emergency management background to head the agency, namely, James Lee Witt, and a concession given to Witt by Clinton that Witt would have a veto on any political appointments to the agency that he felt were not qualified to work in the area of emergency management. Witt's commitment to professional knowledge and ability was quickly translated into the appointment and advancement of professionals within FEMA and FEMA's direct commitment to the professionalization of emergency management at both the state and local levels of government (Schroeder et al., 2001).

After George Walker Bush won the presidential election of 2000, the Bush transition team briefly considered the possibility of retaining Witt as the head of FEMA in spite of his close and personal relationship with President Clinton. In the end, though, Witt's reappointment was rejected, and Joseph Allbaugh, Texas Governor Bush's chief of staff, was appointed to lead FEMA. Quickly, the upper levels of FEMA's administration were filled with political loyalists who lacked any background in emergency management. The process of de-professionalizing FEMA continued at an even faster rate once FEMA became part of DHS reorganization law. Ultimately, political loyalists controlled the five upper management levels of the agency. The return of the marginally qualified political appointees impacted the agency internally, with large numbers of career professionals leaving the agency for positions in either the private sector or state and local government emergency management operations. The net result of the resumption of dominance of the agency by marginally qualified political loyalists was that FEMA, in August 2005 when hurricane Katrina hit, was operating with a staff vacancy rate of 20%, 8 of the 10 regional coordinator positions unfilled, and the agency being led by an individual whose primary management background had been the director of a horse trainer's association, supported by a secondary management level without any experience or training in emergency management (Ward and Wamsley, 2007). It was this professionally weakened agency that had to respond to hurricane Katrina and the New Orleans levee failures and subsequently faltered.

10.4 System Failure and System Recovery

As we have briefly outlined earlier, three factors led to the decline of FEMA and emergency management during the period from 2001 to 2005. The first factor was the almost complete domination by the federal government over emergency management as a result of the passage of the Homeland Security Act of 2002 and the subsequent shift of emphasis of emergency management

toward terrorism. The second factor was the abandonment of the network perspective model and its replacement with a top-down network model structured around a highly standardized and rigid operational structure. The final factor was the return of political appointees who lacked professional knowledge or training to lead emergency management and whose actions resulted in a drastic decline in the professional capacity of the agency through the loss of experienced personnel.

In the aftermath of hurricane Katrina, congressional reports (Bipartisan, 2006; Senate, 2006), White House studies (White House, 2006), and other studies conducted by the Office of Inspector General of DHS (OIG, 2006) and the Government Accountability Office (GAO, 2006) led to the passage of the Post-Katrina Emergency Management Reform Act of 2006. The Post-Katrina Act contains many changes that might have major consequences for FEMA and emergency management nationally; however, the authors are specifically interested in the changes within the act that impact the nationalization of disasters, the development of network systems between levels of government, and the use of political appointees to oversee the operation of FEMA and the national emergency management system.

10.5 Nationalization of Disasters

Under the Post-Katrina Act, FEMA was assigned the primary responsibility to lead the national emergency management system through the use of an *all hazards* approach that covered the four traditional areas of emergency management: preparation, response, recovery, and mitigation. However, a new component was added to the four traditional areas, namely, protection. Within the act, protection's definition, or its operational components, was not clearly defined, but a reading of the congressional testimony that preceded the passage of the act makes it very clear that *protection* deals with intentional man-made disasters and, specifically, acts of terrorism. Additionally, *protection* had a high emphasis on law enforcement and cooperation with counterterrorism efforts by DHS and other agencies of government.

The Post-Katrina Act also required that the president, through the FEMA administrator, establish a new National Preparedness System (NPS). The NPS was to be consistent with NIMS and has an assessment system that measured the preparedness capabilities of the nation at all levels of government: federal, state, local, and tribal. While the NPS was to follow an *all hazards*-based approach, it was also to comply with the *agent-specific* annexes of the NRP (or any predecessor plan). The NPS also targeted state, local, and tribal resource capabilities and required that FEMA preparedness grants to states be based on the catastrophic incident annexes within NRP or its predecessor plan, consistent with NIMS, and that they be developed in consultation with local officials and regional commissions. Additionally, the NPS was required to develop mutual aid agreements between levels of governments, especially regionally developed agreements. Eventually, the Post-Katrina Act charged to develop a new NPS led to the creation in 2006, by FEMA, of a broad-based working group composed of federal, state, and local officials focused on developing a new National Response Framework (NRF) that would replace the critically flawed NRP.

Supporting the Post-Katrina Act, but separate from it, was the John Warner National Defense Authorization Act of 2007 and specifically Section 333 within the act that stated,

...the President may employ the armed forces, including the National Guard in Federal service, to restore public order and enforce the laws of the United States when, as a result of a natural disaster, epidemic, or other serious public health emergency, terrorist attack or incident, or other condition in any State or possession of the United

States, the President determines that domestic violence has occurred to such an extent that the constituted authorities of the State or possession are incapable of (“refuse” or “fail” in) maintaining public order...

The Warner Act authorized the use of national guard troops in both a potential and actual catastrophic disaster. The Warner Act circumvented the Posse Comitatus Act of 1878 that prohibits the direct use of federal military troops in domestic civilian law enforcement except where authorized by an act of Congress or the Constitution. In place of Posse Comitatus, the Warner Act authorized the president to use national guard to restore public order if a natural disaster, epidemic, public health emergency, terrorist attack, or incident had prevented state authorities from having the ability to maintain public order. Probably, more than the creation of the DHS, the Warner Act was the most direct attempt to complete the movement toward the nationalization of all aspects of disasters and assert presidential authority over the entire emergency management system of the United States.

The Warner Act was met with an almost unanimous wail of objections from the governors of the various states and 1 year later was rescinded by the Congress, thus thwarting the movement toward a complete nationalization of the system. However, the rescission of the Warner Act did not stop attempts to assert domination over the emergency management system by the federal government, and a second movement toward nationalization became evident in the development of the new NRF—especially in terms of the underlying foundations of the network organizational model that would guide the development of the emergency management system.

10.6 Network Organization

In the aftermath of the congressional hearings surrounding the hurricane Katrina, and almost universal criticism of FEMA’s failure to maintain a network partnership between federal, state, local, and tribal governments, the Congress passed the Post-Katrina Act and specifically charged DHS and FEMA to reestablish the network partnership between the federal, state, local, and tribal governments that had existed during the Witt leadership of FEMA. However, by the time that the Post-Katrina Act was passed, both homeland security and emergency management had become so intertwined that it was difficult to separate them, especially into separate spheres of operations and policy development. For the most part, homeland security dominated this policy arena and tended toward a federal perspective that saw both as part of national security, with direction being dictated from inside the Washington beltway. The top-down network model that finally emerged generally required guidance and direction to the state, local, and tribal governments coming from Washington and often without any consideration for local conditions.

Since the Congress had required in the Post-Katrina Act that FEMA and DHS develop a new system to deal with disasters, and engage state and local government officials and practitioners in the development of the plan, FEMA initially sought to meet the congressional charge by establishing a broad-based working group to assist in the plan’s development as a collaborative effort. However, in early 2008, as the Warner Act was being rescinded, the working group was disbanded by order from DHS, and the plan’s development was turned over to a small group within DHS and FEMA to complete the draft. The decision to develop the final version of the NRF without the involvement of many of the state and local government officials and agencies charged with actually responding to disasters was met with another round of criticisms and objections—most of which were, again, ignored by DHS. Additionally, the final draft plan released by DHS and FEMA

completely changed the approach and focus of the original working group's draft, dropping the majority of proposals developed by the working group.

In spite of the Congress's direction that FEMA return to an *all hazards* approach, the new NRF continued the emphasis on terrorism, with 12 of the 15 disaster scenarios related to terrorism. The Congress also required that preparedness and operations were to be retained inside FEMA; however, the NRF continued to keep these functions outside of FEMA's authority. Additionally, the plan was rewritten in order to emphasize the legal role of elected officials and thus provided little direction for emergency management implementers and planners or to produce a comprehensive approach to the four cornerstones of emergency management: preparedness, response, recovery, and mitigation. In spite of the Congress's direction that FEMA reestablish the cooperative network model, the final release of the NRF retained the top-down model preferred by the federal government and continued the process of asserting Washington control over the entire emergency management system.

Even more troubling, though, than the ignoring of the charge by the Congress to recreate the collaborative network was the blatant ignoring of the charge within the Post-Katrina Act that related to the role of the FEMA administrator. The issue of the role of the FEMA administrator harkens back to the historical problems of presidential political appointees within the overall effective administration of emergency management.

10.7 Political Appointees

The quality of political appointees is probably the major single action by previous presidential administrations that has determined whether or not FEMA will succeed or fail. In the aftermath of hurricane Katrina, and the congressional studies conducted to review FEMA's failures, this problem of professional competency was recognized, along with the negative impact it had on the retention of qualified staff in the agency. Changes in the qualifications of political appointees were mandated by the Post-Katrina Act, especially in terms of the qualifications for the FEMA administrator.

Under the Post-Katrina Act, the president still appoints the FEMA administrator, who must also be confirmed by the Senate; however, the individual who is presented for approval by the Senate must meet certain qualifications. According to the act, individuals who are presented for Senate confirmation must have knowledge of emergency management and homeland security and at least 5 years of executive leadership or management experience in either the private or public sector (*P.L. 109-295, § 611(11), new HSA Sec. 503(c)(2)*). While the Congress has made it very clear that professional knowledge, competency, and experience are expected at the helm of FEMA, such mandates may not produce the desired effect.

One of the more troubling aspects to the passage of the Post-Katrina Act occurred after the act was approved by the Congress and then presented to the president for his signature. President Bush signed the act, but did so only with a so-called signing statement. In the section related to the qualifications for the FEMA administrator, the following notation was attached to the presidential signing statement: This act "...purports to limit the qualifications of the pool of persons from whom the President may select the appointee in a manner that rules out a large portion of those persons best qualified by experience and knowledge to fill the office. The executive branch shall construe (the provision) in a manner consistent with the Appointments Clause of the Constitution" (Bush, 2006).

The end result of the passage of the Post-Katrina Act and the subsequent signing statement by the president is that the individuals selected for appointment as the FEMA administrator may

find themselves caught in power struggle between the legislative and executive arms of the government over their qualifications. If a future president seeks to advance a nominee who does not meet the act's qualifications, and the Senate refuses to confirm the appointment, then which branch of government, political party, or interpretation of the law and the Constitution will prevail? While the president's signing statement is based on the *Appointments Clause of the Constitution*, the Constitution also specifies that such appointees at such a level must be confirmed by the Senate. More than likely a stalemate will occur, and the president will make an interim, temporary, or acting appointment, once again leaving the agency without effective, professional leadership. If there does not exist consensus between the legislative and executive branches of the government over the FEMA administrator's qualifications, the problem of an unqualified political appointee remains in play within the emergency management community.

The Post-Katrina Act, as it relates to the FEMA administrator, also contains another section that could prove politically difficult to resolve by any political appointee to the position of FEMA administrator, whether they are or are not qualified. The inclusion of FEMA within DHS under the Homeland Security Act saw the position of the FEMA administrator downgraded from a cabinet level position to a point where the head of FEMA reported to a deputy secretary within DHS. This downgrading of the position, along with the cutting of direct access to the president, was cited by the Congress as a major problem in terms of FEMA and the federal government responding to hurricane Katrina.

The Post-Katrina Act changed the rating of the FEMA administrator, raising it to a Level II executive schedule and making the FEMA administrator a deputy director within DHS—reporting directly to the DHS secretary. The act also makes the FEMA administrator the principal advisor to the president, Homeland Security Council, and DHS secretary, on all matters related to emergency management, and allows the president to designate the FEMA administrator as a cabinet member during any event that may arise in the future. However, the FEMA administrator still works for the DHS secretary, even during a disaster when the president temporarily assigns the administrator a cabinet status. One needs to ask how a political appointee, whose success depends on the well wishes of both the president and DHS secretary, will speak truth to power. Will the person risk the wrath of the DHS secretary by presenting information the secretary objects to, or will they risk the wrath of the president by not divulging information that the secretary objects to being discussed, but which the president might need to avoid response failure and political embarrassment? Once again, the issues surrounding political appointees have not been resolved and, in fact, may have been made worse.

In spite of the good intentions of the Congress in terms of improving the professional competency of political appointees within FEMA, the matter still remains a major problem for both the agency's and emergency management's future. If the past is any indicator, presidential preference to award positions based on political loyalty rather than professional competency will, someday, come back to haunt both FEMA and emergency management.

However, more troubling than the hypothetical issue over the FEMA administrator's qualifications and authority is the new NRF and within it the assigned role of the FEMA administrator. While the Post-Katrina Act specified that the FEMA director should be the principal advisor to the president in the event of a disaster, the new NRF leaves the overall coordination and implementation of the disaster management in the hands of the Homeland Security secretary. While part of the Post-Katrina Act was an attempt to clarify responsibility, the new NRF creates even more confusion over roles and responsibility and only rarely mentions the FEMA administrator. In fact, a reading of the final approved version of the NRF makes it very clear that the FEMA administrator works for the DHS secretary, and in terms of all major decisions

related to planning and response to disasters, the secretary is the key decision maker or advisor to the president. This lack of authority designation for the FEMA administrator in the NRF has been a major issue of criticism over the NRF within the professional emergency management community and the subject of a scathing editorial in *The New York Times* titled the “Department of Brazen Bureaucracy. In the editorial, *The New York Times* editorial staff blasted the NRF for “...flout(ing) of the U.S. Congress’s mandate to restore the primacy of the Federal Emergency Management Agency in dealing with disasters” (New York Times, 2007).

The sum total of the actions by the federal government after the passage of the Post-Katrina Act was to leave in place for the next presidential administration an agency still suffering from many of the same problems that created the environment for failure witnessed in 2005.

10.8 Changing of the Guard

As of this writing, President Obama nominated Jeh Johnson as DHS Secretary. Johnson had served as a lawyer in private practice and for the government and, from 2009 to 2012, as general counsel at the Department of Defense. Johnson replaces Janet Napolitano, whose tenure was occupied by public controversies over immigration and government statements about the nature and extent of the terrorist threat. Napolitano, a former governor of Arizona, was also trained in the law. Behind the scenes, Napolitano worked to clarify management structures of the department. Leadership of emergency management was left to W. Craig Fugate, the FEMA administrator who had served as director of Florida’s emergency management agency. Fugate brought much-needed knowledge of state and local processes to FEMA. He was known for his “Waffle House test,” in which he gauged the health of a community immediately after a disaster by whether its Waffle House restaurants were all open and functioning normally, serving only half menus (with power outages) or completely closed, which signaled a dire situation. Fugate earned praise from states and localities for his attention to their needs. “He speaks the language of first responders because he was one of them,” Alan Rubin, who oversaw Florida’s economic recovery after Hurricane Andrew, told the *New York Times* (Steinhaur and Schmidt 2012). “He doesn’t have to be brought up to speed on what FEMA can do and when they can do it.”

Fugate earned praise for emphasizing the prepositioning of resources such as cots and water storage before a disaster, so much so that former FEMA administrator Michael Brown criticized him for being too aggressive in supplying resources to states before the Sandy storm of 2012. Fugate replied through a National Public Radio interview, “Better to be fast than late” (Steinhauer and Schmidt 2012). Fugate earned praise from members of both political parties for FEMA’s performance during Sandy, which hit relatively well resourced areas in New Jersey and New York. In the wake of the storm, Republican presidential candidate Mitt Romney was criticized for earlier suggesting that FEMA’s activities should be scaled back (Feldmann 2012). The media gave FEMA a national platform during Sandy and after tornadoes in Joplin, Mo., where the agency burnished its reputation, in contrast to the criticism it received after Hurricanes Katrina and Andrew.

The major policy innovation of Fugate’s term was the “whole community approach” formalized in the National Response Framework, which was released in its second iteration in 2013. (The first edition was released in 2008). The NRF is part of the National Preparedness System mandated in Presidential Policy Directive 8. The PPD defines five core policy areas as prevention, protection, mitigation, response, and recovery, and requires the development

of policy and planning documents to add greater specificity. The NRF begins with Fugate's signature "whole community" approach to emergency management, which is a form of the network approach rather than the top down or bottom up approaches. The whole community includes the federal government, states, and localities, and also non-profits, private businesses, and citizens. The DHS entered into a well-publicized partnership with Walmart, but changing emergency management planning to incorporate businesses and non-profits at the state and local level may prove more difficult because of the diffusion of non-governmental entities and their traditional lack of participation in emergency management networks (Walmart 2011). The NRF's whole community approach aims to improve the credentialing of disaster relief and recovery personnel, ease acquisition, and expand communication to incorporate non-profits and business into the five phases of emergency management (FEMA 2013, Fugate 2011). As the "Whole community" approach to the NRF begins to be absorbed by states and localities, emergency managers will have to draw on the toolbox of network governance to build connections across levels of government and with the private sector to face a range of hazards, from local and regional events to large-scale terrorist attacks or catastrophic natural disasters. The literature on network governance prescribes collaboration as a means to build ties with network members (Provan and Kenis 2008, Waugh and Streib 2006). In the heat of an emergency it is too late to exchange business cards, as the saying goes. It remains to be seen whether emergency management will receive sufficient resources to engage in the collaborative processes necessary implement a whole community approach at all levels of government.

10.9 Streams, Equilibrium, Garbage Cans, and Federalism

As Claire Rubin has so succinctly stated: "As can be seen from timeline charts covering the past several decades of disaster history in the United States, certain focusing events drive changes in laws, regulations, systems, and practices. In fact, virtually all major federal laws, executive directives, programs, policies, organizational changes, and response systems have resulted from major and catastrophic disasters" (Rubin, 2007: 6).

The pattern of the development of emergency management in the United States has, historically, been a reactive process rather than a proactive process. Rather than developing a comprehensive and effective emergency management system based upon a thorough analysis of data related to its complexity, the system has emerged and evolved in reaction to major events that tend to exploit weaknesses in the policy making and organizational processes within our governance system. The noted policy analyst John Kingdon has proposed a *policy streams* model of policy making that closely matches the historical development of emergency management policy in the United States (Kingdon, 1984).

Kingdon sees policy development as three distinctive streams flowing through the policy-making process: problem recognition, problem definition, and politics. These *streams* operate independently of each other and do not necessarily follow each other in any established order; however, the streams may ultimately merge and form an opportunity to create public policy that he calls a *policy window*. Under the right circumstances, the *policy window* will open, and public policy and law will emerge.

In the *policy recognition* stream, the policy-making community must recognize that a problem actually does exist and that it is in fact appropriate for the government to take action to address the problem. Failure to recognize that a problem exists, or government action is appropriate, may

cause the problem to linger for years unaddressed, leading to even deeper consequences that ultimately have to be addressed.

In the *problem definition* stream, the nature of the problem and possible solutions to the problem are debated. In this stream, various groups or factions with differing agendas may seek to control how a problem is defined in order to present a solution that favors their interests over others. Unless a consensus is obtained in this stream, the debate within the definition stream may be endless, resulting in stalemate and failure to deal with the problem.

In the *political* stream, which is the actual lawmaking portion of the model, another opportunity is presented to once again challenge whether or not a problem even exists or if the proposed solution is workable. Again, debate, compromise, and consensus come into play, and unless successfully navigated, the problem is not addressed.

The policy-making process may start in any one of the streams. It may be played out in the full view of the media or behind closed doors within the corridors of various congressional committees, government agencies, think tanks, political parties, organized lobbies, or citizen action groups. Wherever it starts, though, ultimately, it must flow through the various streams, gaining enough momentum to open a *policy window* and emerge as policy and law. The history of emergency management in the United States is an excellent example of Kingdon's *streams* at work (Birkland, 1997; Ward and Wamsley, 2007).

Problem recognition has always been difficult in emergency management, with constant debates over whether or not dealing with disasters is a personal or governmental responsibility, a federal or state obligation, a national security, or domestic safety problem. Problem definition has been equally contentious, involving discussions over natural versus man-made disasters, federal authority versus states rights, response versus mitigation, or private and charitable funding versus public expenditures. Finally, the political stream has always been influenced by the prevailing political ideologies flowing through our history and the unsettled question of the proper role of the government in the life of the country.

What is also troubling about policy making in emergency management within the United States is that it also exhibits characteristics of what Frank Baumgartner and Bryan Jones have referred to as *punctuated equilibrium* (Baumgartner and Jones, 1993). Baumgartner and Jones posit that policy making in the United States is inherently unstable. No matter how settled an existing policy may be, there always exists in our political process critics and groups who wish to overturn the policy and replace it with one that is more favorable to their interests. Since our social, economic, and political environment is constantly shifting and changing, the opportunity to challenge an existing policy is always possible and is only waiting for an event to occur that will challenge the underlying logic or structure of existing policy. Once such an event happens, the *equilibrium* within the existing policy structure is *punctuated*, and an opportunity opens to change the policy. As the previous quote from Claire Rubin has shown, emergency management is an area of policy making waiting for a major disaster, of some type, to occur, and when that *opportunity* emerges, the existing policy *equilibrium* is *punctuated*, opening the policy-making process.

At the point when a major disaster punctuates the policy equilibrium, all of Kingdon's *streams* are activated, and groups wishing to change policy in this arena now have an opportunity to advance their cause. Compounding this event-driven scenario is the fact that the community that makes up the emergency management field is composed of a wide range of interests ranging from first responders to elected officials, civilian government to the armed forces, the business community to the public and nonprofit sector, and the academic to the political arena. Any major or catastrophic event that occurs and that exceeds the current

capacities of the existing system punctuates the existing equilibrium and opens the entire policy area to debate and change by these various groups and interests (Ward and Wamsley, 2007). Additionally, no matter what the event that energizes the policy-making process, the method of dealing with the *new* problem, unfortunately, exploits another weakness in our governance system, namely, the manner in which we make decisions on how to organize our government to deal with complex problems.

Efforts to reform the government in the United States have a checkered past of marginal successes and major failures. Driving these reform efforts is an underlying assumption on the part of lawmakers and the general public that the government is some form of a machine in which political decisions are reached by duly elected representatives of the people, and these decisions are then implemented by government agencies using rational and scientifically based methods. In spite of the fact that extensive research has shown that this assumption is false, it maintains a rigid hold on our thinking of how government should work, but fails to recognize how the government actually does work.

In the heightened decision-making atmosphere after a major disaster, analysis and decision making tend to be obscured by defensive behavior on the part of both elected and appointed officials, often driven by fear of negative media coverage. Generally, such major events tend to create a media atmosphere of investigative reporting that seeks to determine what went wrong and who is to blame for failure. This type of media atmosphere exploits the dramatic *story telling* traditions of modern journalism rather than the factual reporting traditions of classical journalism. Journalists, in their aggressive pursuit of the *truth* and viewer ratings, often engage in a competitive struggle with other journalists. In such a competitive media environment, journalists may seek to *scoop* each other by reporting allegations or assertions by witnesses to the event, often without first pursuing in-depth exploration of the accusations or facts behind the charges. This charged media atmosphere generally leads to a blame game on the part of both elected and appointed officials where they seek to shift responsibility for accusations of failure from their shoulders to others.

Congresspersons, who are always sensitive to media criticisms and their own public image, often react by declaring that they will discover the *truth* and *fix the problem*. This public declaration leads to the calling of special committee hearings or the establishment of special commissions, which then hold extensive media-covered hearings where not only all of the defensive elected and appointed officials testify but also testimony from all of the representatives of the various interests seeking to change the policy under consideration is gathered.

This type of media-driven hearing often results in an unlimited number of contradictory analysis and recommendations, resulting in what Cohen, March, and Olsen refer to as a *garbage can* decision-making process composed of issues *looking for* a hearing in which they might be aired, preconceived solutions *looking for* problems to which they might be attached, and decision makers *looking for* justification for their jobs (Cohen et al., 1972).

Additionally, while these special hearings, initially, draw extensive media coverage, eventually, the environment changes, and some new event draws the media away, leaving these special hearings and commissions with a charge for change but a lack of political commitment on the part of the Congress to challenge vested interest groups. The end result of the process is often the passage of solutions that are politically expedient rather than effective at resolving the underlying problems (Ward and Wamsley, 2007).

Unfortunately for emergency management in the United States, the previously mentioned process of flawed reform is the legacy that each new presidential administration inherits and under which the emergency management system operates. Basically, the history of emergency

management reform in the United States is a history of problems only partially identified and never fully addressed.

A major underlying issue that relates to this lack of effective governmental reform harkens back to the very system of federalism that structures our form of government. While emergency management may not be viewed by some as a major policy or organizational issue in the life of our democracy and federalism, the underlying structure of it in fact encompasses all of the levels of our government, the principles of federalism that form the structure of our constitutional order, and the murky intersection between the potentially dominant power of the government and the economic forces of capitalism.

Unlike unitary forms of governments, our system of federalism was designed as a balancing act that pits potential sources of power and self-interest against each other in an endless process. Our government was designed in such a manner in order to balance and check such conflicting forces as government domination versus individual freedom, executive authority versus legislative will, unfettered capitalism versus societal needs, and the rights of minorities versus the rights of the majority. Our government is in fact what is referred to in systems theory as an open system, an entity that lacks hard, defensible boundaries between itself and its environment and one that is constantly affected by changes in its social, political, economic, and natural world. Such a system of government cannot be controlled from any single or consolidated point, but rather must be guided to success through a process of compromise and cooperation that focuses on the common weal, not on the interests of dominant factions or loci of individual authority.

Effective reform of emergency management in the United States must be done with an understanding that the very system of government within this country is, in fact, a form of a network—a network of governance. Our founding fathers designed this governance network so that it would be a network governed neither from the bottom nor the top nor from the center. Effective emergency management in the United States will only be accomplished when it is recognized by all of the interests involved in this policy arena, both public and private, that the system that is created must conform to the spirit of constitutional governance in this country, and that involves working from the center and focusing on the common weal. The successful accomplishment of this ideal remains the central challenge to emergency management in the United States.

10.10 Conclusion

As many observers of emergency management have commented over the years, the consequences of all disasters are political. It is a normal human reaction to wish to affix blame for personal suffering and to hold accountable those persons or institutions perceived as culpable. FEMA, unfortunately, has often found itself as the target to which all of the blame for failures to effectively respond to disasters has been affixed. It is an easy target to blame and also an easy target for a cosmetic political *fix*. Thus, we play out the old scenario; New Orleans is destroyed, FEMA is to blame, and FEMA is *fixed* by passing the Post-Katrina Emergency Management Reform Act of 2006, which follows the conventional wisdom of centralizing power by retaining FEMA as part of a huge department headed by a cabinet secretary who is supposed to have a more significant connection to the president.

The fact is that this huge and heterogeneous department, of necessity, has its mission focus on a particular kind of emergency, attacks by foreign forces from within our borders. The mantra justifying throwing homeland security and emergency management together in this fashion

is an emergency is an emergency or a disaster a disaster. This is only true at the most superficial of levels—as in lions and house cats are both feline.

Additionally, while we weaken the direct connection of the FEMA administrator to the president by buffering the president through a Homeland Security secretary, we charge the administrator of FEMA to reestablish a cooperative network between all the levels of government, but within a framework that is dominated by the federal government's terrorism priorities and supported by advisory committees without any form of review or approval authority related to the development of the other aspect of the emergency management system, namely, natural disasters. The "whole community" approach is a step in this direction, but implementation will require collaborative processes at many levels of government and a nurturing of the emergency management community, rather than a return to FEMA as a dumping ground for political appointees.

In the end, emergency management is still left with a system that is controlled from the federal government and still heavily weighted toward terrorism over other types of disasters. In the end, emergency management is still operating within a top-down framework controlled from the federal level, with marginal input from the other levels of government. In the end, emergency management is still left with a system centered on the White House's priorities, rather than the state and local government's priorities, and most assuredly not from the priorities of the professional emergency management community.

Possibly, it is time that the emergency management community recognizes that politics permeates the entire process of developing and managing a national emergency management system. While first responders and emergency managers might wish to deal with their profession in a rational, scientific approach, they cannot escape the fact that their system is part of the always complex, and sometimes chaotic, nature of the American system of federalism. The emergency management community cannot avoid politics. Instead, emergency management must embrace politics in the sense that the rational and scientific manner of emergency management will always operate in this political environment. As Stanley and Waugh stated in the first edition of the *Handbook*, "Political skills are more important than technical skills if emergency management is to be integrated into the fabric of society and emergency managers are to be effective advisors for elected officials and the public at large and as administrators of their programs" (Stanley and Waugh, 2001: 701).

The emergency management community is composed of a multitude of professional groups vying with each other for influence, money, and prestige. It is a house divided and speaking against itself. It is time that the community recognizes that if it wishes to maintain any professional autonomy and integrity, and to progress in creating a truly effective national system, then its differences must be put aside for the good of the polity and society. It must find a common ground and join in a united political front that effectively engages the entire spectrum of the political process and advances the professional knowledge needed to protect the country. It is also time for the emergency management community to summon the resolve to grapple with the most formidable of its political problems as it relates to the profession, namely, the Executive Office of the President.

The sporadic or episodic nature of emergencies means that presidents more often than not will fall into the *not likely on my watch syndrome*. Under the press of immediate and less episodic problems, presidents tend to lose sight of emergency management's importance until disaster strikes. But then of course, it is too late to devote proper attention to it. We have seen this syndrome in operation often enough and long enough to know it will not disappear for long. Nor will this problem be solved by placing emergency management within the DHS. The mission of the

department is different enough that it will inevitably have its attention focused elsewhere, and it has already shown that it suffers from its own version of the *not likely on my watch syndrome*.

In a recently published work on emergency management, *Emergency Management: The American Experience 1900–2005* (2007), the authors contributed a chapter titled “From a promising past to an uncertain future.” In the chapter, the authors advanced the radical concept that emergency management was too critical a factor in modern life to be left solely under the control of congressional partisan politics or the episodic nature of presidential attention. In the chapter, we point out that it is not possible to remove presidential authority from this arena due to the president’s authority as commander in chief nor is it possible to remove legislative partisanship due to the Congress’s constitutional oversight authority.

The political problem, therefore, for the emergency management community is to come to terms with the political nature of emergency management and seek the institutional arrangements that will temper or mediate the conflicts and pressures of politics. In the chapter cited earlier, we offered two examples within the federal government that might serve as possible models for mediating the partisan and institutional politics in which emergency management must operate, one model being the Federal Reserve System and the other model being the GAO.

Both the Federal Reserve System and the GAO are led by professionally competent persons nominated by the president, approved by the Congress, but then serving a fixed term, but one that is not coterminous with any president and independent of the Executive Office of the President. The persons that work within the Federal Reserve and GAO are professionals, selected inside the partisanship of political nominees, but held to a higher professional standard that is capable of advancing the needs of the nation without fear of political retribution or political manipulation. Their work is no less political in a broad sense than emergency management, but they are shielded somewhat from the most deleterious aspects of partisanship and institutional politics between the branches of government.

Emergency management is an arena of national life so critical today that we need to consider establishing a professionally managed system that recognizes and embraces politics, but retains an independence that allows it to speak truth to power. Possibly, the Federal Reserve and GAO model might be the vehicle to advance the professionalism needed to develop a truly effective national response system. For in the end, while emergencies and disasters, like defense and wars, have their inevitable political aspects, such politics must be muted and not in the foreground—to allow it to be anything else is morally reprehensible.

10.A Appendix

Federal Departments and Programs Transferred to the Department of Homeland Security by the Homeland Security Act of 2002

US Customs Service of the Department of the Treasury
 US Secret Service of the Department of the Treasury
 Immigration and Naturalization Service of the Department of Justice
 Animal and Plant Health Inspection Service of the Department of Agriculture
 US Coast Guard of the Department of Transportation
 Transportation Security Administration of the Department of Transportation
 Federal Protective Service of the General Services Administration
 FEMA

Office for Domestic Preparedness of the Office of Justice Programs

National Domestic Preparedness Office of the Federal Bureau of Investigation
 Domestic Emergency Support Teams of the Department of Justice
 Office of the Assistant Secretary for Public Health Emergency Preparedness

Office of Emergency Preparedness
 National Disaster Medical System

Department of Health and Human Services

Strategic National Stockpile
 Metropolitan Medical Response System

National Infrastructure Protection Center of the Federal Bureau of Investigation
 National Communications System of the Department of Defense
 Critical Infrastructure Assurance Office of the Department of Commerce
 Computer Security Division of the National Institute of Standards and Technology
 National Infrastructure Simulation and Analysis Center of the Department of Energy
 Federal Computer Incident Response Center of the General Services Administration
 Select agent registration enforcement programs and activities of the Department of Health and Human Services
 Programs and activities of the Department of Energy including

Chemical and biological national security
 Activities of the nonproliferation and verification research and development program
 Nuclear-smuggling programs and activities
 Nuclear assessment program
 International material protection and cooperation program
 Energy security and assurance program and activities
 Life sciences activities of the biological and environmental research program related to microbial pathogens

Environmental Measurements Laboratory

Advanced scientific computing research program and activities and the intelligence program and activities at Lawrence Livermore National Laboratory
 National Bio-Weapons Defense Analysis Center of the Department of Defense
 Plum Island Animal Disease Center of the Department of Agriculture

Homeland Security Act of 2002, Public Law Number 107-296, Title V, 116 Stat. 2135 (2002).

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Chapter 11

Improvised Explosive Devices

Daniel C. Goodrich and Frances L. Edwards

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11.1 Introduction

Islamist terrorism confronts western liberal democracy across a void of culture. On one side, the Islamist terrorists are not state-supported, although funding streams from Muslim cultural organizations and Bin Ladin's private wealth supports some of the cells. On the other side, American military might was designed to defeat a heavily armed adversary fighting in the open with sophisticated weapons, but the enemy *de jour* is a religiously motivated individual (or small group) who believes he—or now even she—is fighting for eternal truths under a missionary banner. The modern battle for the restoration of the caliphate is conducted by unequal adversaries: weakness against strength, little funding against seemingly endless government support, low-technology society against high-technology society, religious versus secular combatants, and all out war versus international law like the Geneva Convention.

Weapons of mass destruction (WMDs) are complex constructions that require a high degree of sophistication for their effective use. Since state support is a likely prerequisite for the manufacture and deployment of most WMDs, their use is becoming more unlikely as state actors face the likelihood of American retaliation, which would be a deterrent for most modern nations. As weapons, improvised explosive devices (IEDs) overcome most of the objections to the use of WMDs. They can be relatively simple and still be quite effective, as seen in the ammonium nitrate/fuel oil (ANFO) truck bomb used to destroy the Murrah Building in Oklahoma City in 1995.¹ Furthermore, they can be made with components readily found at feed stores, hardware stores, and electronics shops, can be contained in common objects like backpacks and wine bottles, and can be assembled in a home workshop using a *cookbook* with little additional assistance.

IED has become a household word as a result of their intensive use in the current conflict in Iraq, where vehicle-based improvised explosive devices (VBIED) have become one of the most successful antipersonnel tactics in the arsenal of the insurgency. “IEDs have accounted for more than half of all U.S. military injuries in Iraq and are the single greatest cause of death of service members.”² For example, on August 6, 2007, a suicide bomber used a truck bomb to kill 31 people and injure scores of others in a village in northern Iraq. In addition, four US military personnel were killed by a roadside IED.³ “Three 155 mm shells, linked together and combined with 100 pounds of Semtex plastic explosive, covered by canisters of butane or barrels of gasoline, can upend a 70-ton tank, destroy a Humvee or blow an engine block through the hood of a truck. Those deadly ingredients form the signature weapon of the war in Iraq: the improvised explosive device.”⁴

While chemical, biological, and nuclear WMDs continue to grip the imagination of the public, it is the IED that has been, and will continue to be, a far more probable threat. Based on a blending of civilian and military technology and individual resourcefulness, an IED is limited only by the imagination and experience of the builder and access to a wide variety of readily available materials. As a result, IEDs are difficult to classify and countermeasures are problematic.

In this war of ideologies and cultures, the IED has become the terrorist's weapon of choice. Made from readily available materials, based on *recipes* available on the Internet, the individual

or small cell can have a large impact on a society for little money. For example, on February 1, 2008, Al Qaeda in Iraq recruited two women with Down syndrome to wear shrapnel-filled suicide vests into two popular Baghdad bird markets. On the Muslim Sabbath, families were buying pets when the vests were remotely detonated, killing 77 people.⁵ According to the *New York Times*, “Officials said insurgents had shifted tactics, because increased checkpoints and roadblocks have made it harder to detonate the car bombs that killed much larger numbers of people in the past. . . . Secretary of State Condoleezza Rice said the bombings underlined ‘the absolute bankruptcy and brutality’ of those who carried them out.” Apparently the bombers got into the markets because women are not routinely searched at the markets’ checkpoints.⁶

Although there is a long history of employing IEDs in the United States, few Americans are aware of their presence in our culture. The daily newspaper reports, “a series of car bombs strikes Iraq city”⁷ and “car bomb at busy corner kills at least 8, injures 64,”⁸ so the impression is left that IEDs are part of a Middle Eastern culture of violence rather than a ubiquitous threat. For most Americans, the Oklahoma City truck bomb is a unique horror rather than just one in a long line of IEDs.

The current situation in Iraq and Afghanistan clearly identifies the complexities presented by IEDs to trained personnel. Vehicle bombs and suicide bombers have become staples of west Asian insurgencies. Large stockpiles of explosives are present in these countries. It is difficult for Americans to understand the impact of such ubiquitous IEDs. However, when one considers that over 5 billion pounds of explosives are consumed annually in the United States for commercial purposes, the potential threat for continuing use within this country becomes clear. Additionally, precursor chemicals used in explosives production are readily available, with little or no governmental monitoring. In reality, IEDs are far more common in the United States than most realize. Over the last 30 years, the increased number of local/state/federal law enforcement agencies with full-time explosives ordinance disposal (EOD)/bomb technicians bears witness to this.

The goal of this chapter is threefold: to impart the history of IED-based terrorism in the United States; to explain how IEDs are made, discovered, and disarmed; and finally, to make the reader aware of the likelihood of IED use in the United States. The Department of Homeland Security (DHS) has developed a series of outreach programs aimed at engaging the community members in surveillance for danger in public places. One example is the public transit-based *eyes and ears* program, designed to heighten the riders’ awareness of the potential for IEDs in stations and on vehicles.⁹ In order for the public and the media to be effective partners in homeland security’s community surveillance, they must be aware of the chameleon-like nature of IEDs, the ease of their construction, and the danger they pose. The acronym *RAIN* describes DHS’s awareness goal for the American public: recognize, avoid, isolate, and notify.¹⁰ The information in this chapter will heighten the possibility of achieving this goal.

11.2 IEDs in the United States

11.2.1 Industrial Revolution

Although it will be shown that IEDs have a long history, it was the Industrial Revolution that created a surplus of preprocessed materials that truly enabled the development and diversity of IEDs. Precursor chemicals for the explosives, as well as other materials and products that could be readily modified to function as casings, shrapnel, triggering mechanisms, and power sources, became available on a large scale. Previously, only black powder had been used as an explosive, because it was the only explosive that was readily available in any quantity. The requirement that

it be strongly contained to result in an explosion required heavy castings, such as cannon balls, or that it be tampered in a rock hole. Other explosive mixtures were inconsistent due to poor environmental controls during manufacturing and were expensive because of the cost of obtaining and processing the precursor chemicals.

11.2.2 *Ubiquitous Devices*

The field of improvised devices has a long history. Adaptations from emerging civilian and military technology have often resulted in evolutions in equipment for both the military and the revolutionary. For example, the Romans used civilian lamp oil and clay pots to create military fire bombs that they catapulted into cities under siege. More recently, in the 1880s through the early 1900s, anarchists used dynamite bombs.¹¹ The Haymarket riot in Chicago in 1886,¹² the 1910 bombing of the *Los Angeles Times* headquarters that killed 21 people,¹³ the Wall Street bombing of September 16, 1920,¹⁴ and the Bath School disaster in Michigan, May 18, 1927, are examples of the use of IEDs against civilian targets in the United States.¹⁵

In World War I, the military began using IEDs to augment standard munitions when they became ineffective due to circumstances on the battlefield.¹⁶ In World War II, the government created instructional manuals for troops in how to create IEDs when standard munitions would not be effective. For example, in the movie *Saving Private Ryan*, the soldiers created a *sticky bomb* out of a sock, a block of trinitrotoluene (TNT), a fuse, and a detonator, covered in grease, so that it could stick to the outside of a German tank for better targeting at detonation.¹⁷ IEDs were also used extensively in Vietnam¹⁸ where the indigenous army would harvest unexploded ordinance from the battlefield and convert it for use in booby traps. There were also rumors that the mujahideen in Afghanistan harvested Russian ordinance to use in IEDs.

During the US anti-war protests of the 1960s and 1970s, groups like the Weathermen and Symbionese Liberation Army used IEDs to attack law enforcement vehicles and stations.¹⁹ In the 1990s, a series of IEDs was used against abortion clinics by Eric Rudolph, who also created a backpack IED for use in Atlanta during the Olympics.²⁰ The Oklahoma City bombing mentioned earlier used a VBIED based on ANFO.²¹ Islamist terrorist organizations have used IEDs against nightclubs in Tel Aviv (The Dolphinarium²² and Mike's Place²³) and Bali.²⁴ Suicide bombers in Israel,²⁵ and in the United States on 9/11,²⁶ relied on IEDs (albeit 9/11 used mechanical explosion) to create death and destruction. Car bombs are used in Iraq and Israel routinely.²⁷ Backpack-based IEDs were used to target mass transit in Madrid in 2004²⁸ and London in 2005.²⁹ The so-called Y2K bomber crossed the border from Canada with the equipment to blow up Los Angeles International Airport (LAX) using a urea-based IED.³⁰

11.2.3 *“Cooks” versus “Chefs”*

IEDs are created using the techniques of both *cooks* and *chefs*. A chef can create a gourmet meal out of whatever ingredients are available. A cook finds a recipe and has to find the exact ingredients and follow the exact instructions to create that dish. In making IEDs, the *cooks* seek instruction manuals and follow the procedures, hoping to create a specific type of device. A *chef*, on the other hand, can take whatever materials are readily available and create an IED, often customized for a specific target or function. The *chefs* often have background knowledge in chemistry and/or electrical engineering to support their creations.

The government began creating such *cookbooks* in the 1940s for battlefield use during World War II. These manuals made IEDs using military equipment in unexpected ways, such as the

sticky bombs mentioned earlier. From 1962 through the 1970s, the US Army's Frankford Arsenal improvised munitions program continued research and development in this area and published a series of manuals that became available to the public in the late 1960s.³¹ Later books like *The Anarchist's Cookbook*³² were available in counterculture book stores and by mail order. Most of these were based on information from the military manuals but lacked the illustrations that helped to clarify specific points. An additional problem was that the government often omitted information about the process, possibly as a precaution against misuse, while the authors of other guides to explosives may have omitted information because they were unaware of it themselves. Kurt Saxon is a well-known creator of such books, and he has lost several fingers as a result of his failed experiments.³³ Would-be terrorists assumed that the cookbooks would be easy to follow to create basic IEDs. In some cases, the recipes were complete enough to generate a usable device.

Even most military demolitions experts should be considered *cooks*. The materials have been manufactured to a specific *military specification*, and the person has been trained to use that specific equipment. Deviation from those established procedures and protocols is rarely encouraged. For example, substituting munitions manufactured by another nation to create a device can result in unexpected reactions and safety issues.

It takes a *chef* to benefit from what is readily available in the environment. A chemist or munitions expert could imagine substitutions and work-arounds for unavailable ingredients that are normally used. The *cook*, however, must find what he knows how to use, even if other materials that are more efficient are readily available. For example, the Y2K bomber could have found many materials for formulating an IED to use at LAX, but he fell back on a urea-based bomb because that is what his cell had the recipe for.

11.2.4 Definitions

In order to explore the issues involved in the use of IEDs, some definitions are necessary. First, an explosion may be defined as a chemical, mechanical, or nuclear process that results in a rapid energetic release through conversion from one state to another. It may also be understood as the conversion of mechanical, chemical, and/or nuclear materials to generate a sudden and violent reaction. For the purposes of this chapter, the focus will be on chemical explosives, as they are the most common and often function as precursors to the other two types of explosives.

Chemical explosives are broken into two categories: high and low. High explosives detonate, meaning that there is chemical reaction, yielding a speed of detonation greater than 3,300 ft/s. Some are over 29,000 ft/s. In contrast, low explosives deflagrate, meaning that they burn at a speed lower than 3,300 ft/s.

Low explosives are also considered to be propellants and have existed since at least the tenth century but may actually go back to 220 BC in China when an accident was reported to involve black powder during the separation of gold from silver.³⁴ Low explosives are still used, but a larger volume of it is required, as well as significant containment, in order to achieve a similar amount of damage as would be caused by high explosives.

High explosives are further separated into three categories based on their sensitivity to insult or stimuli. They are primary, the most sensitive; secondary, significantly less sensitive; and tertiary, very insensitive. Primary explosives are normally made in small batches and kept separate from other types of explosives because of their sensitivity to heat, shock, friction, electrostatic discharge, and impact.³⁵ Examples include lead azide and mercury fulminate. Their use is usually restricted to detonators, also referred to as *blasting caps*.

Secondary explosives are generally insensitive to insult and must be initiated by a significant shock. C-4, TNT, Primacord, Semtex, and dynamite are examples of secondary explosives. They are usually packaged in easy-to-handle blocks or sticks.³⁶

Tertiary explosives are even less sensitive, thus requiring greater insult than secondary explosives to detonate. This category is represented mainly by ANFO, and this type is usually bulk packaged.³⁷

In order to detonate less sensitive secondary and tertiary explosives, an *explosives train* using different categories of high explosives is employed. Primary explosives are used to initiate secondary explosives that in turn initiate tertiary explosives. The secondary explosives under such circumstances are often referred to as a *booster*, as it is boosting the effect of the primary explosive in the detonator. Thus, detonators that contain primary explosives are kept separate from the rest of the explosives and are not introduced until the final phases of building an explosive device.³⁸

The second important definition is IED, which is a contrivance fabricated to explode using readily available civilian products and/or military stores. It may also be defined as an ad hoc invention used to destroy a specific or general target by explosion.

11.3 Historical Primer

To appreciate the current state of IEDs, it is necessary to review some of the history of explosive devices and their components.

11.3.1 Black Powder

The best example of antigovernment use of IEDs based on black powder was Guy Fawkes' gunpowder plot against the British Houses of Parliament on November 5, 1605.³⁹ Black powder remains an effective source of explosive materials, notably for use in pipe bombs, as it is a well-known and documented product that is easy to obtain without any special permits in the United States. It is very simple to use, requiring only a fuse to initiate and strong containment to develop sufficient pressure to initiate the violent release of stored energy.

11.3.2 Chemical Revolution with the Industrial Revolution

Many of the precursor chemicals for explosives were well known to chemists before the industrial revolution. However, batch inconsistencies due to lack of environmental controls, variances in the base materials, as well as subtle changes and modifications resulted in inconsistencies in chemical composition of the finished product, making assurance of consistent performance impossible. It was not until the industrial revolution was firmly established that sufficient stocks of consistent refined chemicals were made available to chemists for broad experimentation.

Between 1830 and 1900, the greatest advancements in chemical research with explosives took place.⁴⁰ Due to the increases in quality and quantity, prices dropped, making it cost-effective to use the new types of explosives for commercial purposes. Likewise, the expanding literature, and new patents taken out, increased the general knowledge in the field of explosives formulas. However, this information was restricted to chemists and other scientists, due to the relatively low level of science literacy in the general population. Laborers handled explosives materials in mining and railroad building under little supervision. An understanding of how explosives were used was

developed outside the scientific community. Adaptation under field conditions caused by a lack of information and/or associated explosives equipment led to these workers improvising substitutes based on their own experience and trial and error.

In parallel to the development of explosives, the industrial revolution also generated vast amounts of goods that could be readily adapted for use in bomb making. For example, timer mechanisms in the form of clocks, as well as containment vessels to function as bomb casings, wires, batteries, and other components, became available in the United States, Europe, and any part of the world where industrial development led to export. These products were also relatively uniform, enabling a cookbook approach to IED construction.

11.3.3 Chemical Explosives

In 1846, nitroglycerine was invented.⁴¹ It was the first explosive besides black powder that was economically advantageous to use on a wide scale. However, its sensitivity required it to be made in small batches on the site where it would be used, leading to a general understanding among construction crews of how nitroglycerine was made. It was also dangerous, so not attractive to most workers.

It was not until 1867 that dynamite was invented by Alfred Nobel⁴² as a result of his experiences with nitroglycerine. This represented the stabilization of nitroglycerine, permitting it to be made on an industrial scale and transported long distances for use, eliminating the need for on-site fabrication.

During this same period, in 1863, Joseph Wilbrand prepared trinitrotoluene, better known as TNT, for the first time. However, its explosive properties were not recognized for 30 years, probably due to its low sensitivity and need for a primary explosive to initiate it. TNT was used as a munition for the first time in World War I, with its production being limited by the amount of toluene that could be refined from coal tar.⁴³ It was originally used as a chemical reagent. When its explosive capabilities were recognized, it became so widespread that it established the industry standard of explosives. To this day, a TNT equivalency is assigned to every commercial and military explosive to enable charge computations between the various explosives available for a given project.⁴⁴

There are hundreds of explosive compounds with possible IED applications, but many of the formulas are so unstable as to be unsafe for use or are too expensive to produce. For example, a urea-based explosive compound proved impractical on a widespread basis because of the amount of urine that would have to be collected and processed, and the final product would not be stable enough for military use. Triacetone triperoxide (TATP), used by the terrorists in London in July 2005,⁴⁵ is another example of an unstable mix that also suffers from its explosive properties degrading in a short period of time. However, Islamic extremist bombers have developed IEDs based on this formula because they have ready access to the raw materials and have developed protocols for comparatively safe short- and midrange transportation, supporting clandestine actions. Also, precursor chemicals are often drawn from commercial products, calling into question the safety and potency of some of these improvised explosive mixes.

Many similar formulas exist, particularly in the bomb-making literature, in both published and Internet form. They often are accompanied by claims that these formulations are more powerful than military explosives or that the formulas are being kept a secret by the government. The result before *the information age* was a high number of individual incidences of people experimenting with these formulas, often with tragic results.

11.4 Learning Curve for Bomb Makers

While the industrial revolution laid the foundations for a rich field of experimentation in IEDs, it was not until more experiments had been carried out that IEDs become common. World War I resulted in a large number of people developing an understanding of explosives and how they could be used as IEDs. Previous organizations, including the anarchists, had released pamphlets and books in limited number on how to make bombs, but information circulation was limited.

11.4.1 *Military and Civilian Professional Experience*

In the 1800s, the principal driving force in explosive use was in commercial applications in mining, tunneling, and railway construction. The need for effective explosives fueled the investment in research and development of explosive compounds, but without adequate experiments on various applications. People employing these explosives mostly learned through on-the-job training. Through a Darwinian selection process, those with a healthy respect for explosives managed to experiment and stay alive, while those without much caution were killed. From these survivors, a clear understanding of explosives applications in commercial use developed, but training remained largely through apprenticeship. It was not until World War I that more formal explosives application formulas were developed by the military, particularly the US Army Corps of Engineers, and other countries' military pioneering and sapper units.

Most of the people currently working in the blasting industry know how to lay out an explosive charge to achieve the desired results, provided they have manufactured materials with known characteristics. They can explain the formulations behind the process. In fact, if the military has explosive materials that they can identify by type, but that does not have a batch number, or if the chain of custody is questionable, they will destroy it rather than use it. This group, while not knowledgeable about explosives manufacturing, does have a very significant role in the development of explosives-handling knowledge, as they provide the practical knowledge base regarding what explosives are capable of doing. Even though blast formulations, and equivalencies between explosives, have existed for years, a true understanding of the applications still requires peer-to-peer education in the field.

There are two principle fields in the military that develop extensive knowledge on working with explosives: combat engineers and EOD. The combat engineers have learned from civil engineering techniques and combat engineering techniques. These latter are most applicable to IED creation using military and, to a certain degree, civilian explosives. EOD in turn is concerned with safe removal of the various explosive devices in the field environment, including IEDs. Successful EOD operations require improvisational skills to overcome restrictions of the site or disposition of the device. These skills also support IED invention, but because they are often lacking a chemistry background, EOD personnel cannot create the explosive materials.

Even a member of the armored cavalry, though, can obtain enough information about explosives and their use to create and employ an IED from scratch. Timothy McVeigh created the ANFO truck bomb that blew up the Murrah Building in Oklahoma City using a base of knowledge gained during his military service and as a civilian. In preparation for the special forces course in 1991,⁴⁶ he would have studied various military demolition manuals.

11.4.2 *Role of Military and Civilian Books*

After World War II, the literature about explosives manufacture and use continued to develop. The military created new manuals documenting lessons learned from explosives use in World

War II and the Korean War. Engineering schools, such as New Mexico Institute of Mining and Technology, approached the use of explosives from a more scientific perspective, using chemistry and physics to enhance the social benefits of explosives in mining and construction.

In the late 1960s, the counterculture groups sought out literature on bomb building and explosives mixtures. The US Army Demolitions, Booby trap, and Improvised Munitions Manuals, as well as the *Anarchist's Cookbook* and various Marxist guerrilla warfare books, were popular in college towns across the United States. In response to the surge in bombings, police agencies began to create or expand their EOD units,⁴⁷ often based on personnel with prior military experience as combat engineers.

In 1962, Major Joseph Stoffel, a retired Austrian Army officer, wrote *Explosives and Homemade Bombs*. The book provided a knowledge base for these new police units in managing unexploded devices found during crimes and investigations. Unfortunately, it also provided information for the counterculture and terrorist groups that wanted to build the IEDs, thus began a chess-like game, as both sides sought out each other's literature. While bombs were used for crime from the anarchist period onward, there was a notable surge in such violence. For example, in the 1950s in New York City, there were "no more than 50 bombings a year. By 1969, the number of bombings had almost doubled. There were 93 bombs that exploded and 19 that did not explode in New York City."⁴⁸ "Nationally, bombing incidents went from 1.6 per day in 1969 to 3.1 per day in the first six months of 1970."⁴⁹

The trend in using EOD books as blueprints for bomb making continues on to this day. For example, Thomas Brodie has written several editions of *Bombs and Bombing*, and Captain Jim Smith has written *A Law Enforcement and Security Officer's Guide to Responding to Bomb Threats*. These books and others like them have provided good training manuals for urban police department bomb disposal units while also explaining explosive handling methods for the adversaries.

The two most obvious books that show the tie in between the first responders and the counterculture come from Paladin Press, a first amendment supporter that published materials on all aspects of guns, bombs, and tactics, without regard to the selection of consumer, during the 1970s through the 1990s. After a lawsuit over a book called *Hit Man: A Technical Manual for Independent Contractors* by Rex Feral caused them to almost lose their insurance, they have since removed their more explicit books on bomb making and other terrorist tactics from their catalog. The two books from Paladin that bridged the world of first responder and perpetrator were *Police Guide to Bomb Search Techniques* by Frank Moyer and *Booby Trap Identification and Response Guide for Law Enforcement Personnel* by Tommy L. Jones. While the brief Jones book remains available by mail order, the *Police Guide* is no longer in print, although used copies can be obtained from other sources. Other publishers, however, such as Delta Press, continue to sell similar books.

The combination of professional literature, military manuals, EOD manuals, and the counterculture press had produced enough usable information that the concept of IEDs had entered into the culture of the United States. The increase in law enforcement EOD units is directly related to this phenomenon. In the early 1970s, there were only 19 experienced police bomb disposal technicians.⁵⁰ By the turn of the twenty-first century, major metropolitan police departments and many sheriffs' departments had full-time trained EOD teams, with over 200 even having bomb disposal robots.⁵¹

11.4.3 Role of the Media

During a war, it was common for successful attacks to be hidden from public knowledge. If the enemy knew how successful his attack was, it would enable him to both repeat it and to improve upon it. For example, if a certain type of bomb hit a ship in the stern and did little damage, but hit midships and blew it up, this gave the enemy information about targeting, bomb size,

composition, and deployment. If the enemy could not get any damage assessment information, he was unsure of the success of his bomb and its targeting, meaning that faulty devices were not recognized readily, and sometimes not at all, while really successful devices were also not recognized and therefore not used more frequently.

Today, when a bomb goes off, the first responders need to evaluate the crime scene to collect evidence to use in finding and prosecuting the perpetrator. This information also reveals a great deal about the manufacture of the device, which is often a crucial part of the investigation. It also demonstrates clearly how well the device worked and how effective it was against a specific target. The police prefer to withhold this information from the general public to prevent copycat actions, which would make the investigation more difficult, and to deny the bombers useful damage assessment information.

Unfortunately, in the age of digital communications, electronic media, and 24 h news, the media is hungry for any new story. First amendment rights permit the media access to most areas unless crime scene tape is strung to limit their entry. However, long lenses and microphones can often pick up quantities of useful information from long distances, making the protection of the crime scene information problematic. The perpetrator will often have conducted surveillance of the pre-bombing scene himself, and the film footage from the media may enable him to make his own assessment of the success of his attack.

Modern bombers, such as Eric Rudolph, are interested not only in attacks on a specific site, such as a women's health clinic, but also in disrupting the rescue efforts for the victims of the bomb. Therefore, the concept of the *secondary device*, a bomb placed to intentionally kill the police, fire, and medical personnel who arrive at the scene, has been developed. The *primary device* acts as bait to bring in large numbers of first responders. The *secondary device*, which is generally much larger, is designed and positioned to kill the maximum number of first responders as they operate in the disaster scene. The media's filming of the crime scene discloses considerable information about police tactics, including the placement of the incident command post, the marshaling of resources, and the routes of entry and egress. This information can increase the effectiveness of future attacks and secondary devices, by revealing points of maximum vulnerability of response operations.

The use of a secondary device is an adaptation of a long-standing military tactic, showing the convergence of civilian and military techniques. The US Army Field Manual 5-31, *Boobytraps*, 1965 describes the placement of such devices to attract as many people as possible to the scene, enabling the secondary device to create the maximum number of victims.⁵²

11.4.4 Role of Copying Machine and the Internet

Books on bomb making have been available for generations, but to access them, someone had to go to a library or bookstore or purchase the books by mail. A potential bomber had to know that the books existed and have the funds to purchase the books, with many of the scientific books costing hundreds of dollars. In addition, the purchase of books provided a chain of evidence for the police to follow in their investigation, potentially leading them to the perpetrator.

The advent of the copying machine made reproduction of the manuals economical and relatively private. One person could buy a book and it could be circulated to others without any trail. Copies could be made and sold for a fraction of the original price. Bootleg copies of bomb-making information were sold or traded at flea markets, used book stores, gun shows, and counterculture gatherings.

The early Internet provided bulletin boards where people would anonymously post information on any subject for free, and other users could access it in relative privacy. Documents like the *Jolly Roger's Cookbook* provided information on bomb building, as well as rudimentary tactics.

In this period, scanners were not widely available, and people were typing in information from military manuals on bombs and bomb building. The manuals relied on many illustrations, which were lost when only the text was copied.

By the late 1990s, the Internet had become a worldwide source of information of all kinds. Ready access to scanners enabled the creation of *Bookz*, a technique where people scanned entire books page by page into Adobe's software creating *portable document formats (.pdfs)*. These were normally posted as *file transfer protocol (FTP)* files for transmission from one user to another, due to the low bandwidth availability. As bandwidth increased, large files could be posted on the Internet, and users could pull information down through programs like *Torrentz*,⁵³ as well as *leaching* information from a site through the *save as* function.

Discussion forums also developed, which eliminated the geographical boundaries between like-minded individuals. Even people living far apart were able to share information on their explosives formulas and experiments. Several of these forums exist currently, and the information is exchanged internationally. These sites are not associated with any traditionally recognized institution of higher learning, and there are very few, if any, restrictions on obtaining the information on them.

This new combination of Internet forums and scanning capabilities has resulted in the closing of the information gap, making IED construction safer and more efficient. Therefore, the complexity and probable success of these devices is increasing. However, there are limitations because successful bomb building is a multidisciplinary activity. For example, a machinist, welder, chemist, and electrical engineer, with their associated equipment, would have to work together to create more sophisticated devices. It would also require this team to conduct testing to perfect the design. Manufacturing techniques and materials composition would have to have a higher level of consistency than is currently being demonstrated with IEDs to achieve predictable results. Builders stealing blueprints and specifications is a possibility, but again the manufacturing tolerances would remain an obstacle to an untrained worker.

11.4.5 Developing Trends

In recent years, the publication of bomb-making books has become a cottage industry. Kurt Saxon, author of *The Poor Man's James Bond*,⁵⁴ started Atlan Formularies, a micropublisher of his books. Atlan now distributes the material in CD and DVD format, including DVDs of Saxon's bomb-making instructions, which can be purchased through his website: <http://www.kurtsaxon.com/>. Uncle Fester has published *Home Workshop Explosives* through his Festering Publications, which is in its second edition.⁵⁵ Saxon's and Fester's books can be purchased through Amazon.com and other commercial sources.

11.5 Device Variety and Complexity

An IED is normally composed of more than just an explosive. It usually includes the explosive, a method of detonation, a timing or triggering device, and possibly shrapnel. The following section will explain the components and their interrelationships.

11.5.1 Explosives

Explosives for use in IEDs may be obtained in several ways. They may be homemade, or they may be civilian or military manufactured products. The manufactured products may be purchased or

stolen. With approximately 5 billion pounds of explosives used in the United States every year,⁵⁶ theft continues to be a significant source of explosive materials.

As mentioned earlier, there are several different types of explosives, both high and low. There are literally hundreds of formulas for explosives, each having its own unique properties. From a commercial or military standpoint, very few of these formulas are usable due to either safety or cost considerations. However, a person improvising is often restricted to what they may have access to, or what they know how to use, to create an explosive. For example, because of operational necessity, a perpetrator may choose to use a primary explosive as their only explosive, instead of the safer practice of using only a very small amount of primary explosive to initiate a secondary explosive.

Such was the case with the 2005 London bombers⁵⁷ who used TATP, a primary explosive, which would require only heat to initiate.⁵⁸ While these practices are generally considered unsafe, one must consider what the perpetrator's intent is and what risk they are willing to accept. For example, if they are suicide bombers, they have a different risk assessment than someone who wants to survive the blast. The simplicity of a device that requires only the explosive and a fuse renders it nearly invisible to conventional x-ray examination.

11.5.2 Method of Detonation

More traditional models of IEDs have a separation between primary (detonator/blasting cap) and secondary explosives, making it more probable that detection can occur. Detonators are normally comprised of either an electrical or fuse mechanism to initiate them. Manufactured detonators are approximately 2–3 in. long and ¼ in. in diameter. Improvised detonators may be made out of spent rifle casings or similar copper tube material that is crimped on one end and then filled with a small amount of primary explosive, followed with a low explosive with either a fuse or an electrical bridge similar to that of a light bulb filament. In fact, light bulb filaments and rocket motor initiators from hobby supply stores have also been used as substitute electrical bridges. As with explosives, detonators are used industrially in large volumes every year in the United States, also creating a situation where they may be stolen. IED builders may steal the detonators or purchase them from black market sources.

Mechanical means are also used in some cases. For example, rifle or shotgun casings have had their projectiles removed and had a small amount of primary explosive inserted. The result is a mechanically activated detonator, in which the primer is struck by the triggering mechanism, which in turn sets off the rifle/shotgun powder charge that in turn initiates the primary explosive, which activates the secondary explosive in which the detonator is set.

11.5.3 Triggering Mechanism

There are three basic types of triggering mechanisms. The first one is fuse, the second is mechanical, and the third is electrical. Of these three, currently, electrical is the one most likely to be employed due to its flexibility. However, the triggering mechanism depends greatly on the intended use of the IED, available resources, and the knowledge restrictions of the builder.

A fuse is simply a length of cord, either soaked in black powder or similar material, that is designed to be lit and will then burn into the detonator, causing low explosives to go off in the detonator, beginning the explosive train. This flame source can be anything from a hot water heater to a deliberately set fire, or simply a match lighting the fuse directly. Time delay for such a device is based on how long it takes the fuse to burn.

A mechanical triggering mechanism works in conjunction with a mechanical detonator. It is a device that is usually spring-loaded that is designed to strike the back of the detonator to cause the primer to go off and initiate the explosives train. This type of device can be as simple as a modified mouse trap, wherein the spring-loaded part of the trap has a pin soldered to it, a hole drilled in the base of the trap, a shotgun shell mounted to the same board, and a trip wire that will activate the release to the spring-loaded arm to strike the shell. Many hand grenades use this same basic design but usually provide a few seconds of delay by incorporating a fuse between the primer and the detonator.

An electrical triggering mechanism is designed for an electrical detonator. Its purpose is to provide an electrical charge to the electrical bridge of the detonator to initiate it. This electrical charge can be provided from a number of sources; most memorable are blasting machines (made famous by Wyle E. Coyote),⁵⁹ which are boxes approximately 12–18 in. tall, 8–10 in. wide, and 6–8 in. thick, with a handle that is pulled up and then pushed down quickly to induce an electrical charge to set off the device. Old bicycle-light wheel generators are also capable of accomplishing this. More complex devices use electrical detonators because of the wide variety of triggering mechanisms that can be incorporated into them and can be tailored to a specific task. A power source, such as a battery or an electrical outlet, is used to provide the source of energy, with the circuitry providing the switch.

Electrical triggering mechanisms are dependent only on the resource base and the imagination of the IED manufacturer. Adaptations from thousands of commercially available products are possible. Virtually anything that can turn something on, such as a light or an alarm, and that is activated by an external source or timing device can be used. A good example would be an alarm clock. If an alarm clock were dismantled, and the speaker revealed, two wires connected to that speaker would be exposed. By taking these wires and disconnecting them and reconnecting them to the detonator, it is possible to use the clock as a time delay device to initiate the bomb. Similar approaches are taken in creating other devices by reviewing their schematic designs or by dissecting the device and using a multimeter to determine when and how voltage is sent through a particular circuit. If the voltage is inadequate to detonate the device, then a relay circuit using higher voltage/ampereage is used with the electrical device providing the switching on and off of the relay.

Because of the capability of radio frequency (RF) to detonate some IEDs, the use of any radio at the scene of a potential IED event should be eliminated. Handheld radios, car radios, cell phones, and personal digital assistants (PDAs) all have the potential to set off an electrically triggered IED. This complicates the management of the response to a terrorist disaster scene, leaving communication via landline telephone as the only safe method.

11.5.4 Adaptation of New Technology

At the start of the last century, electrical applications were limited to lights and other rudimentary devices. Today, the market is filled with adaptable devices, creating limitless options. Use of digital wrist watches, common in the 1990s IED construction, has given way to cell phone use, basing detonation on a specific incoming phone call from a specific phone to activate either the vibrate feature or the auditory feature of a phone (these circuits are separate). This enables the IED manufacturer to tailor a device to activate only from a specific phone.

Use of global positioning system (GPS) devices creates another possibility. If the device has an alarm feature, it may be set to go off at a predesignated location, altitude, or time, based on the waypoint/alarm feature. PDA devices may also be used, provided they have some output source that can be identified.

More traditional to IED building are remote control/servo-activated devices that are as rudimentary as a remote control car. By boosting the output signal of the sending unit, the range of such a device is increased, though it is prone to RF interference. Once the IED is armed, a similar frequency may cause input that could detonate the device before the user is able to get clear of the area.

11.5.5 Use of Shrapnel

Shrapnel is material added to a bomb that represents a concerted attempt to enhance the lethality of an explosive device. The shrapnel material will produce debris that is traveling at the velocity of the detonation of the device. The goal is a device that is lethal beyond the shock/overpressure radius of the explosion itself. Very few people are killed by the blast/overpressure wave unless they are fairly close to it. Deaths and injuries are generally attributable to fragmentation, shrapnel, and secondary injuries from being thrown to the ground.

For example, the original suicide bomber vests were made of just explosives, causing a blast/shock wave that killed those in close proximity to the bomber. Today the vest load is 50% explosives and 50% shrapnel to greatly increase the lethality of the device to bystanders farther away.

Shrapnel, however, increases the likelihood of detection because of the x-ray signature, weight, and bulk of the device. Most amateur IED manufacturers are not aware of the shrapnel effect in IED construction and focus solely on the explosive itself.

There are certain models of IED that should be noted in the United States. Pipe bombs are the most common and are normally constructed of galvanized threaded pipes and their associated caps. The reason why they are used is because the explosive used in them is normally low explosives, such as black powder, reloading smokeless powders, or nitrocellulose/gun cotton. The pipe provides sufficient containment for the powder to build up pressure and cause mechanical failure of the pipe. The pipe bursting yields an inconsistent fragmentation/shrapnel pattern, but the shrapnel yield can be enhanced by the addition of epoxy and ball bearings on the outside or wrapping wire around the device.

Bombs may also be made from polyvinyl chloride (PVC)-based pipe. They reduce the x-ray signature of the device to a silhouette. However, they suffer the same issues as galvanized pipe bombs and do not provide the same degree of containment and resulting pressure buildup, making their explosion less violent when used with comparable materials.

11.6 Bomb Detection and Bomb Disposal

Theoretically, the detection of IEDs should be easy. However, the many sizes and shapes that IEDs can take, the designs that can be used, and the many materials that are available make detection very difficult in practical conditions. Because of that, the people manning explosive detection machines, or working with bomb dogs, need to know both how the different components are used legitimately and how they are used in IEDs.

11.6.1 Detection: Machines

X-ray machines enable the operator to take 3D imaging of a package and rotate it not only in a 360° pattern on its x-axis, but also on its y-axis, leading to detection. The problem comes with the density of the materials involved. If other materials of the same density and composition are

surrounding the device and there is no clear differentiation between them, the x-ray will probably not pick up the weapon. However, the different components of the device will have different densities and therefore present a signature. The question is with the x-ray's interpretation by the operator. If the device looks similar to a regular piece of electronic equipment, the device may be allowed to pass.

Metal detectors present the same issues, but are even more limited, in that they will simply provide an auditory signal when too large a mass of ferrous material attempts to pass through. If the metal detectors' sensitivity is adjusted down, it may be possible to walk through without triggering any alarms at all, even though the device may use steel and iron components extensively. Alternatively, the device may be composed of nonferrous materials, rendering the most sensitive metal detectors incapable of sensing the device.

Another technique for detecting that someone has handled explosives is a machine that processes swabs taken from someone's hand or from the handles of luggage, briefcases, and purses. Using ion-mobility spectrometry or chromatography, a computerized analyzer recognizes chemicals on the swab and alerts on bomb-making precursors and components.⁶⁰ Unfortunately, false-positive readings come from the medication, nitroglycerin, taken for chest pain, from fertilizers, and from some perfumes.

11.6.2 Detection: K-9

Another method of detection is through the use of trained dogs. While they are highly efficient in searches, the dogs do have some drawbacks. First, there may be a false positive if a person has recently worked with fertilizer, since the nitrates in fertilizer may trigger a response from the dog. This means that the handler has to know how to question a potential subject to determine if he or she is a farmer, gardener, or otherwise working around fertilizers for legitimate purposes.

Second, dogs can only detect certain types of chemicals. While they can be trained to alert on most nitrogen-based materials, they are not normally trained to recognize peroxide-based explosives, although some dogs are now being tested for their abilities to detect even these explosives.⁶¹

Third, dogs become fatigued just like people. There are 19,000 smells related to explosive materials. Even a well-trained dog cannot concentrate for more than 20–30 min every couple of hours. They tend to get confused in a crowded place. Dogs alert on an explosive by sitting down, but this can also be a sign of fatigue. They also need constant reinforcement, with the opportunity to find some material and get rewarded. This means that the handlers have to set up situations in which the dogs find planted material and get rewarded, which can be difficult to do in public places.⁶²

11.6.3 Detection: Situational Awareness

The best machine or dog is only as good as its operator/handler. The cornerstone of IED detection is the human being. Staff members need to be trained on what the device looks like, as well as on the behavior patterns of potential bombers. Awareness enables staff to take items that seem unrelated and put them together to create a level of suspicion that leads to further investigation. The only practical way of doing this is to provide knowledge of IED construction to staff, as well as behavioral profiling, in order to determine if a possibility of an IED is being presented.

The training does not need to be elaborate. It could be a combination of bomb search protocols for the persons working in a given area, as well as what the IEDs look like and the most probable locations where they would be found, all of which could be combined into an exercise/training scenario for staff. Someone familiar with IEDs could create some facsimiles and put them in likely

locations, with each IED individually numbered or coded. This allows the staff to search the area and make notes of the devices that they find by number or code. The organization can then ascertain how well the staff has absorbed the lesson while familiarizing the staff with the appearance of many types of devices. The higher the likelihood of a problem occurring, based on the site's risk assessment, the more training that would be needed, meaning that the facsimile devices should be more complex and placed in areas more difficult to search.

Situational awareness training for first responders is also available through New Mexico Institute of Mining and Technology in conjunction with the DHS. Courses include *Incident Response to Terrorist Bombings* and *Prevention and Response to Suicide Bombing Incidents*.⁶³

The general public also has a role in reporting suspicious situations to appropriate staff members or law enforcement authorities, either anonymously or identifiably. There is currently a legal concern about the rights of the public to report suspicious behavior because of the case of the imams traveling on a plane. In 2007, the imams sued US Airways and threatened to sue the passengers whose concerns were reported to airport personnel after the imams were seen praying publicly and loudly in Arabic and then refused to cooperate with flight staff, which raised concerns about suicide bombers.⁶⁴

Mass transit is also a likely target of IEDs. The events of Madrid and London clearly demonstrated that open societies carry the inherent risk of disruptive behavior. Mass transit agencies have developed *if you see something, say something* campaigns to raise the awareness of passengers over left luggage, strange packages, and odd behavior.⁶⁵ The murders on the Long Island Railroad⁶⁶ and the release of sarin in a Tokyo subway⁶⁷ demonstrate that IEDs are not the only threat to mass transit passengers, so vigilance by all passengers is a safety benefit.

While airport passengers can be readily screened because they go through various restricted portals, mass transit passengers have multiple points of access and egress. This makes physical screening impractical. Likewise, people in malls and public buildings are at risk because screening is either impractical due to the many points of access and egress or may be unconstitutional based on the people's right to assembly. Therefore, outreach to the public to encourage vigilance is very important.

Training in vigilance for the public is offered to members of Community Emergency Response Teams,⁶⁸ Neighborhood Watch groups, and Radio Amateurs in Civil Emergency Services⁶⁹ in many communities. Public presentations by emergency preparedness staff members are offered to school, church, and community groups to develop a culture of awareness of personal surroundings as a way to enhance the anti-terrorism surveillance available throughout the community.

11.6.4 Disposal: Countermeasures

While several countermeasures exist, particularly with RF jamming, they are not without problems. The military uses IED countermeasures equipment (ICE) and Warlock as countermeasures, which jam the IEDs by using low-frequency radio signals to block the radio signals for initiators like cell phones or satellite phones.⁷⁰ One commander in the Sunni Triangle of Iraq is reported to have found that most IEDs in his patrol area were using toy car remote controls to set off the bombs. He mounted a toy car controller on the dashboard of his Humvee with the levers taped down to detonate any IEDs up to 100 yd ahead of him.⁷¹ RF jamming is the transmission of RF signals across a broad spectrum and at high power in an attempt to block the remote controls for IEDs or to initiate IEDs before the designer intended them to go off.

Jamming is a countermeasure but presents unique problems of its own. The device may go off in an undesirable location and injure persons other than those who were its initial target. This

technique can also disrupt various forms of communications, depending on the frequency range being employed and the location of its transmission. The result can be disruptive for both first responders and civilians.

IEDs represent an extremely diverse and eclectic design process, rendering a significant portion of them immune to RF jamming. The device's construction may be based on either a mechanical fuse or an electrical circuit that is either shielded or requires so much RF energy that the jamming equipment will not impede it.

Disruptors are another form of countermeasure against IEDs. If an explosive device is identified and determined to be unsafe to move, it presents two potential options. One is the attempted disarming of the device by personnel. This, however, puts the personnel at extreme risk and is only used as an absolute last measure. The more common option is to use a disruptor or interrupter. This approach has been used for decades and began with the use of either a small explosive charge being attached to the IED, and then detonated to control the blast, or by firing into the device from a distance in order to initiate the explosion. Developments in the 1970s resulted in the use of shotguns with buckshot as disruptors, either positioned on a stand next to the device and remotely fired or via robot-mounted shotgun that would be moved into position by remote control via a tethered line, and then shot.

In the early 1990s, developments resulted in a rethinking of the approach. A compressed water charge was used to disarm the device. This approach is normally conducted via robot but may be pre-positioned similar to the shotgun and remotely fired. The device itself is comprised of a heavy-walled barrel, a plastic cap on the end to contain the water, water in the barrel, and a high-powered cartridge at the chamber of the barrel. Upon firing the device, the expanding gasses of the shell force the water out of the barrel as a high-speed jet, which penetrates the packaging of the device and is specifically targeted at the triggering mechanism of the device to ensure the highest probability of disarming it.

11.6.5 Disposal: Safety, Training, and Equipment

There is a lot of lore related to the safety of dealing with explosive materials. Much of it was based on old designs and military charges and triggers. The current diversity of designs makes an emphasis on safety essential.

The three most important factors in safety, when dealing with explosive materials of any kind, are time, distance, and shielding. Safety begins by exposing personnel to the device for the shortest time possible. This is why robots have become essential to most urban EOD units, as the robot's cameras can transmit detailed information on the IED back to personnel in a secure location. This is also why stand-mounted disruptors are preferable to human-held weapons, as the exposure time is limited.

Distance from the IED is another key factor in safety. The Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) has conducted tests of many explosive materials and IED designs and has created a *standoff* card for law enforcement personnel that provides safe distances from various sizes of IEDs. This information is useful in setting up the command post at a safe distance from the device and in evacuating the public from an area around the device. When RF or disruptors will be used, the standoff distances dictate where all personnel must be, at a minimum, when the disruption is set off.

Shielding from the effects of the explosion is also key to safety. Scientists have developed studies that generate charts for the *shadow* of an explosive. This is the area where the blast wave will travel with devastating force to kill and maim. By providing shielding between the personnel and

the device, the distance can be closed. This is especially important if medical or fire personnel will need rapid access to the area of the explosion to provide care for first responders or bystanders. Shielding also offers protection from shrapnel, provided it is thick enough.

Shielding can take the form of a building, a vehicle, or a specialized structure created for that purpose. Personnel must be careful to thoroughly evaluate the capabilities of the shielding and not overstate its protective characteristics. For example, a fire engine full of water provides a good shield for the area that it covers, so parking a patrol car on the side opposite the explosion could protect those people inside the car. However, a person standing next to the engine could have blast effect damage from the explosion to their legs and feet exposed below the engine body. Likewise, buildings constructed of glass provide little protection and may actually be more dangerous than standing in the open, due to the shattering of the glass and the creation of glass shrapnel from the blast.

Training of personnel is the key to safety. The standoff cards and shadow information noted earlier must be available to incident commanders and others in charge. The personnel responding to IED events need awareness and response training delivered at regular intervals to keep their knowledge fresh. The Federal Emergency Management Agency and the National Fire Academy offer courses on responding to and operating in IED environments.

EOD training is provided by the Hazardous Devices School at Redstone Arsenal, Alabama. Applications are made through the Federal Bureau of Investigation (FBI). The ATF conducts a bombing investigation school for police and fire personnel at the Federal Law Enforcement Training Center at Glynco, Georgia, but the personnel must be Redstone graduates. Also the International Association of Bomb Technicians and Investigators conducts various international, regional, and chapter training conferences for police, fire, and security personnel. The US FORSCOM at Fort Gillem, Forest Park, Georgia, offers a course called *explosive ordnance reconnaissance and disposal*, which may be offered locally for first responders.

Equipment for managing IEDs is the same as that used for any explosive device. The introduction of robots⁷² to EOD has probably been the single greatest contributor to the safety of explosive ordnance technicians. Prior to robots, an EOD technician had very few options to assess the device safely. Robots carry several cameras to permit a good view of the device, which is transmitted to a technician in a secure location. Fiber-optic cables, reeled out at the robot end to minimize fouling, carry movement signals for the robots, the cameras, and the tools held in its claws. Newer radio control devices allow the robot to travel thousands of yards from the handler without concern for the cable getting fouled or limiting the distance the handler can be from the device, but may run the risk of setting off a radio-controlled device.

Personal protective equipment, especially the bomb suit,⁷³ has improved dramatically over the past 30 years. Kevlar body armor, blast-resistant face shields, and flexible joints make the suits easier to wear. Self-contained breathing apparatus has been added to provide respiratory protection from particulate matter generated by a blast and from chemical and biological materials that might be at the scene or be released as part of a secondary device. Cooling vests permit a technician to stay in the suit longer. The newest versions have an overpressure feature to provide an additional level of respiratory and skin protection to the user against chemical and biological materials. The optics on the face masks have improved to permit a clear view of the IED components through the shielding.

Because the suits are heavy and do not breathe, some departments have obtained small vehicles to move personnel closer to the IED. Golf carts and Segways are used by urban EOD units to carry the technicians to the scene with little exertion, reducing their fatigue and saving their air supply, thus permitting longer time at the IED site.

For lighter devices, the robot may have sufficient power to move the device into a safer location or a transport truck. Larger devices may be moved using rigging, to take it from its site to a safer

location for on-site detonation or to a transport vehicle for removal to a bomb range. Extremely large devices, such as VBIEDs, require disarming in place and transportation to a remote site for complete destruction.

In all cases, IEDs are destroyed because of the inherent safety issues with their construction. While in most cases preservation of evidence is essential, bombs are the exception. Photographic evidence is collected before destruction, then the debris field and remaining materials are collected and evaluated for use at trial, clearly demonstrating the disastrous potential of the IED.

11.7 IEDs as Stepping Stones to WMD/CBRNE

IEDs form a stepping stone to chemical, biological, and nuclear attacks, as the improvisational design thought process and tactical employment are similar. Thus, individuals and/or organizations with extensive IED construction and employment experience are more capable of conducting a successful attack using such WMDs. As noted in *Aptitude for Destruction*,⁷⁴ the question remains as to whether these organizations possess the resource base necessary to support the experimentation and further development of their IED capability. It could be obtained through open-source information or through working in collaboration with other terrorist groups, or through state-supported cookbooks. The availability of these options will also influence the development of their WMD/CBRNE abilities.

Even the simplest WMD creates a new challenge for first responders. Do they treat a chemical-laced WMD as an IED or a hazardous materials incident? It should be remembered that hazardous materials incidents are normally controlled by the fire department, while IED events are controlled by law enforcement. Police and fire personnel receive very different training, so WMDs require a new level of cross-training for successful responses. Events involving biological or radiological materials add additional challenges for first responders.

The IED manufacturers also face similar obstacles. They do not usually have experience working with biological and radiological materials. Dispersal through explosive means may be less than optimum, destroying the material in the explosion. Manufacturing effective WMDs requires levels of knowledge that are usually limited to state actors because of the cross-disciplinary knowledge required to design, test, and refine such devices.

11.8 IEDs in the United States: Conclusion

As has been noted, IEDs have been used in the United States for over 100 years, by anarchists and protestors, as weapons against civilian police forces. Since the 9/11 attacks, the DHS has funded programs to raise the awareness of the American public about the threat of IEDs, most notably on transit systems. After the attacks in Madrid in March 2004 and London in July 2005, the focus on transit safety and awareness was heightened, with DHS providing specialized terrorism awareness and prevention grants for transit systems in the United States. Thirty-nine transit systems received more than \$500 million from 2003 to 2007 through the Transit Security Grant Program for intracity rail and bus programs, as part of the critical infrastructure protection program.⁷⁵ A major focus of these grants is the “prevention and detection of explosive devices...”⁷⁶

One of the most notable programs is the New York Metropolitan Transportation Authority’s *If You See Something, Say Something* campaign.⁷⁷ Posters are placed in busses, subways, and trains to remind passengers of the dangers of attack by IEDs. Characteristics such as inappropriately heavy

or bulky clothing, suspicious behavior, tampering with surveillance cameras, or attempts to enter restricted areas are highlighted as hallmarks of possible IED attack. Unattended packages and items with exposed wires are other suspicious factors that should be reported. The program states, “The vigilance of all New Yorkers has kept MTA buses, subways, and railroads safe.”⁷⁸

Yet how likely is it that an IED will be used against civilian targets in the United States again? The DHS believes that “...history has shown IEDs are the terror instrument of choice and thus have the highest frequency and probability of occurrence.”⁷⁹ One of the 15 National Planning Scenarios is # 12 *Explosives Attack—Bombing Using Improvised Explosive Devices*.⁸⁰ Couple this with the declassified National Intelligence Estimate on Global Terrorism for 2006 that stated, “the global jihadist movement—which includes Al Qaeda, affiliated and independent terrorist groups, and emerging networks and cells—is spreading and adapting to counterterrorism efforts,”⁸¹ and it appears that the likelihood of the use of IED devices inside the United States is rising.

Al Qaeda is using Iraq as a training ground for terrorists. Along with learning to make IEDs, they are taught the skills a terrorist needs to succeed: urban guerrilla training in tactics like ambushes and booby traps, as well as learning to blend in to avoid detection, and religious and psychological counseling to prepare them to kill or die.⁸² If more adversaries are being trained, strategies to withstand terrorism must be developed in case prevention fails.

One system to withstand terrorist attack is that based on the Community Emergency Response Team training cited earlier. This approach teaches citizens how to protect themselves and support their neighbors. Harvard researcher Robyn Pangi advocates planning for and training about the likely terrorist weapons at the neighborhood level. She notes that, “Individual and collective measures taken before an attack may give citizens a sense of purpose and direction during and after the attack, increasing their chances of survival. ... If citizens are involved in the process of defending the nation and themselves, they will be empowered to prepare for and manage an array of scenarios.”⁸³

RAND terrorism expert Brian Michael Jenkins believes that more terrorist attacks are likely over the next several decades. Since IEDs are cheap and relatively easy to make and deploy, they continue to pose a threat. “To me the final defense against terrorism in our society is not metal detectors. It’s not the explosive detection systems. It does come down to, as a nation, the individual citizen, our own courage...a realistic acceptance of risk, a stoicism...a continuing commitment to the values that I think this nation stands for. ... It is psychological steel that is the defense against terrorists.”⁸⁴

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**NATIONAL AND
INTERNATIONAL
CASE STUDIES**

UNIT
3

*Part I: Crisis and Emergency
Management in North
and Latin America*

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Chapter 12

American Presidential Crisis Management under Kennedy

The Cuban Missile Crisis

Robert E. Dewhirst

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12.1 Introduction

The Cuban missile crisis is one of the most extensively chronicled crises in American political history. Actions taken and decisions made during a 13-day period of October 16–28, 1962, have been discussed, studied, and analyzed by a generation of journalists, scholars, and even the participants themselves. Subsequent publication of the memoirs of many key antagonists, first the Americans in the 1960s and 1970s, followed by the Soviets in the two subsequent decades, filled in some information gaps found in early analyses. Moreover, key government documents were declassified in both the United States and Russia in the 1980s and 1990s. In addition to this abundance of information and speculation, widespread interest in the Cuban missile crisis also likely

has been sparked by the spectacular drama of events occurring in each step of the affair. In many places, a simple account of the crisis's events reads like a best-selling thriller.

To be sure, the crisis, perhaps the seminal point in the history of the Cold War, marked one of the most dangerous brief periods in world history, with the confrontation of two nuclear superpowers, each with enough military firepower to destroy millions of lives.

12.2 Historic and Political Setting

The Cuban missile crisis occurred at the peak of Cold War tensions. Throughout the nearly two decades following the end of the Second World War, the United States and the Soviet Union had faced off in one tense confrontation after another before Kennedy became president: the Berlin airlift, the establishment of Soviet puppet states in Eastern Europe, Mao's victory in mainland China, the shooting down of a U-2 spy plane over the Soviet Union, the Korean War, violent crushing of rebellions in Czechoslovakia and Hungary, or growing conflicts in Laos and South Vietnam.

As president, Kennedy had already endured such intense Cold War confrontations as his first (failed) summit conference with Nikita Khrushchev, the construction of the Berlin Wall, the unsuccessful Bay of Pigs invasion of Cuba, and budding Cold War conflicts in third world countries and Africa and Southeast Asia. Kennedy seemed to move from one Cold War crisis to another. Moreover, the young president was especially burdened by fears of repeating the two public pratfalls of the unsuccessful summit conference and the Bay of Pigs debacle. On top of all this, the president was enduring intense domestic crises as well—especially concerning the civil rights movement in states of the Deep South.

Yet the Kennedy administration continued to focus on Castro and Cuba. Soon after the failed Bay of Pigs invasion, President Kennedy approved implementation of a Central Intelligence Agency (CIA) covert plan to overthrow Castro. Code named *Operation Mongoose*, the program had an annual operating budget of about \$50 million and involved more than 2000 Americans and Cubans working from a base in the Miami area to initiate economic and political sabotage in Cuba (Giglio 1991: 190–192).

In late summer 1962, the president ordered high-altitude flights over Cuba by U-2 spy planes. Initial surveillance flights produced photographs revealing Soviet surface-to-air missiles (SAMs) for antiaircraft defense of the island. However, on the evening of October 15, a pair of spy flights produced photographs indicating the construction of launch sites in western Cuba for Soviet intermediate- and medium-range intercontinental missiles. The weapons represented a *first-strike* capability for the Soviets, placing the missiles within a few minutes' flight time to any spot on the heavily populated East Coast of the United States. Although the discovery marked a significant escalation in Cold War tensions, the development also presented a possible avenue for resolution: construction of the launch sites and installation of the missiles had not yet been completed. After being notified immediately by his National Security Advisor McGeorge Bundy, President Kennedy began planning how to get the Soviets to remove their missiles before they completed their installation in Cuba.

12.3 Kennedy's Crisis Decision-Making Apparatus

Eager to avoid repeating previous decision-making mistakes, especially those prevalent in the Bay of Pigs disaster, the president assembled a top-level task force to collect and study information and

make recommendations of favored courses of action. The group, which later became known as the Executive Committee of the National Security Council (commonly abbreviated as the ExComm), met secretly throughout the 13-day crisis. Sessions were held at any of the three sites: the cabinet room or the oval office itself in the White House or across Washington in a state department conference room near the office of George Ball, undersecretary of state. Overall, the group advised the president both orally, through interaction during ExComm sessions, and in writing, through proposals explaining and defending favored courses of action or attacking rival positions (Blight et al. 1987; Janis 1982; Kennedy 1969).

Kennedy chose an eclectic group of 18 men whose advice he generally valued for either their ability to make intelligent decisions, possession of technical knowledge, or both. Over time, the unelected leaders of the group evolved into Robert Kennedy, the attorney general and the president's brother, and Robert McNamara, the secretary of defense. Others attending any or all of the sessions included Ball; Dean Rusk, secretary of state; Lyndon Johnson, the vice president; John McCone, director of the CIA; Douglas Dillon, secretary of the treasury; Theodore Sorensen, the president's legal counsel; Alexis Johnson, deputy undersecretary of state; General Maxwell Taylor, chairman of the Joint Chiefs of Staff; Edward Martin, assistant secretary of state for Latin America; Llewellyn Thompson, a former ambassador to Russia; Roswell Gilpatrick, a deputy secretary of defense; Paul Nitze, assistant secretary of defense; Adli Stevenson, American ambassador to the United Nations; Kenneth O'Donnell, the president's appointments secretary; Dean Acheson, a former secretary of state; and McGeorge Bundy, the president's national security advisor (Allison 1971; Blight et al. 1987; Giglio 1991; Janis 1982).

Each member of the group, including the president himself, worked aggressively to maintain the secrecy of their deliberations. Each man, especially Kennedy and his cabinet members, did his best to honor previously made commitments for public appearances, fearing that a cancellation might ignite too many questions from either journalists or the public. The president even made congressional campaign appearances in Connecticut and Chicago, while the vice president went to Hawaii (Giglio 1991).

In marked contrast to the formal meetings of the full National Security Council, which so characterized the Eisenhower administration, the pressure-packed sessions of Kennedy's ExComm were always informal and often highly argumentative. Both Kennedys strongly wanted to avoid the pitfalls characterizing the decision-making process leading up to the earlier Bay of Pigs debacle. They developed several methods to try to avoid repeating their previous errors. First, not every member attended each ExComm session. In fact, Robert Kennedy asked his brother to stay away from some meetings so as to assure a frank exchange of ideas and avoid the possibility of members voicing opinions that they thought might please the president. Conversely, few advisors or cabinet members would ever be willing to argue against a position he knew the president favored. Hence, when Kennedy did attend sessions, he would sometimes carefully hide his views so that others might feel freer to air their opinions. Robert Kennedy would also do this at times. In sum, the president wanted to make certain that each ExComm member felt free to give his best judgment (Giglio 1991; Janis 1982).

On the other hand, Robert Kennedy and Sorensen would at times assume the role of devil's advocate and challenge the positions and assumptions of the ExComm majority, thereby forcing members to defend their positions and possibly even view their positions from a different perspective. Furthering this effort, ExComm members at times were divided into subgroups to develop position papers to be presented to the full group for critical analysis. Such practices often opened the door for subordinates to critique the analyses of their superiors and of generalists to challenge the work of subject experts. In addition, the president sought the counsel of experienced officials

outside the ExComm, such as Charles Bohlen and Robert Lovett, as two leaders in the Truman administration (Giglio 1991).

In sum, all of the participants writing their memoirs about the ExComm meetings agreed that the sessions tended to be lengthy and stressful, with members, including the president himself, losing their poise more than once.

12.4 Pressures and Limitations Confronting the ExComm

Members of the group were working in response to powerful conflicting pressures. To begin with, there was the obvious threat of making a decision that would ignite a thermonuclear war. This possible outcome constantly overshadowed deliberations, causing many members to lose both sleep and their composure during heated exchanges. Even the thought of contributing to decisions leading to such an outcome was a burden constantly weighing heavily on the thoughts of several members, especially McNamara and Rusk. The possibility of igniting a Third World War and subsequently causing millions of casualties clearly seemed to pressure members to seek less forceful courses of action.

On the other hand, ExComm members felt overwhelming domestic political pressures to take any action necessary that would lead the Soviets to remove their missiles from Cuba. Most immediate were concerns over how the crisis might affect the midterm congressional elections, to be held just the following month. On several occasions, the president and others in the ExComm exclaimed that botched decision making would lead to democratic congressional losses and possibly even a Republican takeover of congress. Of course, longer-term effects were related directly to the president's ability to win reelection in 1964 and, ultimately, to his standing in history. Failure here could turn the tide of the Cold War struggle in favor of the Soviets.

In addition, the president and ExComm members were working under severe limitations. First, time limitations severely pressed ExComm's decision making. They had to work quickly to develop an effective plan leading to the removal of the missiles from Cuba before the Soviets completed installing the weapons. Such a delay could greatly strengthen Khrushchev's bargaining position. Second, members were limited in their knowledge of Soviet intentions and political and military capabilities. ExComm members spent much of their time speculating on likely Soviet responses to an array of possible American courses of action (Allison 1971; Janis 1982).

In sum, President Kennedy, advised by ExComm and working under unprecedented pressure, had to quickly develop a plan to compel the Soviets to remove their missiles from Cuba while also avoiding the ignition of a major war.

12.5 Alternative Courses of Action Are Developed

From the initial meeting on October 16 onward, ExComm members developed and debated eight possible options for responding to the Soviet action before eventually settling on two primary possible courses. Most members of the group quickly rejected any purely diplomatic solution, such as one focusing entirely on reaching a negotiated settlement through, for example, an arbitrator or mediator. On the other extreme, most in the group rejected a purely military solution, such as invading Cuba, unless other less drastic measures should fail.

Most ExComm members eventually came to favor one of two primary rival solutions. One option involved either a narrowly focused *surgical* air strike by the United States against the missile

sites themselves or a broader attack that would also include nearby Soviet anti-aircraft installations. The proposal generated extensive debate in ExComm, with its advocates (termed *hawks* by some group members) maintaining that such action was the only certain way to remove the missiles quickly. Opponents of the plan countered by arguing that the attack would cause numerous Soviet and Cuban casualties and likely would ignite a counterattack, either from any surviving missiles in Cuba or from Soviet forces elsewhere, either in Europe or in Turkey, where the United States had its own missiles aimed at the heart of the Soviet Union. Finally, Robert Kennedy advocated an argument that proved effective against the air-strike proposal—that America's moral tradition would never support a surprise attack by a more powerful nation against a smaller and weaker country (Blight et al. 1987; Giglio 1991: 197).

The second option, favored by a steadily increasing number of ExComm members during their lengthy sessions early in the crisis, featured the US Navy's establishment of a blockade around Cuba. The blockade, which advocates euphemistically termed *quarantine*, would prevent further shipment of missiles and associated military materials into the country. The action likely would not produce the casualties an air strike would, quarantine supporters argued. In addition, it would be a forceful yet limited response. However, air-strike advocates noted that the quarantine was illegal by most interpretations of international law, would not prevent completion of the missile installation in Cuba, and would be so slow as to give Khrushchev valuable time to react elsewhere in the world. In sum, the blockade itself would not physically remove any missiles; its advocates simply hoped that it would force the Soviets to make a deal resulting in the missiles' removal.

Following lengthy debates spun throughout several meetings, the president called for a straw vote of the ExComm on Saturday, October 20. The blockade won the vote, 11–6, over the air strike. The president agreed with the ExComm majority, although everyone agreed that the air strike could be made later should the blockade fail (Giglio 1991: 199–201). Although popular with a majority of the ExComm members, the blockade would never enjoy the unanimous support of the panel's members at any time during the crisis.

Several subsequently published reports assert that the president's thinking throughout the crisis was affected by his reading of historian Barbara Tuchman's *The Guns of August*, then newly published. This book chronicled how European leaders stumbled into the First World War through a series of mistaken decisions based upon misperceptions and unintended consequences. Hence Kennedy, determined to not make similar mistakes and lead the world into another world war, instinctively tended to side with the dove faction of the ExComm. However, he refrained from advertising these views during his appearances at ExComm sessions (Allison 1971; Blight et al. 1987; Janis 1982).

12.6 Crisis Goes Public

Throughout the early days of the crisis, the president had been overwhelmingly successful in maintaining secrecy, in order to give ExComm members sufficient time to prepare a response. Although several journalists, reporters from the *New York Times* and *Washington Post* in particular, knew fragments of the story—especially that it involved a Cold War military confrontation with the Soviet Union over Cuba—Kennedy succeeded in convincing journalists to censor themselves.

This enabled the president to gain maximum political leverage, both domestically and internationally, by dramatically announcing the crisis on national television the evening of Monday October 22. Earlier that day, administration officials briefed the full cabinet, congressional

leaders, and the chief executives of leading allies. An hour before the president's speech, Rusk gave a copy of the address to Anatoly Dobrynin, the Soviet ambassador to the United States. Kennedy's speech announced the discovery of the Soviet missiles, outlined the planned blockade of Cuba, and requested an immediate meeting of both the Organization of American States (OAS) and the United Nations Security Council. The president attacked the secret nature of the missiles' deployment, called for their immediate removal, and threatened massive retaliation should the weapons be used in a first strike (Giglio 1991).

Keeping the crisis secret until it could be announced dramatically—along with a proposed countermeasure—made for an important political victory for the president. That is, the drama and suddenness of the moment helped mute possible criticism from other political elites, as congressional leaders, newspaper and magazine editorials, and other chief executives largely supported the administration.

This approach undoubtedly also helped the administration win important international legal and political backing. The OAS voted 19–0 in favor of a resolution supporting the president's plan entirely. In addition, Stevenson had the Soviets dramatically on the defensive throughout the United Nations Security Council sessions on the crisis. Finally, early public opinion polls revealed that 84% of the American public supported the blockade and only 4% opposed it (Giglio 1991: 203–207). The opening salvo of the public phase of the Cuban missile crisis clearly favored the Kennedy administration.

12.7 Early Rounds of the Public Confrontation

Brinkmanship now clearly dominated American management of the crisis. Kennedy was publicly confronting Khrushchev, as both national leaders stood on the brink of a nuclear war. By the evening of the day following Kennedy's dramatic announcement, the president and his ExComm completed final plans for implementing the blockade, particularly to determine which weapons were to be quarantined. The president now assumed detailed control over all matters concerning developing and implementing the blockade. In addition, he sought to win Khrushchev's approval for the plan. By the time the blockade was to begin—at 10 a.m. (East Coast time) on Wednesday, October 24—the Americans had assembled a fleet of more than 160 vessels to handle the task. At the suggestion of an advisor, Kennedy shortened the blockade along the eastern side of the island from 800 to 500 miles, to allow Khrushchev more time to prepare a response to the American initiative (Allison 1971; Giglio 1991).

Throughout the night before, as 25 Soviet ships made their way across the Caribbean to Cuba, Khrushchev announced that his country would defend its rights. Then, at 10 a.m. on the day of the blockade, six Soviet ships near the blockade line had either stopped or turned back. Kennedy soon responded by ordering the Americans to follow closely any ships entering the blockade area, thus allowing those vessels additional time and space in which to turn around. As the blockade began taking effect, the two national leaders exchanged communications, both formally and informally. Of particular importance was Kennedy's letter to Khrushchev in which the president restated his previous public position, particularly the demand that the missiles be removed from Cuba. Also that day, Stevenson had his dramatic confrontation with his Soviet counterpart before the UN Security Council. Yet Stevenson's forceful rhetoric, coupled with several enlarged photographs of Cuban missile sites taken earlier from the U-2 flights, was not enough to win official and public support from the United Nations.

Meanwhile that day, Kennedy maintained constant personal contact with the blockade forces, ordering that obvious non-weapons-bearing ships, such as tankers, be allowed to pass through. Finally, to demonstrate his resolve in maintaining the quarantine, the president ordered that Americans board and search a ship. However, he carefully selected non-Soviet ships initially, again working to give Khrushchev as much time to formulate a response as possible. The following day, the Soviets responded through informal links with an American television network executive that they would remove their missiles in exchange for an American pledge not to invade Cuba. The Soviets followed this contact with a letter from Khrushchev later that day, essentially restating the offer.

However, the following day, as ExComm members were analyzing the letter and preparing a response, the president received a second formal letter from Khrushchev. This message, transmitted over Moscow radio, contained a new proposal—that the Soviets would remove their missiles from Cuba if the Americans would remove theirs from Turkey. Making the ExComm session that day even more somber was a report from the Federal Bureau of Investigation (FBI) that Soviet officials in New York were preparing to destroy secret documents in their office (a practice normally only done at times of extreme emergency). During much of their session that day, Kennedy and the *dove* ExComm members considered strategies for persuading North Atlantic Treaty Organization (NATO) members and recalcitrant Republican critics in congress of the wisdom of removing the Jupiter missiles, outdated by then, from Turkey (Blight et al. 1987; Janis 1982).

More sobering news arrived early the next day, on October 27, when it was learned that a Soviet anti-aircraft missile had shot down a U-2 spy plane over Cuba. Meanwhile, another U-2 spy plane inadvertently flew over Soviet airspace in eastern Siberia, nearly triggering an armed conflict as it scampered back to Alaska just in front of Soviet fighter planes, who nearly exchanged shots with American fighters who had scrambled to defend the returning U-2. The two incidents appeared to harden the positions of both the hawks and doves on ExComm. The hawks felt even more strongly that the United States should launch air strikes against Soviet installations in Cuba, while the doves argued that the incidents revealed the dangerous instability surrounding the crisis and that accepting the Soviets' exchange offer would be the safest and sanest resolution of the confrontation (Blight et al. 1987).

The president at this time openly began moving more closely into the ExComm dove camp, fearing that a military response could lead to an uncontrolled escalation of armed responses and hence possibly a Third World War.

These ExComm deliberations throughout October 27 led Kennedy to accept a now legendary strategy advocated by several group members, but especially his brother. Kennedy's counteroffer, contained in a letter sent to the Soviets that evening, accepted the basic proposal made in Khrushchev's *first* letter to the Americans and expanded upon in subsequent unofficial contacts. In essence, Kennedy ignored the Soviets' second proposal to mutually withdraw missiles from Cuba and Turkey and accepted Khrushchev's earlier offer to withdraw the weapons from Cuba in exchange for an American promise to end the blockade and not invade the island (Allison, 1971; Giglio 1991).

Soon after sending the letter, Kennedy initiated secret overtures to the Soviets reporting that he already had made plans to *later* (in 4–5 months) remove the American missiles from Turkey. To be sure, the president clearly was in an extremely delicate bargaining position. On one hand, he wanted to win Khrushchev's acceptance of the American offer, and the most likely way for that to happen would be if the Soviets would not appear to be dramatically backing down from a confrontation. On the other hand, Kennedy himself could not appear to be yielding to Soviet

pressure. The president then would be open to outcries from congressional Republicans, his presidential challenger the next year, and a host of NATO allies. In sum, Kennedy needed to assure each side of *saving face* publicly (Allison 1971; Giglio 1991).

Waiting for a Soviet response to the American offer was almost unbearable for ExComm members, especially the president. Meeting that night, members considered their options should Khrushchev reject their offer. Hawks called for an immediate air strike followed by an invasion. Evidence revealed decades later suggested that Kennedy favored less drastic measures, such as possibly increasing the list of blockaded items to include petroleum products or asking the United Nations to request that the countries withdraw their missiles from Turkey and Cuba (Giglio 1991).

However, Khrushchev relieved the ExComm members' pressures early the following morning by accepting Kennedy's offer. The crisis had finally come to an end. Significantly, unstated in the public Soviet response was acceptance of the private pledge to remove the Jupiter missiles from Turkey.

12.8 Analysis of the ExComm Decision Making

One of the earliest analyses of the decision-making effort was written by Robert Kennedy and published in 1969, the year following his death. Of prime interest have been his explanations of the *lessons learned* from the crisis. Of particular note was his stressing the importance of empathy or of *placing ourselves in the other country's shoes* when formulating offers and counteroffers. In addition, the attorney general urged that crisis decision makers such as presidents should take as much time as possible to formulate their plan, should seek out an array of opinions, should especially consult those with well-developed expertise on the country(ies) in question, should always remember the aggressive eagerness of the military, should carefully monitor world opinion, should avoid humiliating other national leaders by furnishing them a face-saving mechanism, and should always avoid triggering an unanticipated chain of events escalating the crisis into a major conflict (as had occurred in the First World War) (Kennedy 1969).

The year Robert Kennedy's treatise was published, Graham Allison, a member of the Harvard faculty, published a journal article analyzing the administration's decision-making process during the crisis, followed 2 years later by the publication of a more thorough book-length treatment (*Essence of Decision: Explaining the Cuban Missile Crisis*). Allison produced one of the most widely discussed and influential analytical examinations of crisis decision making in American public life. The study was used extensively in university classes on policy making, bureaucracies, the presidency, foreign policy development, and institutional decision making to help educate a generation of scholars (Allison 1969, 1971).

A mainstay of Allison's effort was that he provided readers with *three* possible conceptual models (or *cuts*, as he termed them) for explaining and understanding decision making during that crisis. Readers then were free to compare and contrast the strengths and weaknesses of the explanations and, in turn, to learn from the unique contributions each offered to one's understanding of the decision-making process in that crisis. The first model, which viewed national leaders as rational actors seeking to attain specific policy objectives, was an approach traditionally taken in the analysis of foreign policy decision making. Allison's second model was based on analyzing organizational processes and focused on decisions as *outputs* of governmental organizations. Here the emphasis was on understanding an organization's routine decision-making apparatus and appreciating its standard operating procedures. Finally, Allison developed a "bureaucratic politics model that analyzes the behavior of either individuals or various branches of the bureaucracy. These are

looked at based upon how they bargain and maneuver in relation to other power centers in the bureaucracy. A key factor here is determining how individuals and/or bureaucracies maneuver to attain their personal or organizational goals (Allison 1969, 1971).

One of the many attractive aspects of Allison's analyses was his contention that the three models were essentially complementary and not rival explanations. For example, Allison notes that the *rational actor* approach viewed decision making from the perspective of the entire government, while the second approach looked at organizations within that government, and the *bureaucratic politics* approach examined the behavior of individuals within those organizations. Hence, analyses of decision making should look at *all* levels of behavior. The process of examining each level involved making a distinctive group of assumptions that, in turn, generated specific questions seeking to uncover information unique to that arena of analysis. The rational actor model saw the Soviets trying to strengthen their hand in Cold War nuclear deterrence by placing the missiles in Cuba. On the other hand, the Americans behaved rationally by employing a blockade as an interim step in exerting pressure, which ultimately rested upon the possibility of deploying the United States' massive nuclear arsenal. The organization theory and bureaucratic politics approaches focused on how those decisions were implemented by considering how the responses fit into the daily operation and policy goals of American government agencies and their leaders. In sum, the subsequent two models indicated that neither the United States (nor the Soviet side, for that matter) was as rational or as monolithic in its decision-making processes as the rational actor model indicated (Allison 1971). For example, contrary to the president's orders, the US Navy shadowed and forced to the surface several Soviet submarines in that region. And the Soviets, contrary to orders from Moscow, shot down a U-2 spy plane flying over Cuba.

Although the overwhelming bulk of the literature produced in reaction to Allison's analysis was complimentary and even laudatory, Jonathan Bendor and Thomas Hammond produced a sobering dissection of the original study. In sum, while Bendor and Hammond pay homage to the many contributions of Allison's analyses, they are critical of many of the details of his models. They maintain that Allison made several methodological errors in developing his models and that in several cases his assumptions simply are incorrect or, at least, significantly misleading (Bendor and Hammond 1992). Yet their critique notwithstanding, Allison's work remains important at minimum because it leads others to seek alternative and multiple-layered explanations for crisis decision making.

Another modern *classic* study of the ExComm crisis decision-making process was written by Irving L. Janis, a member of the Yale University faculty. His study, which defined and subsequently popularized his concept of *groupthink*, was particularly useful for several reasons. First, his groupthink theory introduced elements of social psychology into the political, legal, and historic issues previously considered in studies of the Cuban missile crisis. In addition, Janis featured in both editions of his book case studies contrasting ExComm decision making in the Bay of Pigs debacle with the effort of nearly the same group of men later in the Cuban missile crisis. Readers were given an opportunity to see how ExComm members, especially the Kennedy brothers, learned from the mistakes made in the Bay of Pigs decision-making process (Janis 1982).

In sum, Janis's concept of groupthink is exemplified when members of a group, assigned to make a decision, work so hard at attaining unanimous agreement that they abandon efforts at seriously and objectively evaluating rival courses of action. Internal peer pressures to conform to the thoughts and goals of the group then become the overriding norm driving members' thought processes. Noteworthy symptoms of groupthink include the feeling of members that the group is invulnerable; a ready collective effort to rationalize and hence discard any effort to compel members to reconsider their assumptions, stereotyped negative views of rivals (e.g., as being

either weak or incompetent); overriding belief in their group's *inherent morality*; the placing of immediate pressure on any group member seeking to dissent from the groups' prevailing views; a parallel *self-censorship* prohibiting members from expressing dissenting views; widespread pressures to agree with the group, creating a *shared illusion of unanimity*; and the eventual appearance of *self-appointed mindguards* in the group, who block the flow of any information adverse to the group's assumptions (Janis 1982).

Janis's treatment of Cuban missile crisis decision making has been especially useful because of the efforts of ExComm members, particularly the Kennedy brothers, to identify and overcome the pitfalls of groupthink. They carefully sought out rival views or, when such views might not be available, played *devil's advocate* to attempt to create challenges to burgeoning majority views. Indeed, such efforts undoubtedly contributed to the lengthy and chaotic sessions that so dispirited some consensus-seeking members. The president avoided some meetings to assure that members would feel free to air their views without fear of possibly alienating him. In addition, his brother on several occasions would ask challenging questions, even confronting views he shared, to make sure that ExComm members considered as many perspectives as possible (Janis 1982). In sum, ExComm's decision-making process in the Bay of Pigs case was a classic example of *groupthink*, while the decision-making procedure in the Cuban missile crisis was a perfect example of overcoming the hazards of groupthink.

A broader analysis of the Cuban missile crisis decision-making effort has been provided by James Blight, Joseph Nye, and David Welch, some of Allison's Harvard colleagues. Writing more than two decades following the intense days of October 1962, the three men examined the proceedings of a seminar in March 1987 composed of a number of former ExComm members gathered with several scholars. The authors' bemoaned the fact that there was little agreement on the crisis-management lessons that the Cuban missile crisis case study could offer decision makers today (Blight et al. 1987).

However, Blight and his colleagues praised the list of *lessons learned* presented by Robert Kennedy not long after the crisis. The three Harvard scholars then added their own—courtesy of two decades of hindsight—*updated* list of five lessons learned from ExComm's crisis-management effort. First, they urged avoidance of similar superpower nuclear confrontations in the future, because another such crisis might lead to disaster. Second, they urged that decision makers avoid having *rigidly preconceived world views*, because these could possibly fatally damage their ability to analyze information gathered during a rapidly changing situation. Third, they emphasized the inadequacy of rational models of deterrence. Actors on either side of such a confrontation have rarely been found to be as *rational* as the model suggests they should be. Fourth, the authors urged that senior administration officials work hard ahead of time at preparing themselves to make crisis decisions that may be called for later. Finally, the scholars maintained that the crisis outcome revealed the importance of the United States having a nuclear deterrence capability. Blight and others maintained that fear of massive retaliation from the American nuclear arsenal helped compel the Soviets to end the crisis largely on the terms sought by President Kennedy (Blight et al. 1987).

Finally, Paul Anderson produced a distinctive analysis of administration decision making during the crisis. Examining primarily archival evidence of the decision-making process during the Cuban missile crisis, Anderson developed a theory of *decision making by objection*. He maintained that crisis decision makers were governed by three primary factors. First was an intense desire to avoid a failure (in terms of either igniting a nuclear war on one hand or of failing to get the missiles removed from Cuba on the other). In fact, their fear of failing was greater than their desire to attain a measurable success in the venture. In addition, throughout the crisis, decision

makers were confronted with making a series of mostly dichotomous choices from among a number of nonrival options for action. These choices tended to be made in sequence, so that the process of selecting from among two alternatives would present decision makers with a new pair of alternatives—which, after a decision, was made—would present still another pair of alternative courses of action, etc. Finally, the process of making each of these decisions led decision makers to discover new goals as they went along. For example, ExComm initially only had the goal of showing America's commitment to removing the missiles from Cuba. But during the process of deliberation, ExComm uncovered other goals, such as avoiding being the aggressor in a Pearl Harbor-type attack and providing Khrushchev with a political face-saving *out* (Anderson 1983).

In sum, Anderson maintained that his model was better able than Allison and other efforts to explain this crisis decision making. His model *captures the ambiguity and change in preferred courses of action* in the crisis decision-making process. The ExComm exhibited group decision making by *argumentation and debate*, as its members moved from selecting between one pair of choices to the next pair of choices. However, such a decision-making process is not foolish behavior, because to attempt to choose from among a larger array of choices could *overwhelm the limited information-processing capacity* of the ExComm members (Anderson 1983: 218–220). Hence, their meetings, while appearing chaotic to some, could be said to be a productive approach to making important decisions under great pressure.

12.9 Conclusions

There are at least two reasons why the decision-making processes of President Kennedy and ExComm likely will long endure as a prime example of performing well under intense pressure. First, the participants clearly attained their goal of forcing the removal of intercontinental missiles from Cuba while simultaneously avoiding escalating their confrontation with the Soviet Union into a Third World War. For the American side at least, the story had a happy ending. Second, an abundance of information has since been made available, enabling scholars to study details of the event. There is an abundance of evidence (such as correspondence, official documents, and memoirs) for observers to sift through. Finally, the natural and intense drama inherent in the crisis has added something of a mystique to the events of October 1962.

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Chapter 13

Collaboration, Consolidation, and Coordination in the Broward Sheriff's Office

A New Paradigm in Public Safety and Emergency Management?

John Carroll and Leslie Taylor

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13.1 Introduction

The public administration literature on collaboration has focused mainly on discussing the collaborative relationships between multiple agencies as networks, intergovernmental and interorganizational relationships, and the issue of governance that expands the interpretation of government to include external stakeholders such as contractors, the private sector, and nonprofit organizations (cross-sector collaborations) (Bryson et al., 2006). After the events of September 11, 2001 (9/11), the literature has made an assessment of the strengthened relationship between law enforcement agencies at all levels of government (Agranoff and McGuire, 2003) and reviewed the increase in interagency cooperation at the state and local level. This chapter attempts to add to the literature and discusses collaboration in the context of consolidating the operations of two agencies, which the authors argue is a *new* model of collaboration within the public safety/emergency management arena after the events of 9/11.

The concept of national security has evolved in the wake of the events of 9/11 as some responsibilities have shifted from the federal government's intelligence, law enforcement, and border control agencies to state and local actors. The fundamental lesson learned was that state and local governments are in the forefront of the response to terrorism and disasters and they are increasingly tasked to key roles in homeland defense. This clearly indicates a paradigm shift in the way law enforcement contemplates emergencies regarding terrorism and homeland defense. The fact that local governments are now tasked with a homeland security role necessitates a reexamining of the way emergency and public safety agencies execute their duties. This chapter takes the position that the threat posed by domestic and international terrorism and natural disasters will require public safety and emergency management institutions at the local level to establish regional collaborative structures to address these complex issues.

13.2 Collaborative Management

Several definitions have been offered to describe collaboration. Linden (2002) describes collaboration as occurring "when people from different organizations (or units within one organization) produce something together through joint effort, resources, and decision making, and share ownership of the final product or service" (p. 7). Bardach (1998) on the other hand defines collaboration as "any joint activity by two or more agencies that are intended to increase public value by working together rather than separately" (p. 8).

Agranoff and McGuire's (2003) definition of collaboration however is apt in describing the relationship between the Broward Sheriff's Office (BSO) and the Broward County Fire Rescue (BCFR) that merged its operations in 2003. According to Agranoff and McGuire (2003), collaborative management "describes the process of facilitating and operating in multi-organization arrangements to solve problems that cannot be solved, or solved easily, by single organizations. [It] is a purposive relationship designed to solve a problem by creating or discovering a solution with a given set of constraints" (p. 4). The authors suggest that the buzzword for the twenty-first century is interdependence, which when combined with the salience of information results in an "environment where organizational and sectoral boundaries are more conceptual than actual and collaborative managerial responses are required to complement and in some cases displace bureaucratic processes" (p. 4). More than 10 years into the new century and combined with a deepening fiscal crisis demonstrates the importance attached to collaboration and other innovative ways for local and state government to balance service and budget needs.

The authors view collaboration as much more expansive than cooperation. While cooperation and collaboration means working jointly with others, collaborative management entails “engaging one or more organizations in a purposive and official partnership or contractual arrangement ...” (p. 4). This view is also shared by Gray (1989) who views collaboration as a more integrated process “through which parties who see different aspects of a problem ... constructively explore their differences ... search for solutions that go beyond their own limited vision of what is possible” (p. 5).

In discussing collaboration, Kettl (2006) traces the historical antecedents of boundaries in government and the central role it has played in American public administration. He writes that boundaries define “what organizations are responsible for doing and what powers and functions lie elsewhere” (p. 10). The classic trade-offs according to the author have been reconciling vertical boundaries that stresses hierarchy and authority to horizontal boundaries where decision making is fluid and street bureaucrats have the flexibility to make decisions. He asserts that “the challenge is determining how best to draw boundaries to deal with situations in which even the best decisions can seem arbitrary and produce conflict between top-level control and operating-level flexibility” (p. 12).

Kettl (2006) rhetorically asks whether the traditional notions of boundaries have limited government’s capabilities to deal effectively with important and inescapable issues such as terrorism, pandemic, or climate change. Rauch (1994) calls this *demosclerosis*, a progressive loss of government’s ability to adapt and respond to new issues. Kettl (2006) writes “we are facing a growing set of inescapable issues, that the agencies charged with managing these programs have boundaries that do not fit the problems well, and that the mismatch of boundaries and problems is causing growing performance problems” (p. 13). Kettl (2006) suggests that the nature of current *wicked* problems such as hurricane Katrina and September 11 demands far-reaching cross-agency and cross-jurisdictional action on a wide scale. There is a need according to the author to devise “new strategies to bring public administration in sync with the multiorganizational, multisector operating realities of today’s government ...” (p. 17), and this requires a collaborative, network-based approach.

Goldsmith and Eggers (2004) also argue that the hierarchical government bureaucracy model used to deliver public services and implement public policy goals in the twentieth century is obsolete. In line with similar suggestions made by O’Toole (1997), Goldsmith and Eggers (2004) opine that in place of bureaucratic government, public officials have developed new models of governance as society has increasingly become complex. The authors write “the traditional, hierarchical model of government simply does not meet the demands of this complex, rapidly changing age. Rigid bureaucratic systems that operate with command-and-control procedures narrow work restrictions, and inward-looking cultures and operational models are particularly ill-suited to addressing problems that often transcend organizational boundaries” (p. 7). Although the author’s networked model of governance (which includes a wider array of agencies organized across the three levels of government and public–private collaborations) is being utilized in a narrow sense regarding the consolidation of BSO and BCFR, the description of this relationship being a new model of governance at the local level is useful when discussing emergency management and public safety.

The change in the bureaucratic model of government is also discussed by Kamensky et al. (2004) who write that collaboration through the use of partnerships “appears to have staying power” (p. 5) but more importantly, the new model “places increased emphasis on services and results” (p. 5) instead of agencies and individual programs that are managed by separate agencies. The authors suggest that the new model organizes around customers and outcomes rather than a focus on agencies and programs. Linden (1992) referred to this change as the *quiet revolution* that is characterized by the emergence of the seamless organization, an organization that the author describes as being fluid, agile, integrated, transparent, and connected (p. 4). Linden (1992) also writes that organizations and agencies are now shifting the emphasis on change from *within* to *between*.

One of the factors put forward by Van de Ven and Walker (1984) for understanding the kinds of organizations that are likely to engage in a dyadic relationship is domain similarity, which the authors define as “the degree to which organizations have the same services, clients and personnel skills” (p. 601). The authors further expound on this concept and write:

when organizations have moderately similar domains, they are likely to have complementary resources, which motivates them to communicate more frequently in order to negotiate quid pro quo arrangements that are mutually beneficial to the parties involved. Furthermore, organizations with moderately similar professional skills, clients, and services represent a common culture of shared meanings, which facilitates communications. (p. 601)

This common culture of shared meanings in the case of the BSO and BCFR merger as with all other first responder services is enhanced by a common language of understanding and a common purpose to manage disasters and crises. The authors however caution that organizations with highly similar domains tend to hinder the potential for interorganizational relationship to emerge. They hypothesize that moderate domain similarity and resource dependency stimulate interorganizational communications.

Several authors have discussed and described different forms of collaborative management structures (Powell, 1991; Cigler, 1999; Mandell, 2000; Milward and Provan, 2000). In developing a typology of collaboration, Mandell and Steelman (2003) provide a number of different types and identify their characteristics. The authors identify five different types:

- Intermittent coordination that occurs when policies and procedures of two or more organizations are adjusted mutually to accomplish some objective. This forms a low level of interaction and commitment on the part of organizations. This form of organizational arrangement is often utilized in dealing with disasters with the coordination of activities of various agencies.
- Temporary task force is established to accomplish a purpose(s) but differs from intermittent coordination in terms of the specific focus and tasks to be accomplished. It is set up for a specific purpose and disbands when the task is accomplished.
- Permanent and/or regular coordination occurs when a formal arrangement is established between two or more organizations. It requires commitment of resources beyond information sharing and involves common goals. Requirements on activities and relationships are formalized in terms of resource sharing, and there is some degree of commitment of each member regarding time, staff, and facilities.
- A coalition occurs when interdependent and strategic action(s) are taken. However, the purposes are narrow in scope and actions occur within the participant organization. Resources are committed to the collaboration and involve long-term commitment.
- Network structures take on broad tasks that reach beyond the simultaneous actions of the independent operating organizations. There is a strong commitment to overriding goals, and members commit significant resources.

13.3 Fire Services–EMS/Law Enforcement Regional Consolidation

At the time the original merger proposal was drafted, the following points from the National Fire Protection Association (Karter, 2001) were used to illustrate activities:

- Fires and civilian fire deaths have generally been declining over the past two decades.
- Civilian fire deaths in 2000 were 4045, a 38% reduction from 1980.
- Since 1980, fire calls have fallen 43%, while medical aid calls, false alarms, mutual aid, and other calls more than doubled.
- There were 1,064,150 firefighters in the United States in 2000. Of these, 286,800 were career (full-time) and 777,350 were volunteers.
- The majority of career firefighters are in communities that protect 25,000 or more people. More than half of all volunteer firefighters are with small, rural departments protecting fewer than 2500 people.
- From 1986 to 2000, the number of hazardous materials calls handled by fire departments increased 86%, to 319,000 calls.

Since the time the proposal was presented, several updated figures have been gathered from the National Fire Protection Association (Karter and Stein, 2010):

- In 2009, there were 1,148,100 firefighters in the United States working in 30,165 fire departments.
- A total of 812,150 (or 71%) were considered volunteers and 335,950 (or 29%) were considered career full-time firefighters.
- A percentage of 59 of the 30,165 fire departments provided emergency medical services (EMS).
- Fire protection costs rose 111% from 1986 to 2008, while the number of career firefighters increased by 41%.
- In 2008, fire protection nationally cost 39.7 billion dollars.
- Reported fire deaths have decreased by 59% since 1977.
- In 1980, there were 10,819,000 calls for service; in 2009, there were 26,534,500.
- In 1980, response to fires accounted for 28% of calls for service; in 2009, fire only comprised about 5% of calls for service.
- In 2009, almost two-thirds (64%) of calls for service were medical aid or EMS.

Over the last three decades, it is clear the fire services have changed considerably in size and service delivery. The fire services go far beyond the popular notion to simply *fight fires*. Despite the growth in the fire services over the years, or how an organization is structured, a fire department has the following four basic functions: fire suppression, fire prevention, special services, and support functions (Lavoie, 1988: 37). As noted previously, about 59% of fire departments also provide EMS services. Fire suppression operations have three basic functions: (1) rescue; (2) work involving the ladder, forcible entry, and ventilation; and (3) the application of water through hose lines. Rescue and ladder companies handle the first two and engine companies the third (Granito and Dionne, 1988: 119). Fire prevention includes education programs, while special services include dive/rescue, hazardous materials, technical rescue, and others. Support functions may include communications, administration, and logistics.

According to Coleman and Granito (1988), current trends in the fire service fall into a number of categories: “consolidation and regionalization of resources; conflict between generalization and specialization of personnel; less rigid management approaches; technological improvements; and continuing emphasis on built-in fire protection” (p. 474). As we already know, local government bears the brunt of funding fire and police services. To help offset the rising costs of fire services, a number of local governments have looked to consolidation and regionalization as options.

For example, in Orange County, California, a variety of regional ideas have been explored and successfully implemented. Regional police and fire dispatching programs have been developed, regional airborne law enforcement helicopter services have been tried, regional radio repair facilities have been built, and countywide auto theft, gang, and narcotics task forces have been formed, to name a few. One extremely effective tool, developed through the use of California Office of Criminal Justice Planning (OCJP) grant funds, was a regional crime analysis unit (Cope et al., 1998).

One of the true measures of savings in a police service agreement is the *economies of scale* offered by the regionalization of BSO ancillary countywide services. Many agencies have been selected to provide this range of services on their own and bear the burden of costs. In other words, costs are spread over a much larger quantity, which reduces per unit or per activity cost. The savings are passed on as a reduced cost to the county and thus the taxpayers.

The BSO has employed the regionalization philosophy since 1978 to improve services, while containing costs. The law enforcement services began merging a number of municipal police departments into the agency through agreements with city commissions. The first municipality, Lauderdale Lakes, merged in 1978. At present, there are 15 cities under contract for services. Law enforcement support services were then structured along regional lines for better accessibility to those cities.

Consolidation and regionalization in fire services are evidenced by the increasing number of organizations that are engaged in contracts and regional consolidations to compensate for increased costs of personnel and equipment. These arrangements often improve the efficiency and effectiveness of fire services in the region (Coleman and Granito, 1988: 474–475). There are four types of consolidation:

- Full consolidation: A single, unified force where each officer is fully cross-trained in both firefighting and law enforcement. Individuals may, however, have specialized assignments, such as fire ground commander or juvenile detective.
- Partial consolidation: Separate police and fire services with a special patrol cross-trained.
- Functional consolidation: Separate police and fire agencies with no cross-training, but with some consolidation of administrative functions (e.g., records and communications).
- Nominal consolidation: Separate police and fire entities, but with one command structure.

Several research sources have offered support for consolidation. Administrative overhead costs may be reduced, which enables additional trained staff to be available for critical incidents and create a single hierarchy of command (Cities and Towns, 1986). Slahor (1992) argues that, when it succeeds, consolidation is effective and efficient. Matarese (1987) termed it a nothing less than a revolution, and Rule (1989) identified elements where consolidation may be successful.

Kenneth Chelst is credited with developing the first quantitative analysis model to measure the effect of a police/fire merger. His research suggests that, in a properly designed consolidation, public officials can expect not only a reduction in costs but also a significant reduction in response times to both police and fire activities—a measure routinely used to evaluate police and fire departments' performance (Matarese, 1987).

The most commonly referred to form is the full consolidation, with law enforcement and fire fighters cross-trained in a *public safety* model. According to Matarese and Chelst (1991), this concept has not really taken hold in local government, and a high proportion of attempts were later abandoned. More successful public safety models were observed in new communities that began with the concept or those communities transitioning from a volunteer to a professional fire

service. Less successful were those local governments where the separate police and fire entities already existed and were merged along the full consolidation model. Operational issues were not the reasons when consolidation was discontinued. Coleman (1984) notes a number of barriers to overcome in consolidation: legal restrictions, labor relations problems, political opposition, low morale, high turnover, administrative and operational difficulties, and reduction in public service activities (p. 36).

Burkell (1986) concluded in his study that there was no direct corollary between the delivery of fire, police, and emergency medical and other public services and the presence or lack of presence of a public safety director. Rubin (1984) concluded that for any consolidation to succeed, there must be cooperation, particularly between labor and management. The BSO–BCFR model is a hybrid form of the partial and functional consolidation models. Essentially, the services were intended to and continue to remain separate. Specialized cross-training for joint functions and a consolidation of some administrative and support functions took place following the merger.

13.4 Capitalizing on Collaboration: Broward Sheriff's Office Case Study

Broward County is the 15th most populous county in the United States and second most populous in Florida. The county has more people than 16 US states. According to the 2010 census, the county is home to almost 1.75 million people and is projected to grow to almost 2.3 million by 2035 (Broward County Planning Services Division, 2009).

The BSO has more than 5300 employees (sworn and non-sworn) in three operational departments: law enforcement, detention and community control, and fire rescue and emergency services. The agency patrols about one-third of the Broward population and provides emergency and dispatch services to about half the population. The agency also provides law enforcement services to all unincorporated areas, 15 contract cities, the Fort Lauderdale/Hollywood International Airport, and the seaport (Port Everglades). It controls and manages the 13th largest local jail system in the United States (Bureau of Justice Statistics data for 2010). In addition to the provision of law enforcement, county jail services and civil service, and court security to the residents of Broward County, BSO provides *nontraditional* regionalized services—County Probation Division, County Pretrial Division, State Child Protective Investigations, Juvenile Assessment Center, Crime Lab, DUI, Fire Rescue, and Emergency Medical.

The impetus for the BSO 2002 consolidation proposal to the Broward County Commission was based on the culmination of several focusing events from which law enforcement and fire rescue professionals have learned some costly lessons over the years. The ability to meet emergencies in Broward County has become more complex. A number of events helped shape the merger proposal when it was presented in 2002. For example, public safety agencies in Broward have long trained for hurricanes. In 1992, hurricane Andrew created a focusing event for emergency services like no other natural disaster in South Florida before it. The devastation in Miami-Dade County was widespread and beyond the capabilities of local government to handle in a sustained effort. Two of the most fundamental lessons learned from this event were the need for better communications and control between emergency services, and it will be 6 h or more before substantial help will arrive to assist local government. Therefore, local agencies must be able to work together and talk to one another during this critical time.

For the purposes of this discussion, we will consider two fundamental types of disasters/emergencies: *natural* and *man-made*. Natural includes events such as earthquakes and hurricanes.

Man-made may be considered in two categories: *accidental* and *intentional*. Accidental events include crashes and infrastructure failure, while intentional events may resemble accidental or even natural events but are actually criminal actions designed to cause damage, injury, or death, such as acts of terrorism. Natural disasters are certainly a concern, but in the context of collaboration, man-made disasters cannot be overlooked. Accidents, such as the 1996 crash of Value Jet Flight 592 near the Broward/Miami-Dade County lines in the Everglades, caused the branches of local emergency services from varied jurisdictions to work closely together. BSO aviation and dive resources were deployed alongside Broward fire/rescue assets and their Miami-Dade counterparts to manage the recovery of the crash site.

Intentional disasters have changed the complexity of local government emergency services response. For example, on April 19, 1995, a truck bomb destroyed the Alfred P. Murrah Federal Building in Oklahoma City and killed 169 people, many of whom were women and children. This act was one of domestic terrorism. In April 1999, two students killed 13 people at Columbine High School in Littleton, Colorado. The analysis of both *intentional* disasters again cited communications, unified command at the scene, and recognized that help from resources beyond local government is many hours away.

Disasters have the common thread of being *focusing events* on local government. Birkland (1997) defines a focusing event as a sudden, unpredictable event that influences the public policy process. Clearly, this phenomenon occurs in any of the three types of disasters discussed in this chapter. September 11, 2001, changed the way we think about critical incident response by local government's emergency services. However, it was the terrorist attacks of 9/11 that were the most influential focusing events.

One recurring theme in the focusing events is that the local government emergency services would be responsible for managing the response by relying on local resources. Figure 13.1 depicts a response timeline for critical incidents. The source for this chart is the International Association of Fire Chiefs. The key element of the *Golden Hour* is recognized in emergency management as the critical period when a patient must be stabilized to greatly enhance chances for survival. Second, it is not unreasonable to assume that resources from outside local government will not arrive for at least 6 h. This means the local emergency services must work closely together to maintain the initial rescue and recovery efforts at the scene—essentially to hold the line until additional outside resources arrive.

The collapse of the World Trade Center towers on 9/11 demonstrated to public managers the value of unifying command posts, using common communication systems, and that better coordination between New York City's police and fire departments would have reduced the loss of life. The McKinsey Report (2002) developed recommendations for change to enhance both the New York Police Department and Fire Department of New York preparedness levels. The report also documented the problems of communications, overcrowded radio frequencies, interagency coordination, the complexity of resource management, insufficiency of record keeping, and the lack of planning and logistical capabilities. The 9/11 Commission Report (2004) affirmed the McKinsey Report of systematic failures in communications, information sharing, and command and control.

Following the 9/11 terrorist attacks, the Broward Sheriff was appointed by the governor to chair the newly formed Regional Domestic Security Task Force for Southeast Florida and its almost 5.5 million residents. An internal *task force* was established to analyze the lessons of 9/11. From these perspectives, it was noted that emergency services were more similar than different—with a number of crossover functions, such as hazardous materials response, aeromedical rescue, bomb and arson investigations, code enforcement and investigations, homeland security planning/response, ocean-borne rescue and recover, response to hurricanes and other disasters, patient care, and transport and special events.

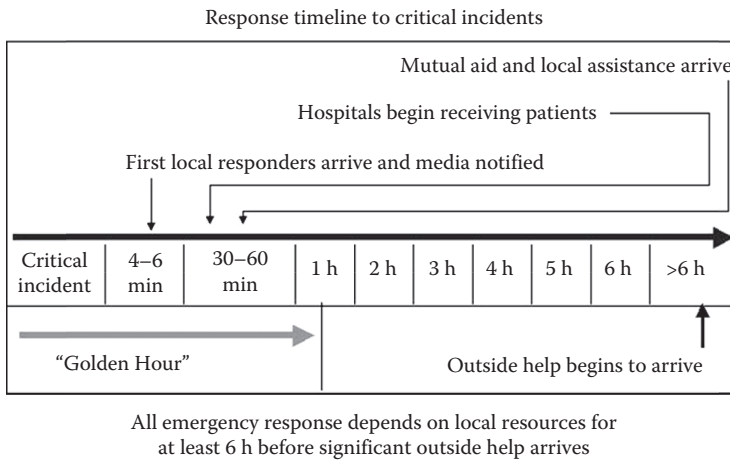


Figure 13.1 Response timeline to critical incidents.

This in turn led BSO to begin formulating the concept to integrate the County Fire Rescue Division with an organization already nationally recognized in law enforcement, detention, and community control. This was not simply a revisit to the traditional *public safety officer* model of dual-certified police/fire employees, rather recognizing that creativity could be applied to the national problem of intergovernmental coordination. By combining these services, they could be better providers across a wider spectrum and more cost efficient for the taxpayer, as well as address issues raised during focusing events. After a great deal of planning and spirited debate, the Broward County Board of County Commissioners approved the contractual by merging the operational and administrative responsibilities of its Fire Rescue Division with the BSO.

13.5 Why Consolidate?

BSO is tasked at the county level to provide law enforcement services to unincorporated areas and correctional services and has contract arrangements with several local jurisdictions. The Broward Sheriff is a state constitutional officer and an elected position. At that time, the BCFR was an agency of county government, reporting to the county commission. BCFR is also tasked with providing emergency and fire rescue services at the county level. As such, the merger was aimed at blending the strengths of two providers of county-level services allowing the county to better prepare and respond to critical incidents, as well as increase administrative efficiencies. The consolidation of the two providers created a condition to realign emergency management and public safety to deal with terrorist threats, weapons of mass destruction (WMD), and chemical and biological proliferation.

As mentioned earlier, the events of 9/11 and other disasters show the critical importance of maintaining communication across multijurisdictional boundaries and with first responders. The improvement of emergency communication and response became a key factor in the merger between BSO and BCFR. Although the two agencies had jointly worked in the past on several major events, the two agencies were working on different communication and data systems that hindered interoperability. The merger has allowed the agency to deal effectively with natural disasters and show that the best way to protect the public is when first responders join forces, train and plan together, and unify their command structures.

There were other salient reasons for collaborating with BCFR other than the need to better prepare for and successfully manage disasters and crises. The provision of emergency services and public safety are two of the most expensive services a local government can provide for its residents. According to Lawrence (1997), the public safety sector of government consumes a large share of budget expenditures, and there is a need for innovations in service delivery as a result of the amount of resources allocated. There is a need therefore for these agencies to improve their efficiency and cost-effectiveness that creates the conditions to improve service delivery.

The merger achieved through the elimination of both duplicative functions, instituted joint professional training by realigning the training department, and reduced replacement and maintenance costs. Furthermore, service integration provided economies of scale in many areas, namely, liability, risk management, purchasing, fleet control and maintenance, and grant writing. Management consolidation of other functions such as human resources, legal, finance and budget, professional compliance, and training and maximizing the use of county facilities reduced transaction costs and provided long-term savings for taxpayers.

Competition between agencies and local governments for federal and state support specifically for homeland security and emergency planning grants/funds is quite high. The intent of the merger was to provide an opportunity for the agency to optimize the share of national and state capital to increase and improve service delivery to residents. The goals of the merger can be summarized as follows:

- Improving interoperability within the agency and communications between first responders
- Aligning data systems that will ultimately improve data sharing among first responders
- Increasing terrorism preparedness by doing joint counterterrorism and rescue training
- Providing the countywide public safety responders with a clarity in the chain of command during events
- Establishing and implementing an integrated disaster response plan and incident command system

13.6 On Common Ground: Joint Operations

As mentioned earlier, the focusing events of 9/11 allowed the BSO and BCFR to jointly analyze the lessons of changing disasters and find common ground between the agencies to improve services throughout the county. The foundation of the proposal was not to establish an agreement in response to the focusing events of 9/11 but to acknowledge those events that helped foster the notion that there is much more common than uncommon ground in what the agencies do. The following list demonstrates where the services of both agencies intersect:

- First response
- Incident command
- Aeromedical rescue
- Joint arson investigations
- Police and fire records and information management system
- Police and fire communications system
- Dispatch/call taking
- Joint service location to the Florida Everglades
- Juvenile fire setters program and other educational programs
- Dive/rescue and recovery response (BCFR = rescue, BSO = recovery)

- Incident command/management systems
- Accidents involving BCFR vehicles/apparatus investigated by BSO traffic homicide
- Concept of regionalized operations
- Unified medical direction for public safety
- Hazards of the job and stressors to emergency services workers and first responders
- Unified incident command structure

Beyond the joint operations are the lessons learned from training and education. For example, the International Association of Fire Chiefs and the International Association of Chiefs of Police are offering a series of courses designed to help fire service and law enforcement agencies work together during emergencies. In addition, the Constitution of the Sacramento County Fire Investigation Unit requires cross-training between fire and police personnel in all areas relevant to the successful conclusion of fire investigation.

Ann Simank, when she was a city council member in Oklahoma City and chair of the League of Cities Public Safety Panel, insisted region-wide training for emergency service workers is imperative (Pierce, 2001). Matarese (1987) notes that appropriate training and personal protective equipment for police, EMS, and fire should be purchased to protect these first responders in the event of a terrorist attack. Local hazardous materials response teams should expand the capacity to assess and respond to releases of chemical weapon agents.

Finally, the International Association of Fire Chiefs (2002) maintains that planning and training for the consequences of a terrorist attack should be performed at the local level. This effort should involve fire, police, EMS, emergency management, nursing, emergency physicians and surgeons, hospitals, poison control centers, and other appropriate agencies and specialties. Lessons learned from events such as the 1996 Atlanta Olympic Games clearly proved the need for multiagency and multi-specialty planning.

BSO and BCFR training divisions each brought a unique set of skills, experiences, and backgrounds in the areas of training, especially in the areas of WMD and antiterrorism. Expertise also extended to seaport and airport incidents utilizing special operations personnel from both fire rescue and law enforcement. Some of the merged training included the following:

- Working to reduce overlap and duplication of efforts, such as a reduction in number of class offerings when department staff can attend jointly offered training.
- Joint training in the principles of evidence collection enhanced awareness for responses to potential crime scenes and protecting the chain of evidence. Responses to an act of terrorism would greatly enhance the ability to perform evidence collection in a contaminated environment (Bio-Chem) with BSO personnel trained, certified, and operational at HAZMAT Level A and Level B capabilities to maintain chain of custody for evidence collection.
- BCFR and BSO have the ability to deliver joint public education to homeowner's groups, businesses, and municipal organizations through partnerships. Public education programs include CPR/AED, First Aid, Neighborhood Crime Prevention and Fire Safety, and Citizen Emergency Response Teams (CERTs).

13.7 Organizational Processes

Service integration can be daunting especially when the agencies to be merged have different cultures and administrative processes. One of the ways BSO tried to achieve organizational

socialization was to develop learning work teams at the start of the merger initiative to develop new ways to solve administrative issues and work through realignment problems. These teams developed relationships and helped to bridge the cultural gap.

It was also realized that creating a high-performance agency with committed and motivated employees, BCFR employees were given the opportunity to develop a new mission and statement of purpose that reflected the BSO philosophy. It was a way for every new employee to internalize the values established by the merger initiative.

One of the many tasks of the agency was to realign the policies and procedures of two separate agencies. The BCFR had a completely different set of manuals—operations and procedures manual (OPM), while the rest of the agency utilized the policies and procedures manual (PPM) and standard operating procedure (SOP). BCFR collective bargaining union contracts take precedence over the OPM. The challenge was to integrate all of these into a coherent set of policies and procedures.

A new set of PPM was developed that applied to every employee within the various departments, and a separate SOP was developed for fire rescue. The objective was not to change the way the department does business because of the unique nature of what it does, rather a separate SOP maintained the department specialty. The goal was to integrate and develop common policies for all employees while recognizing the uniqueness of each operational component. There were, inevitably, some conflicts and issues that were raised and resolved.

13.8 Organizational Structure

With the merger, BCFR moved its 555 employees (441 uniformed and 114 support personnel) into BSO, and all property and equipment were also transitioned. The move created a stand-alone department of fire rescue and emergency services within the BSO. The merger created an operations-based organization: Law Enforcement, Detention and Community Control, and Fire Rescue and Emergency Services (Figure 13.2).

The merger structure contributes to organizational effectiveness because it provides the agency with the flexibility for the various units to exercise their functions but at the same time allowing the agency to realign some of its operational areas. The functional approach along operational components allows each to keep its identity as a different function while keeping an eye to the overall goals and objectives of the agency.

13.9 Accountability through Performance Measurement

At the center of effectiveness and efficiency is accountability, which is gained by establishing and evaluating performance measures. The Austin Fire Department (Austin, Texas) has experienced success with the performance-based management approach (Kinsey, 2002). Prior to establishing measures, the goals and objectives of the agency must be understood. Granito and Dionne (1988) suggest that community fire protection calls for a variety of goals and objectives, including the following:

- Acceptable level of risk of fire loss, averaged over a period of several years
- Acceptable level of risk of loss of life due to fire, averaged over a period of years
- Types and scope of emergency services to be provided by the *fire department*

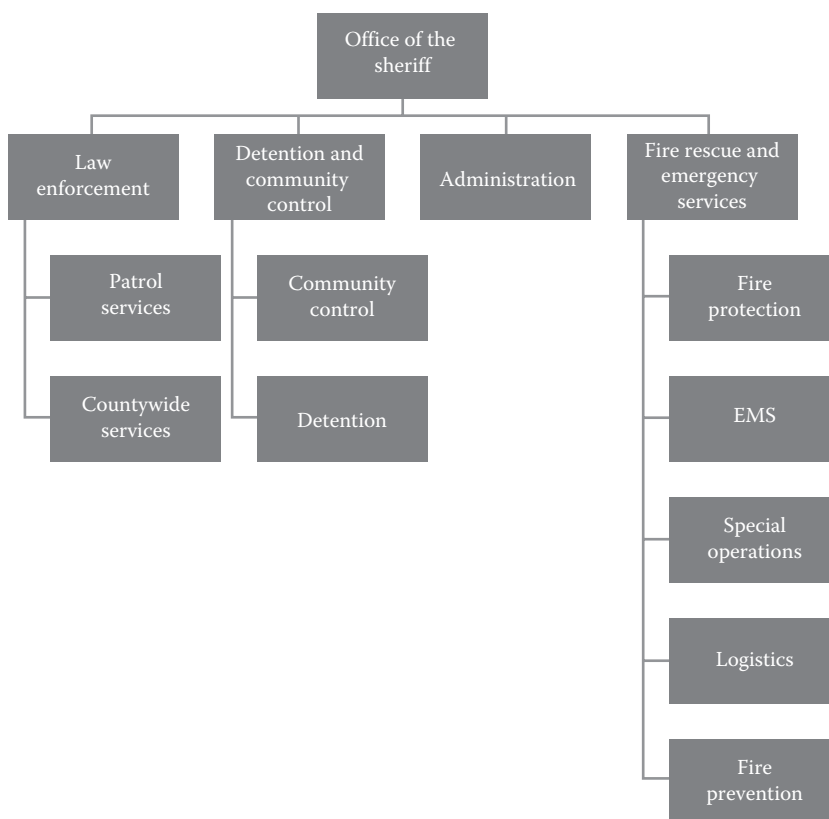


Figure 13.2 Broward Sheriff's Office consolidated organizational chart.

- Number of suppression personnel constituting a first alarm assignment
- Number and types of fire suppression vehicles for a first alarm assignment
- Amount of elapsed time allowed between receipt of an alarm at the dispatch center and the arrival of the initial or full first alarm assignment at the various zones within the district and the various high-hazard locations such as schools and hospitals
- Emphasis to be placed on comprehensive fire protection activities including code development, enforcement, and administration, as well as public education
- Type of staffing arrangements, especially for suppression services, including any volunteer or part-time paid personnel
- Organizational structure and general administrative arrangements for the fire department and related support services (pp. 101–102)

The International Association of Fire Chiefs (Bruegman, 1993) has developed an accreditation evaluation system that contributes to improved program planning, operational execution of programs, and services provided by fire service agencies. As the nation's largest fully accredited Sheriff's Office, an additional accreditation process for the fire services would receive very close attention. The agency successfully completed and achieved the Commission on Accreditation of Ambulance Services gold standards for Medical Transportation Industry in 2010. The agency also gained accreditation from the National Academy of Emergency Medical Dispatch in 2010

and was designated a Center of Excellence. BSO is currently undergoing the Commission on Fire Accreditation International (CFAI) accreditation process.

Hoetmer (1988) asked if efficiency could be improved without affecting performance. He responded to his own question by arguing that there is no comprehensive system of determining what level of fire protection is adequate for a community. The Insurance Service Office (ISO) public protection classification system gauges the capacity of the local fire department. ISO collects information on a community's public fire protection and analyzes the data using a fire suppression rating schedule. ISO then assigns a Public Protection Classification from 1 to 10. Class 1 represents the best public protection, and Class 10 indicates no recognized protection. BSO Fire Rescue currently rates a Class 3.

A number of additional performance measures for fire services warrant discussion (Granito and Dionne, 1988; Schumacher, 1996). BCFR currently employs a comprehensive quarterly reporting system. Additionally, recommendations of the Fire Rescue Task Force Performance Measures and Standards workgroup are currently being evaluated and pursued for implementation. Each of these sources will be considered to build a comprehensive performance measurement system to improve accountability.

13.10 Since the Merger

During the 2004 hurricane season, four major hurricanes (Charley, Frances, Jeanne, and Ivan) struck Florida. Mobilization of self-sustaining public safety teams was ordered to provide law enforcement, fire rescue, detention, and support services to Charlotte, Hardee, and St. Lucie Counties. These teams jointly operated from coordinated command/communication systems that carried all of their equipment and supplies into the response areas to cause no additional burden to resources on site. Their duties included traffic control, anti-looting patrol, search and rescue, hazard clearance, relieving local jail staff by detention teams, fleet service support, and responding to calls for service.

In June 2005, the Organization of American States annual conference was held in Fort Lauderdale at the Broward County Convention Center. It marked the first time in 30 years; this event was held in the United States and featured the heads of state and ministers of 34 nations, the US Secretary of State Condoleezza Rice, and President George W. Bush. Interagency and interdisciplinary planning began mid-2004, to balance the needs of affected local businesses/traffic corridors and conference attendees, with the highest security precautions. Precautions were made for allowing those who wished to publicly voice their protests to be seen and heard. The agency was built upon the successes of the unified approach used in the hurricane deployments to work with the federal-, state-, and local-level agencies assisting in this event. Many delegates commented this was the most efficiently run and best annual conference ever. The coordinated command sought as the catalyst of this program was the foundation for not only the largest event of its kind in Broward County but also one of the most prestigious events held in the state of Florida.

The unified approach to special events and hurricane deployment was also utilized in 2005 to provide public safety services in the aftermath of hurricanes Katrina and Rita (which threatened South Florida) and hurricane Wilma (which hit Broward County directly in October 2005). The incident command system concept, based on the National Incident Management System, provided a foundation to assure joint and coordinated decisions were made regarding strategies, operational plans, and public communications. A unified command post was established to coordinate all of BSO-related assets and responses. Each event enabled learning to be built upon the cumulative knowledge gained from the previous events.

13.11 Lessons Learned

While law enforcement and fire rescue missions are essentially the same (protecting life and property during the most dangerous moments of any critical incident), public safety providers speak a different *language*. As such, communications and protocols had to be reconciled particularly when establishing and implementing the unified command concept. During the merger transition process in 2003, it was essential that the daily verbal language of each discipline be respected and learned by others. The issues of coordinating work tasks within the different disciplines and how ideas and protocols were to be integrated to effectively work across the departments had to be resolved. Most importantly, joint responses to hostile environments had to be considered. To do this, each discipline had to fine-tune its own set of SOPs and then *dry run* each scenario utilizing a joint response approach.

Each lesson learned was beneficial to strengthening the BSO and its unified response. The next logical step was for the agency to begin restructuring its unusual occurrence plan to become fully integrated and formally adopt the elements of national plans. Based on employee surveys, BSO found a few instances of unresolved cultural differences between individuals within the agency. As a lesson learned, one of the most significant obstacles encountered by BSO's program for consolidating and integrating law enforcement, detention, and fire rescue involved reconciling the organizational culture of the new, integrated agency with those of the previously independent BSO and BCFR.

Prior to the merger, each of the five BCFR collective bargaining unions functioned independently of the others, which often created confusion and chaos among fire members. As a result of the merger, the union representatives with the support of their memberships agreed to dissolve each of their union locals and create one union, with one contract for all fire members. This agreement and resulting contract was a crucial piece that paved the way for this collaborative management initiative.

The organizational cultural differences that exist are mostly situational, and they are simply a matter of the two agencies settling into the roles, procedures, and expectations of the new, integrated, and consolidated agency. Consolidation in the public safety sector becomes a policy instrument to achieve larger end goals of providing improved services.

The BSO has increased its operational capabilities since the merger regarding the management of crises and disasters. One of the critical lessons learned operationally is that joint preplanning is the key that helps to mitigate disasters. Several weeks before every hurricane season, the BSO establishes a command center and critical assets such as command vehicles, fuel, and other supplies for both law enforcement and fire rescue are assembled. Joint preplanning provides an opportunity for personnel to do a *dry run* of communication and data systems and predrill its unified command. The agency also learned that an important element after a severe storm or hurricane is the visibility of public safety personnel to provide security and basic law and order duties to residents because this can determine how quickly residents are able to get back to their normal lives.

The BSO's consolidation and integration program deals with collaboration, organizational change and development, and institutional realignment. The ability to replicate any organizational change and collaborative management initiative depends on external and internal organizational environments. These environments include political variables, the presence or absence of policy actors and policy entrepreneurs (Kingdon, 1984), an organizational willingness to change, and public economics. Nevertheless, due to the functional similarities of public safety agencies and the comparable bureaucratic organizational structures of law enforcement

and fire rescue agencies, agencies attempting to replicate the BSO's model stand a good chance of doing so—depending on their abilities to manage organizational change.

There are some potential challenges in developing the BSO model that must be taken into consideration by others seeking a similar merger:

- The political environment (internal/external)
- The presence or absence of policy actors and entrepreneurs
- Public support
- The creation of shared understanding and organizational coherence with members of diverse backgrounds to increase coordination toward common goals and objectives

However, there are indicators for success. Public safety agencies are *more alike than different* operationally and structurally, and this forms a foundation on which to build a joint agency. Furthermore, there is the opportunity to generate vertical and horizontal integration for lowering costs and increasing diversity of services and resources.

13.12 A New Paradigm?

The authors agree with Agranoff and McGuire (2003) that “the greater the interdependence between players, the greater the need for coordination and collaboration” (p. 35). In an ever-changing and demanding political and social environment, emergency services are a perfect fit for this type of relationship. Fire services are no longer relegated to fire suppression and rescue operations. Similarly, the role of law enforcement agencies has expanded from crime control. Focusing events have shown that a *routine* fire rescue mission or law enforcement service call can quickly become a major event.

The article also clearly illustrates the concept of collaborative management in the provision of law enforcement and emergency management services. It shows among other things that, first, the provision of public safety services in the current environment of international and domestic terrorism is becoming more complex and that it takes a collaborative effort that transcends traditional boundaries to solve them (Kettl, 2006). Secondly, this chapter shows that organizations with moderately similar domains (Van de Ven and Walker, 1984), with complementary resources, communicate better and represent a common culture of shared meanings.

The events leading up to and the aftermath of 9/11 will be analyzed for years to come. If we learned anything at all from this disaster, it is that a lack of command, control, and coordination costs lives. As a model of collaborative management, consolidation or service integration of public safety agencies could represent a new way forward to provide regionalized services, combine the best elements of each agency, and at the same time provide the necessary economies of scale.

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Chapter 14

Emergency Management for Radiological Events

Lessons Learned from Three Mile Island, Chernobyl, and Fukushima Reactor Accidents

Frances L. Edwards

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14.1 Introduction

Radiological materials are present in most communities in many forms, often as just one of the hazardous materials in use in an area. For example, in the city of Irvine, California, with over 1000 sites that store and use reportable quantities of various hazardous materials (Orange County

Fire Authority, 2003), there are a research reactor and several locations that store, ship, or use medical isotopes, including patient diagnosis and treatment with nuclear medicine. The University of California, Irvine, is also a receive site for the potential evacuation of the southern portion of Orange County in the event of an accident at the San Onofre Nuclear Generating Station, located at the northern edge of San Diego County, adjacent to the Camp Pendleton Marine Corps Base. As with other hazardous materials, it is important for the community in which they are located, or which they may impact, to have a plan for dealing with an accidental release of, or exposure to, radiological hazardous materials.

14.2 Existing Radiological Hazards to Communities

While many nuclear weapons have been decommissioned internationally, and the Federal Emergency Management Agency (FEMA) no longer mandates specific community-level planning for nuclear war, communities must still prepare for the possibility of hostile use of radiological materials and other chemical, biological, nuclear, and explosive (CBRNE) devices (FEMA). The location and management of Russian nuclear stockpiles from the former Soviet Union have been the subject of concern for counterterrorism programs (Zimmerman and Lewis, 2006), although experts do not believe that *suitcase nukes*—easily portable small nuclear bombs—actually persist as a threat (Vergano, 2007). Experts consider that collecting the individuals and skills to create a nuclear bomb would be a challenge (Goodrich, 2004), but fissile material is part of the global supply chain, which might be subject to a security breach. As Zimmerman and Lewis state, “fissile material, including nuclear explosive material, is an item of commerce, and moves from place to place. One of the side effects of our globalized economy is that opportunities for direct theft and bribing of nuclear custodians abound.” (p. 8)

A more likely radiological scenario is the use of a *dirty bomb*. The dirty bomb is a device that uses a low-level radiological material as part of a conventional homemade bomb or *improvised explosive device*. While the bomb would contaminate an area with radioactive dust, the addition of radiological materials would not add to the number of deaths caused by the explosion. “Nonetheless, the area could be sealed off for months of decontamination, and hundreds of thousands of people could be expected to show up at hospitals for screening. Dozens of buildings might be razed because of the difficulty of decontaminating them” (Richter, 2002). The decontamination of the area to restore normal use would be expensive, and such devices would “exploit fears of radioactivity in a way that makes them a devastating terrorist weapon. . . . There would be billions of dollars of economic damage,” according to Caltech provost Steven Koonin (Richter, 2002). Therefore, a community emergency plan should include procedures for managing the immediate response to a threatened or actual radiological release (FEMA).

Community-based uses of radiological materials exist across the country. Research reactors are used for scientific research and may be located at universities and research laboratories. There are 272 research reactors currently in use in the United States, receiving fuel, and storing and shipping spent fuel for disposal. The movement of this fuel can pose a security challenge (European Nuclear Society, 2013). Radioisotopes are used for medical treatments, moved from manufacturer to medical facility in lead-lined packaging placed in the normal package delivery supply chain. The European Commission estimates that 2.5 million packages of radioisotopes for medical purposes are shipped annually in its jurisdiction alone (European Commission, 2009).

Most hospitals and many clinics use radiological materials for both diagnosis and treatment of disease. When medical equipment is decommissioned, the radiological sources are

removed for reprocessing or safely discarded. However, old medical equipment is sometimes improperly handled and can become lethal in the community. For example, Goiania, Brazil, a city of 1 million people, suffered a community impact when a theft resulted in a community exposure. “In September 1987, two thieves removed part of a teletherapy machine from an abandoned clinic for the metal value of the shielding material only. The operators of the clinic had moved to another location, leaving the strong radiation source behind in an unattended building” (Edward and Steinhausler, 2007, p. 224). A scrap yard dealer was able to open the protective capsule leading to an uncontrolled release of Cs 137, which led to deaths and injuries throughout the community. Because the theft of the radiological source was not discovered, people who went to hospitals with radiation sickness were initially misdiagnosed with infectious diseases, admitted for treatment, and contaminated five hospitals. In the 16 days that it took to discover the theft of the radiological source, 125,000 people were potentially exposed and had to be screened. The most serious 14 patients had to be moved to a specialized treatment facility in a carefully controlled method to prevent further contamination of people and surroundings. Four of these patients ultimately died from the radiological exposure. Careful examination of the city revealed seven areas of heavy contamination, two of which had to be evacuated (Edwards and Steinhausler, 2007).

Because it took so long to discover the theft, early symptomatic patients were misdiagnosed and treated for the wrong diseases. The radiological experts who participated in the diagnosis and care of the victims, once the source of their illnesses was discovered, had to work long hours in protective clothing, creating both physiological and psychological stress for them. Once the source of the contamination was known, the effort to inform the public led to panic and psychosomatic disorders that further complicated the evaluation of those thought to be exposed. During the period of exposure before the source was known, the contamination spread outward to adjacent cities as far as 80 miles away. Vehicles, money, 5 pigs, and 42 houses were among the most contaminated items (Edwards and Steinhausler, 2007).

Definitive medical care was delayed by the lack of knowledge of the theft. Once radiation sickness was understood, there was a lack of trained medical personnel to manage the injured, and those with the training generally had no experience in caring for people after radiation exposure. Medical workers shunned the facilities treating the radiologically contaminated patients, and some even went on strike. Lack of support systems for laboratory testing, inadequate laundry services, and no system for collecting hospital and decontamination waste made the effort to care for the patients very difficult (Edwards and Steinhausler, 2007).

Nuclear power is used in many nations to ensure a supply of relatively cheap and clean energy. For example, the San Onofre Nuclear Power Plant in San Diego County produces energy from a few ounce pellet of Uranium 236 equivalent to “140 gallons of oil, 150 gallons of gasoline, 2,000 pounds of coal or 17,000 cubic feet of natural gas” (San Onofre, n.d.). In 2013, nuclear power generation accounted for 20% of electricity production in the United States (San Onofre, 2013). The 2005 Energy Policy Act seeks to take actions that will reduce the current annual emission of “5.8 billion tones of CO₂ from energy use,” and nuclear power will be one of the alternative sources of energy used (World Nuclear Association, 2013). However, while the development of more nuclear generation plants will benefit the environment by lessening CO₂ emissions, it is not without risks. The movement of fuel to the plants and storage of spent fuel rods at the plants pose some security challenges (World Nuclear Association, 2013). Accidents at Chernobyl (Jarorowski, 1999) and Fukushima (Featherstone, 2012) have shown that fallout can travel around the world.

14.3 Nuclear Power Plants

For many years, the nuclear power industry had an exemplary safety record. The American Nuclear Regulatory Commission has a safety goal of one accident for every 10,000 reactor years. “The world’s fleet of light-water power reactors has racked up 11,500 reactor-years and counts five ‘partial core melt’ accidents,” three at Fukushima, one at Three Mile Island, and one at Greifswald in East Germany (Featherstone, 2012, p. 11). Chernobyl is not a light water reactor but an older Soviet design, making the sixth reactor to release radiation with the most devastating results. Fallout from Chernobyl was found around the world (Jaworowski, 1999), and Iodine 131, a product of nuclear fission released at Fukushima, was detected in Chernobyl (Featherstone, 2012) (Table 14.1).

Nuclear power plants provide the backbone of electricity generation in a number of nations. The first nuclear-powered electricity was created in Acro, Idaho, on December 20, 1951.

As of January 18, 2013 in 31 countries 437 nuclear power plant units with an installed electric net capacity of about 372 GW are in operation and 68 plants with an installed capacity of 65 GW are in 15 countries under construction. ... As of [the] end [of] 2011 the total electricity production since 1951 amounts to 69,760 billion kWh. The cumulative operating experience amounted to 15,080 years by [the] end of 2012. (European Nuclear Society, 2012)

While Europe has the most nuclear power plants (186), Asia (120), Africa (2) North America (125), and South America (4) also have them (European Nuclear Society, 2013).

Table 14.1 Nations with the Largest Number of Nuclear Power Plants, 2013

<i>Nation</i>	<i>Population</i>	<i>No. of Plants</i>	<i>Annual Power (MW)</i>
Top five nations			
USA	313,858,000	104	101,465
France	63,605,300	58	63,130
Japan	127,587,800	50	44,215
Russian Federation	143,165,000	33	23,643
Republic of Korea	48,906,300	23	20,759
Developing			
China	1,350,378,000	17	12,816
Under construction		29	28,753
India	1,259,721,000	20	4,391
Under construction		7	3,824

Source: European Nuclear Society, 2012.

14.4 Characteristics of Three Mile Island, Chernobyl, and Fukushima Compared

The three nuclear power plant accidents (Table 14.2) that provide the most evidence of impact on a community are Three Mile Island in 1979, Chernobyl in 1986, and Fukushima in 2011. Two of the events—Three Mile Island and Fukushima—occurred in light water reactors where containment was relatively successful and the core remained intact and on site. The Chernobyl event was the worst, having no containment and an explosion that dispersed the graphite core materials.

Emergency planning for nuclear power plant accidents is a complex activity. “Charles Perrow characterized it as a kind of ‘normal accident’ that occurs in complex processes with ‘tightly coupled’ systems. A failure in one system affects others, which, in turn, affects yet others” (Waugh, 2000, p. 122). Howitt and Leonard characterize the Three Mile Island accident as an *emergent crisis*: an event growing “from ordinary circumstances that often mask their appearance. ...a simple pump failure out of which spun an escalating series of failures and mistakes until a major crisis was underway” (Howitt and Leonard, p. 6). While Three Mile Island showed little actual human harm or property damage, it was the source of many lessons learned about safe operation of nuclear power plants, epidemiological tracking for potential injuries, and the appropriate management of public information. Its system failures across levels of government led to the creation of FEMA and the shifting of emergency planning for power plants to the new agency from the Nuclear Regulatory Commission. “The Nuclear Regulatory Commission had managed public warning and evacuation so badly during the crisis that the President [Jimmy Carter] reassigned some of the commission’s off-site radiological emergency preparedness duties to FEMA” (Sylves, 2012, p. 126).

Chernobyl revealed the need for international communication plans, as the residue from the plant traveled to Norway, Lapland, and ultimately across the world, first responder protective equipment and medical prophylaxis, and carefully managed public education for evacuation. Fukushima demonstrated that natural hazard mitigation for nuclear plants cannot be expected to perform perfectly every time and reinforced the benefit of public communication plans, evacuation plans, and long-term relocation plans.

14.5 Emergency Planning for Radiological Events

Few local governments have had experience in coping with accidents related to the release of radiological or nuclear materials. In most metropolitan areas, some potential sources of accidental catastrophic release of radiological materials exist, most of which are unidentified in community risk analyses. Medical diagnostic equipment and radioactive isotopes are typically stored in small quantities. Sterilizers in industrial facilities and research reactors at university research centers are typically small with low levels of fuel. However, as the Goiania contamination demonstrated, a small radioactive source can contaminate many people and a large area. Most major military facilities with nuclear materials have been located in remote areas rather than in areas with high concentrations of population (Nuclear Information Project, 2006). Emergency planning coordinated with the military authorities is an important part of adjacent community emergency plans.

There are nuclear reactors used to generate power in some metropolitan areas. Their emergency plans may provide some information useful in preparing an emergency response to a radiological

Table 14.2 Comparing the Three Nuclear Power Plant Accidents

<i>Characteristic</i>	<i>Three Mile Island</i>	<i>Chernobyl</i>	<i>Fukushima</i>
Date	1979	April 26, 1986	March 11, 2011
Cause	Failure in the nonnuclear area led to the loss of coolant and a partial melt down of about one half of the core. Attributed to inadequate instrumentation and inadequate emergency response training.	A sudden power output surge during a systems test caused a reactor vessel to rupture, leading to a series of blasts. An intense fire burned for 10 days.	A magnitude-9.0 earthquake and resulting tsunami damaged the plant's power systems, causing cooling systems to fail. A series of gas explosions followed.
Reactors	Two; but only one (TMI-2) involved.	Four; but only one reactor involved.	Six; but only three of concern, plus pools storing spent fuel.
Type of reactors	Light-water-fueled steam reactor; containment vessel intact. Small releases of radioactive gas offsite.	Graphite-moderated boiling water reactor. The graphite made it highly combustible. The reactor also had no containment structure and nothing stopped the trajectory of radioactive materials into the air.	Boiling-water reactors. Japanese authorities stress that unlike at Chernobyl, the containment vessels at Fukushima remain intact. Also, unlike Chernobyl, the reactors at Fukushima do not have a combustible graphite core.
Radiation released	370 PBq of noble gasses. HEPA and charcoal removed most radionuclides.	5.2 million TBq.	370,000 TBq (as of April 12, 2011).
Deaths	None. No dose above background levels.	A UN report places the total confirmed deaths from radiation at 64 as of 2008. Disputes continue about how many will eventually die.	No deaths so far due to radiation, but stress-related excess deaths from evacuation.

Table 14.2 (continued) Comparing the Three Nuclear Power Plant Accidents

<i>Characteristic</i>	<i>Three Mile Island</i>	<i>Chernobyl</i>	<i>Fukushima</i>
Status	TMI-2 is permanently shut down and defueled. TMI-1 will operate until the end of its license, currently set to expire in 2034. It is a top safety performer.	The damaged reactor is now encased in a concrete shell. A new containment structure is due to be completed by 2014.	Engineers have brought the plant to a <i>cold shutdown condition</i> , a key milestone in bringing it under control. It will take decades to dismantle it completely however.

Source: BBC News, How does Fukushima differ from Chernobyl? December 16, 2011, Accessed January 22, 2013 at <http://www.bbc.co.uk/news/world-asia-pacific-13050228>; Nuclear Regulatory Commission, Backgrounder: Three Mile Island, March 5, 2011, accessed January 22, 2013 at <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/3mile-isle.pdf>; World Nuclear Association, Three Mile Island accident, March 2001, accessed January 22, 2013 at <http://www.world-nuclear.org/info/inf36.html>; World Nuclear Association, Chernobyl accident, 1986, December 2012, accessed January 22, 2013 at <http://www.world-nuclear.org/info/chernobyl/inf07.html>; World Nuclear Association, US nuclear power policy, 2013, accessed January 22, 2013 at http://www.world-nuclear.org/info/inf41_US_nuclear_power_policy.html.

or nuclear incident for that community, including a terrorist act (FEMA, 2010). Moreover, three nuclear power reactors—Three Mile Island in Pennsylvania, Chernobyl in Ukraine, and Fukushima in Japan—have had actual emergencies, whose lessons may inform the emergency planning effort. They provide good lessons for the planning, preparedness, postevent response, and recovery issues that must be addressed in an effective plan.

The exact location of a nuclear event and the composition of the nuclear material will, of course, affect the specific response plan. For example, the radionuclides may differ between a reactor accident and a terrorist release of radiological materials, which will impact the immediate and long-term effects on the victims (Jaworowski, 2010) and the degree of damage to the physical plant of the community. The size of the deposition population may be different than those in the actual reactor events. However, the basic issues for emergency planning remain the same, regardless of whether the source of the radioactive or nuclear material release is a nuclear power plant reactor, a theft and mismanagement of radiological sources, or a terrorist device.

The common issues for planning, response, and recovery during unexpected releases of radiological or nuclear materials are public information, first responder protection, victim care, community protection and evacuation, and psychological impact.

14.6 Public Information

The Three Mile Island accident demonstrates that getting accurate information to the public quickly is important in managing a radiological accident. The utility that owned the Three Mile Island plant had no plan for emergency public information in the event of an accident. When the cooling system failure occurred, the Nuclear Regulatory Commission, Pennsylvania Department

of Environmental Resources, and Governor's Office and President's Office all needed timely and accurate information to share with the media, and in turn the public, but there were no systems in place. "The slow response, miscommunication, lack of decisive leadership and poor coordination of the Nuclear Regulatory Commission with the utility, the state of Pennsylvania, and affected localities, demonstrated to policy makers the need to improve disaster response, coordination and planning" (Sylves, 2008, pp. 58–59).

Garbled communications reported by the media generated a debate over evacuation. Whether or not there were evacuation plans soon became academic. What happened on Friday was not a planned evacuation but a weekend exodus based not on what was actually happening at Three Mile Island but on what government officials and the media imagined might happen. On Friday confused communications created the politics of fear. (Cantelon and Williams, 1982, p. 50)

Well-meant but incomplete public information may lead to some inappropriate actions. For example, during the Three Mile Island event, which had no significant off-site release of radiological materials, the Governor of Pennsylvania broadcast a suggestion that pregnant women and children under two within the immediate area of the reactor should leave as a precaution. The result was that people all over the state left for distant refuges in the homes of relatives or hotels (Behler). This created economic hardship, personal stress, and distrust of the government.

Accurate information was not available to guide people's response to the invisible radiological threat that the public perceived.

...hundreds of environmental samples were taken around TMI during the accident period by the Department of Energy (which had the lead sampling role) or the then-Pennsylvania Department of Environmental Resources. But there were no unusually high readings, except for noble gases, and virtually no iodine. Readings were far below health limits. Yet a political storm was raging based on confusion and misinformation. (World Nuclear Association, 2001)

Chernobyl generally yields negative lessons for public information, as well. Little information was given to the affected populations in the first crucial hours. The government chose to surround the event with secrecy. It was 24 h after the onset of the event when people were told that there had been an accident at the reactor. The only information given to them was to be ready to evacuate within 2 h (Kholosha, 1998). Therefore, individuals at most immediate risk were unable to take even minimal protective actions against immediate respiratory, ingestion, and injecting exposure. One Norwegian leader has characterized the silence as causing "unnecessary harm to affected individuals, and a long heartbreaking and politically turbulent post-accidental situation" (Drottz-Sjoberg, 1998, p. 71).

A study in 2005 disclosed that people initially had no idea that exposure to the smoke from the burning reactor was dangerous. In fact, the May 1 *May Day* celebration was carried on as usual, with children in the impacted community participating outdoors. The government information that was shared initially was optimistic, but suddenly turned pessimistic, informing people that 20% of the population would die as a result of the accident. This left the population scared and perplexed. "It was terror. It was terror," was how one respondent characterized the community's response to the inconsistent information (Abbott et al., 2006, pp. 110–111).

Residents of the contaminated and impacted areas are still fatalistic, unsure of what is safe and what is risky behavior. Unlike other disasters where government is blamed, the Chernobyl victims have not become activist on their own behalf. Researchers attribute this to the initial *optimistic misinformation* released by the government and the later *pessimistic misinformation* released by the media (Abbott et al., 2006, p. 106).

Researchers suggest that information about the disaster contributes to the stress of the survivors. "...contradictory information about the accident in Chernobyl caused, and is still causing, 'cognitive dissonance'... most people think that radiation is an absolutely pathogenic factor and that it harms not only present but also future generations" (Havenaar and Rumiantseva, 1994, p. 89). Epidemiology over the intervening 23 years has demonstrated otherwise. Jaworowski (2010) states that studies of Chernobyl evacuees demonstrate that expected cancer rates have not occurred. Further, "The Chernobyl Forum report says that people in the area have suffered a paralyzing fatalism due to myths and misperceptions about the threat of radiation, which has contributed to a culture of chronic dependency. Some 'took on the role of invalids.' Mental health coupled with smoking and alcohol abuse is a very much greater problem than radiation," according to the World Nuclear Association (2012).

Early and honest information must be an integral part of the emergency response and recovery plan for radiological events, including self-help recommendations. Social and cultural norms of the affected populations must be considered, while educating the population on the real dangers of inhaling, ingesting, and injecting agricultural products that have been covered with the products of the accident. City dwellers can more easily conform to food regulation than rural populations who live more directly off the land. Commercially prepared products can be evaluated by case lot and safe food rapidly restored to circulation in cities and towns. On the other hand, the population of animals available to hunters and fishermen can only be evaluated after the game animals have been caught. Unless evaluation stations are established in these remote areas, exposure through ingestion of contaminated game will continue for long periods of time, raising the health effects even in distant populations.

The Chernobyl experience points out that short-term public information will come from the media. Emergency public information officers must be prepared to address detailed technical questions from the press. It is essential to have an expert with credibility and the ability to speak in simple terms, who can provide briefings for media representatives.

It is crucial to have accurate and noninflammatory information conveyed to the affected public as soon as possible. Jaworowski questions the *radiophobia* that has been developed as an offshoot of the Cold War military strategies. He points out that natural background radiation in many parts of the world exceeds the dosage of those living near Chernobyl (Jaworowski, 1999, p. 25). Since most of the public has no knowledge about radiation exposure as it relates to health effects, it is important to have a nuclear physicist or other scientist available to provide analogies for the press, such as the comparison of the radiation in a cigarette or banana and the background radiation in the high altitudes of Earth to the amount released in a specific event.

The emergency plan should include premade information brochures for the media that provides a basic understanding of radiological materials and related threats. In 2003, the Stanford University Center for International Security and Cooperation convened a stakeholders' workshop to create media briefing materials for nuclear terrorism events. These educational materials were posted on the website for a time (<http://cisac.stanford.edu/nuclearterrorism/index.html>) but have since been removed. Similar educational materials about nuclear power plants, like those on the current San Onofre Nuclear Generating Station website, should be available for rapid dissemination to the media and community members in the event of an accident.

The German technical organization Eurosafe has a report of its work in developing such radiological information for the concerned Germans following Fukushima. The report *The GRS Emergency Centre during the Fukushima NPS Accident: Communicating Radiological Information to the Public* describes the variety of public information topics and pathways that it used to communicate during the Fukushima accident (Sentuc and Dokter, 2013).

In the long term, the best public information should be delivered one-on-one. Teachers, doctors, counselors, and health workers need to be given continuous factual information about ongoing environmental effects so that they can calm community fears. Written materials for the general public must be presented in very simple terms. Numbers must be interpreted in easy-to-understand impact statements. Radiological measurements mean little to the average resident. Rather than quoting dosages and effects, public information pamphlets should list such facts as symptoms, lengths of exposure, and specific areas where the population might be affected.

Public education is essential in guiding self-protective action of the general population, but it must be carefully crafted to ensure appropriate interpretation. After Chernobyl, when information was released that said people were being given potassium iodide (KI) as protection against radiation effects, some parents administered tincture of iodine to their children even though the label clearly stated *poison*. Any public information about medical care must detail not only the steps to take but also any obvious steps to avoid (Nauman, 1998, p. 200).

Special populations must be considered in the development of long-term public information materials on radiation. For example, the Canadian government developed a coloring book for children to help them understand nuclear or chemical accidents and their potential effects on themselves and their communities (Becker, 1998).

Appropriate public information can be a critical link in community recovery. There must be no conflicting information. The representatives delivering information to the media must have high credibility with the public. All public information must be delivered in a culturally sensitive way, including appropriate languages, reading levels, and respect for local traditions. Information on where to get help should be featured prominently. Specific and practical information should be repeated frequently as public service announcements in electronic media and as advertisements in the press.

Civic leaders need to make an honest estimation of the population's view of the government after the accident. The general population may blame government agencies for the accident, believing that the accident was related to their failure to do their jobs. In that case, other spokespersons with more credibility should be selected, like university professors or medical professionals. A generalized hostile view of the government may impact the ability of members of the public to *hear* the message about radiation and its effects (Flynn, 1998).

14.7 First Responder Protection

For 50 years, the model of nuclear release impact on a human population was the Japanese experience at the end of World War II (Sokolov et al., 1998). The bombs dropped over Hiroshima and Nagasaki resulted in specific epidemiology among the survivors, notably radiation burns and leukemia. Longitudinal studies of the survivors of these events suggested that the Japanese results would be replicated in any future nuclear releases in populated areas.

Dr. Viktor Sokolov suggests that actual data from Chernobyl contradict this assumption. He notes that actual epidemiology of Chernobyl survivors suggests that reactor accidents produce different results in the victim population. The National Radiation and Epidemiological Registry of the Medical Radiological Research Center in Obninsk has developed findings that the principal

long-term exposure for the Chernobyl victims was an internal exposure from food at low-dose rates (Sokolov et al., 1998), a different exposure pattern than experienced by the Japanese bomb blast victims. This lower dosage and ground level deposition makes it a better model for planning for radiological and nuclear events in a nonwar setting.

Dr. Michael H. Momeni has noted that the expected leukemia rates have not been observed among the Chernobyl survivors. In reactor accidents, radiation risks are principally from “chronic irradiation due to inhalation of contaminated airborne radionuclides, ingestion of contaminated food and water, and external exposure to contaminated ground” (Momeni, 1998, p. 150). On the other hand, the damage experienced by bomb blast survivors from plume shine appears not to be a problem with reactor accident victims and, by extrapolation, would not be a likely consequence of a radiological or nuclear event (Momeni, 1998).

The results from these effects instead have included thyroid cancer and specific types of tumors in higher than expected proportions, with less than anticipated levels of leukemia. Also, gastrointestinal damage and skin lesions are more important epidemiological findings in these events than previously anticipated. However, “no consistent attributable increase has been confirmed either in the rate of leukemia or in the incidence of any malignancies other than thyroid carcinomas” (Crick, 1998, p. 2).

Therefore, community emergency response plans must consider the appropriate prophylactic response to potential health risks. Initially, protection of first responders from exposure to damaging radiological emissions and dose measurement of the exposed population are critical to minimize the health effects. Lessons learned from Chernobyl include the importance of the management of bone marrow damage through the administration of hemopoietic growth factors rather than bone marrow transplant to counteract radiation damage to the blood creation system of the body (Crick, 1998, p. 1).

The administration of KI to the general population of first responders in the affected areas may not be as beneficial as originally thought. There are portions of the population that suffer adverse reactions to iodides, and the benefits of KI are limited to those portions of the population with iodine-deficient diets or those who receive it immediately after the event (Momeni, 1998, p. 150). However, the Polish experience suggests that a single protective dose of KI would have only moderate and treatable unwanted side effects in the general population and would “significantly lower the thyroid burden of radioactive iodine 131 over time” (Nauman, 1998, p. 202).

Based on the findings of the significance of first responder exposures, the importance of respiratory protection was reinforced. Inhalation of radioactive material promotes adverse health effects in first responders. At present, it appears that any supplied air system provides adequate respiratory protection from acute exposure during an emergency response to a reactor site (Nauman, 1998).

Some research suggests that first responders receiving more than 50 Roentgen Equivalent Man (REM) are suffering from a new form of radiation-induced illness. Headaches, general disability, and a lower overall immune response form a syndrome that is being referred to as *Chernobyl AIDS* (Allen, 1998). Psychosomatic responses, including a higher incidence of stress-related illnesses, were also related by first responders after Chernobyl. This suggests the importance of early psychological intervention, including critical incident stress defusings for all first responders after each shift (Winslow, 2000).

First responders will have anxiety about their own health and the risks they are assuming in responding to the event. Overall, the anticipated effect on first responders provided with reasonable shielding is minimal. Of the 800,000 who were “registered as helping to alleviate the consequences of the accident, . . . 237 were initially admitted to the hospital. Acute radiation syndrome was diagnosed in 134 cases, of whom 28 died from radiation injuries, all within the first three months” (Crick, 1998, p. 1).

These findings suggest that proper training of emergency responders regarding the deployment and use of protective measures and protective equipment, and the enforcement of the safe use of that equipment, is the key to minimizing health effects for that population and lessening first responder stress. First responder training on nuclear scenarios in advance of an event is also a helpful mitigation tool. Finally, critical incident stress debriefings and long-term counseling for first responders should be built into any plan (Winslow, 2000).

14.8 General Population and Victim Care

The general population in the area of the Chernobyl accident did not experience a measurable increase in any specific health effects. At the 10-year point, it was believed that “no consistent attributable increase has been confirmed either in the rate of leukemia or in the incidence of any malignancies” in the general population (Crick, 1998, p. 1). A small increase in the reported incidences of some nonspecific health effects may be due to the intense monitoring of the potentially affected population rather than any increase in actual health-related effects. Small illnesses that might never have been reported to medical authorities are now being picked up in the target populations due to the longitudinal study being conducted (Crick, 1998).

One segment of the population did clearly demonstrate health effects after Chernobyl. There was a “highly significant increase in the incidence of thyroid cancer in the affected areas among... the children” (Crick, 1998, p. 1). The increase was most marked among those who were born less than 6 months after the accident and who were less than 5 years old at the time. The papillary thyroid cancers in children were aggressive, but traditional treatment including removal of the thyroid was successful in most cases (Crick, 1998, p. 1). The International Federation of Red Cross and Red Crescent Societies has a long-term project of health screening for the at-risk age group of children. The project also provides pure milk powder and micronutrition in schools and children’s institutions (Revel, 1998, p. 56).

The long-term findings from the Japanese bombings in 1945 may have led to overestimation of the long-term health consequences for the exposed populations. In 1965, at the 20-year point, medical researchers suggested that “the only significant consequences ... were increases in leukemia and thyroid cancer” (Baverstock and Williams, 2006, p. 1312). By 1974, a significant increase in solid cancers was found, and 50 years after the event “an unexpected incidence of non-cancer diseases was found” (Shimizu et al., 1992). To date, the Chernobyl exposures have generated increased numbers of thyroid cancers in children, with fewer than expected leukemias, with estimates for thyroid cancers rising to as high as 72,000 cases by 2056. Because the post-Chernobyl damage was caused mainly by exposure to isotopes, while the Japanese bomb damage was caused by exposure to x-rays and neutrons, the Japanese bombing experience may not be predictive of long term disease outcomes from nuclear power plant accidents. (Baverstock and Williams, 2006). Jarorowski (2010) states that current studies of Chernobyl survivors suggest that incidences of expected long-term medical impacts of elevated radiation are not occurring.

The decontamination of the affected area is also critical for the long-term health of the general population. At Chernobyl, the radioactive materials were dumped into the ruins, and a containment structure was built around them. It is estimated that 50,500 km² was polluted by the accidental release of radionuclides (Kholosha, 1998).

An area of 1000 km radius was checked for radiological emissions. It was discovered that dose rates followed the terrain. Roadways in these areas were washed, and fallen leaves and agricultural debris were destroyed. These actions lowered the radiation exposure by 30% (Kholosha, 1998).

Exposed foodstuffs, especially milk, were eliminated. Grazing lands and animal food were monitored, and soil modifiers were used to mitigate the radiation effects. Newly produced milk was *filtered* (sic) to remove radiation (Kholosha, 1998).

Outside of Ukraine, there were also significant areas of radiation deposition. For example, hot spots were found as far away as the mountain areas of Norway. Humans there were exposed through external radiation from deposited radionuclides, inhalation of radionuclides from the air, and ingestion of radionuclides through food. Initially, the principal exposure in areas remote from the accident was from these external sources. However, after the first few months, the principal route of exposure was ingestion of contaminated foodstuffs (Harbitz, 1998).

Sheep and reindeer were affected, principally through grazing. Internal doses among the human population of those areas remained high because of the contamination of the food chain. The population ingested high levels of radiocesium through the consumption of reindeer meat, freshwater fish, and milk (Harbitz, 1998).

The Government of Norway established intervention levels for contamination of the food supply. For example, “about 35% of all lambs were contaminated at levels above the intervention levels at time of slaughter” (Harbitz, 1998, p. 24). Animals were treated to mitigate the effects of cesium ingestion from contaminated pasturage. These measures included the addition of Prussian blue, a cesium binder, in salt lick, and special feeding of lambs and sheep have been used. For the 10 years following the accident, over 1.5 million lambs and sheep were included in the special feeding program, at a cost of over \$23 million. Thus, protection of the food stock is a major economic burden for the government in affected areas (Harbitz, 1998).

Populations living more remotely, and with greater dependence on the natural resources of their areas, need special consideration. Many populations rely on hunting and fishing for their livelihoods. An example is the Laplanders, who rely on reindeer for most of their protein. In addition, the poor of many countries supplement their diets with wild game and fish. A careful review of the sources of foodstuffs must be undertaken. Since prohibiting hunting is unlikely to be successful among dependent populations, monitoring stations must be established where hunters and fisherman can have their game evaluated for safety (Drottz-Sjoberg, 1998).

The population of Belarus experienced a 53% contamination rate. The Chernobyl plume moved unexpectedly, and the population received their initial dose of radiation through cloud shine and inhalation. It was 8 days after the accident before the first protective actions were taken for the general population. The principal measure was to end the consumption of contaminated foodstuffs that had yielded high doses of Iodine 131 (Buglova, 1998, p. 204).

14.9 Community Evacuation and Protection

Community protection can take several forms. The most obvious is direct site remediation. Evacuation of at-risk populations is generally used for those at long-term risk from radionuclide deposition.

Direct site remediation in Chernobyl started with placing the debris in the ruins of the reactor and encasing it in a protective structure referred to as the *shelter object* (Rudenko, 1998). This did not prove to be a useful strategy. The result is a permanent reminder of the event and a monument to the contamination that remains in the area. Intended to last for 10 years, it is only now being covered by a new steel sarcophagus that will cover the reactor and allow it to be dismantled inside the protective structure. The 432 million Euro project (*Professional Engineering*, 2007) will not be completed until 2014.

In addition, there is a concern that ground water contamination may result from the way the reactor building was constructed and then damaged. Experts from the National Academy of Sciences of Ukraine have reviewed the threat to the region's ground water, noting that 200 tons of fuel remains in the ruined reactor with coolant water that is still reactive. Studies show that the local river is the drain where reactor water and ground water intermingle. Strontium, cesium, and plutonium are all found in the area's ground water, along with some tritium and americium. This suggests that internal shelter water is leeching out (Rudenko, 1998).

The long-term health effect could be devastating to consumers of the ground water, especially if it is used to irrigate field crops or for community drinking water supplied through wells. On September 22, 2007, President Viktor Yushchenko of Ukraine signed an agreement to build a steel vault that will contain all the debris from the dismantling of the ruined reactor and its existing containment building. This solution is intended to stop all off-site consequences from the reactor accident (*New Scientist*, 2007). Once the *steel tomb* is built and slid into place, the reactor will be decommissioned and then the tomb will be sealed (*Professional Engineering*, 2007, p. 9).

The Chernobyl experience points out the importance of developing a pre-event community protective plan that includes meaningful remediation. A sealed environment that does not include a ground barrier is not fully effective in protecting the community from long-term effects of radiation. The experience in Slovakia with contamination from an early nuclear reactor provides some useful guidelines. Remediation must include the acknowledgement of current knowledge of health physics. The environment should be cleaned up to background levels if possible, but below levels of concern as a minimum. Some combination of remediation steps will be needed to achieve this goal. Fencing off highly contaminated areas to limit population exposure is essential. Affected soil should be removed and remediated through the addition of binders or modifiers (Slavik, 1998).

Evacuation was also used as a protective measure in all three accidents. As noted earlier, in Three Mile Island, there was no organized evacuation. A suggestion by the governor, combined with inadequate public information about the radiological threat, led to needless self-evacuation of people living many miles away from the damaged plant. Evacuation should only be used when sheltering in place will not provide adequate short-term protection until the reaction can be brought under control. An accident or incident with a longer-term impact may require that an evacuation be organized, but the evacuees need specific direction about the personal belongings and essential documents to take with them and some idea about how long they will be gone.

During the Chernobyl accident, people in Pripyat were given 2 h to prepare to evacuate. During that time, they were not warned about the need to shelter in place to limit exposure to the airborne contamination from the burning graphite core or to avoid eating contaminated food (Barclay, 2011). Immediate evacuation included 100,000 people, with 350,000 ultimately moved from contaminated areas in Russia, Ukraine, and Belarus (Tran, 2011).

In Fukushima, the people living in a 12-mile radius were immediately evacuated, while 130,000 people living between 12 and 20 miles away were given the choice to shelter in place or evacuate (Tran, 2011). The Japanese government was also quick to remove contaminated food from the supply chain to limit exposure by ingestion (Barclay, 2011).

In Belarus and Ukraine, evacuation of pregnant women and young children was very effective in lessening their exposure to Iodine 131 (Buglova, 1998). However, since radiation effects are long term in a community, meaningful evacuation will have to continue over weeks or months, while community clean-up proceeds. Populations must be properly prepared to bring along appropriate personal items, including records and personal papers, when they leave their homes. Therefore, the emergency plan should include a premade flier with directions for packing for a long-term

evacuation. One section should include guidance on medical, property, and personal information that victims will need at the evacuation point to receive financial and other assistance to resettle.

The government must also be prepared to provide immediate emergency shelter, as well as long-term relocation for many of those evacuated. In the Chernobyl area, people were evacuated the day after the event, but they were not offered shelter, which created new social and psychological problems for the victims (Kholosha, 1998).

In the United States, the Environmental Protection Agency has established recommended intervention levels leading to various actions. Exposures of 5 REM should lead to sheltering in place. Exposures of 50 REM require a 1-week evacuation to allow for remediation and dissipation. Levels over 100 REM require long-term relocation of the population at risk (Meinhold, 1998, p. 212).

The decision to evacuate brings with it some inherently negative results. Experts must monitor the community for the time when REM levels drop and return is safe. What standards can be used when contamination will be long term? Meinhold suggests that emergency response behavior should be based on the criteria *do more good than harm* (Meinhold, 1998, p. 210), but this is a subjective criteria that could be difficult to apply. The principal public policy problem is to determine *how safe is safe?* Standards established by the International Council on Radiation Protection and the National Council on Radiation Protection may provide some guidance that will be salient in political and legal arenas, but in the mind of the general public, will the community ever be really safe?

14.10 Psychological Impacts

At the 10th anniversary of the Chernobyl accident, experts concluded that “social and psychological effects were among the most prominent and lasting consequences” of the nuclear reactor accident (Drottz-Sjoberg, 1998, p. 73). The presence of the *shelter object*, as noted earlier, serves as a constant symbol of the accident and related losses. Birkland notes that symbols are *shortcuts* to understanding a disaster and gain their power from being recognizable (Birkland, 1997). This readily recognizable symbol in Chernobyl keeps the sense of loss fresh for the survivors, with damaging psychological consequences (Drottz-Sjoberg, 1998).

People fear radiation partly because they do not know much about it and partly because of what they do know about it. The bombing of two Japanese cities at the end of World War II remains the image of nuclear exposure for most people. One important part of emergency planning for response and recovery to radiological events is the acknowledgement that the public’s reaction will not be logical or knowledgeable. Furthermore, one goal of postevent public information is the correction of stereotypes and the introduction of factual information about the actual event.

Planners should assume that the public response to a radiological event will be ill informed and fear prone. Experts agree that any action on the part of a public agency will result in anxiety among the affected population (Meinhold, 1998). Planners must seriously consider what countermeasure policies will be effective to ameliorate fear and psychosocial effects in the general public (Allen, 1998).

The first cause of psychological stress is that most health effects take at least 5 years to appear, thus condemning survivors to anticipate the worst over a long period (Revel, 1998, p. 57). In addition, the stress of the experience itself induces psychological illness. These illnesses can take the form of psychosomatic illness and the “induction of anxiety, depression and helplessness.... An apprehension about risks of unknown events and lack of control, fed by misinformation and poor comprehension of reality, increases anxiety and its consequences” (Momeni, 1998, p. 151).

“Psychological illnesses, changes in diet to avoid perceived food contamination, and the increased use of alcohol and cigarettes to cope with the anxiety all contribute to public health effects related to, but not caused by, the deposition of radiological materials in the community” (Baverstock and Williams, 2006, p. 1313).

A study in 2002 indicated that in the areas around Chernobyl “a culture has developed in which people perceive themselves to be victims, ...where ill health is expected, where there are general feelings of anxiety, instability, helplessness; and a generalized fear about the future” (Abbott et al., 2006, p. 106).

The protective actions taken by public agencies, notably evacuations, actually have economic and psychological costs that must be taken into account in planning. For example, in 2005, the United States’ Gulf Coast experienced a series of damaging hurricanes that led government officials to encourage residents of the threatened areas to leave. The Senate Report 109-322 estimated that during Hurricane Katrina the cost of evacuation for an average family was at least \$1000 for the normal 5 days’ absence from home (Senate Report 109-322, 2006, p. 257). Evacuation behavior reflects a societal effect: those who can afford to leave and have the means to leave, leave. Those left behind are the poor, less educated, and marginalized populations who need greater social and financial support to evacuate (Drottz-Sjoberg, 1998, p. 72).

This evacuation effect was clearly demonstrated in Hurricane Katrina. People in the Gulf Coast area had already evacuated three times previously that hurricane season. The Senate Report catalogs reactions from residents, one of whom said that he had to choose whether to evacuate his family again or to pay the mortgage that month (Senate Report 109-322, 2006, p. 257).

In August 2005, 1.1 million people over the age of 16 evacuated the Gulf Coast in the face of the hurricane, but 500,000 had not been able to return to their homes by December 2005. Those who did return home found a disrupted economy and few jobs available (White House 2006), adding to the economic impact of the evacuation. The hurricane devastation mirrors the community damage of a radiological release in a major urban environment.

Victims will experience psychological effects from several sources. First, they will not understand the event and its implications well. They will be afraid for themselves and their children, both their short-term health risks and their long-term health risks. They will also fear the loss of their homes and communities and the economic upheaval that accompanies such events. There will also be fear and blame in a radiological event, with scapegoating being common. All of these behaviors enhance psychological stress. This stress may manifest itself as illness or may exacerbate physical illness (Drottz-Sjoberg, 1998).

Recent studies have suggested that the psychological effects of a terrorist nuclear attack will be much stronger than reactions to natural events, which humans cannot control. Natural disasters also occur in a discrete period of time and can be understood within days of their occurrence. A radiological or nuclear disaster or attack is either the result of human failure or human intention, which magnifies the psychological stress related to it. In addition, the stress is exacerbated by the fact that the damage was not able to be seen or fully measured in the early days after the accident. In Chernobyl, the true extent of the damage took months to evaluate, thus creating a *spreading catastrophe* (Havenaar and Rumiantseva, 1994, p. 88).

The emergency response and recovery plan for radiological events needs to include a psychological/mental health component. Resources available within the community and from other sources need to be preidentified. Potential counselors need to receive preevent training on radiological risk awareness and a briefing on potential responses. They must be prepared to evacuate with the affected population and offer their services in the shelters. Defusings and debriefings for community groups begin the process of psychological care. Long-term counseling will be

needed for those who are permanently displaced, those who are bereaved through the event, and those who become ill or have a close relative who becomes ill. The counselors may become a critical source of the one-on-one public information discussed earlier (Childs, 2006).

The community at large will also be disrupted and psychologically affected. Even those too far away to be contaminated may believe that they and their families are at risk. The Three Mile Island experience in Pennsylvania showed that unaffected people self-evacuated to distant points because of fear (Drottz-Sjoberg, 1998). Psychological counseling and aggressive public information campaigns must be directed at the unaffected portions of the community as well as the victims. Active intervention in the management and remediation of the radiological event is also critical to the recovery of the general community. The perceived failure of the government to act in a timely fashion in the Three Mile Island event resulted in high anxiety among the unaffected general public (Drottz-Sjoberg, 1998).

Terrorist events using radiological devices are likely to generate low radiation exposure levels for relatively short periods of time. It is critical that the emergency response be an appropriate reaction to the actual threat. Terrorists are anxious for their actions to be as disruptive as possible. Therefore, it is incumbent on the public officials to critically evaluate the actual threat to the population and draw the lines for evacuation and medical evaluation as narrowly as possible. Guidelines like the International Council on Radiation Protection Publication 63, *Principles for Intervention for Protection of the Public in a Radiological Emergency*, can provide guidance for incident commanders and public officials. Such guidelines document what is prudent, while protecting the public officials from overreacting in response to political pressure, thus exacerbating public stress.

14.11 Conclusion

Nuclear reactor accidents in Pennsylvania and Ukraine demonstrate the results of too little government action and delayed government action. The Japanese accident demonstrated better planning and swifter response, even in the face of a much more widespread earthquake and tsunami *triple catastrophe*. Public officials planning for the response to, and recovery from, radiological attacks can benefit from the lessons of these three nuclear power plant events. Illness and injury are most likely to be localized and generally limited to those in immediate proximity to the event site. Most injuries can be ameliorated with rapid medical intervention. Medical impacts on the wider community should be minimal and amenable to relatively simple medical procedures.

Community-wide impacts will be effected mostly by environmental factors: the wind speed and direction, whether the release occurs outdoors or is contained in a building, whether ground water is contaminated, and whether the event occurs in a metropolitan area with little agriculture or in an area with animal agriculture or hunting/fishing resources. The socioeconomic factors in the community may make the response and cleanup easy because people trust the government and understand the information they are given. On the other hand, the situation may be made worse through low educational level, lack of local language literacy or monolingual, nonlocal language barriers, or an overall distrust of the government.

As with any emergency, scenario-based advanced planning will make a response more effective and efficient. Some of the lessons learned from Fukushima, Chernobyl, and Three Mile Island can aid the planner in the quest for a workable and effective all-hazard radiological incident plan.

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Chapter 15

Budgetary Assistance for Nonprofits in Disaster

Barbara L. Neuby

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15.1 Introduction

Throughout our history, nonprofit organizations have always responded to disasters. Local, state, and national organizations like the American Red Cross, the Salvation Army, the North American Mission Board, Lutheran Social Services, and many, many more community- and faith-based nonprofits jump into the thick of the crisis providing food, shelter, rescue, evacuation, medical services, and spiritual care. There are just shy of 2 million nonprofits in the United States, and of those who respond to disasters, most do so out of their own pockets providing millions of dollars in services. Often, nonprofits are themselves victims of disasters losing their equipment, their facilities, or even their volunteers.

The largest organizations like the Red Cross, Catholic Charities, and the United Way take in billions in donations. After September 11, the Red Cross alone took in 2 billion dollars and hundreds of millions after Katrina in 2005 (Rowley 2007). The larger, older, more well-established groups have well-developed funding mechanisms, and these organizations do outstanding work but so do a host of smaller, community- and state-based nonprofits who receive little or no funding and are usually not included in the coordinating process.

The Governmental Accounting Office (GAO) notes the value that nonprofits provide and urges the Federal Emergency Management Agency (FEMA) to do a better job of including them in their disaster planning (GAO 2008, Pipa 2006, Vogel 2009). In fact, nonprofit organizations have been incorporated into disaster planning law and response plans on paper, but federal and state agencies may not have officially incorporated them into their plans or may be unaware of their status.

Federal documents detail a program, the “Public Assistance Program” (PAP), under which nonprofits that participate in a disaster may be reimbursed by the federal government for their services. Although this should be good news to the nation’s volunteer sector, speaking to the leaders and directors of some of the nation’s largest and most well-established nonprofits reveals that nonprofits are unaware of the program and its attendant conditions and requirements. The outline of the process is lengthy and complicated. Organizations always need funds but especially so in tight economic times when timely resources are even more crucial. Can nonprofits take advantage of this program? This chapter investigates the difficulties nonprofits face in reimbursement, discusses why they should be reimbursed, and offers strategies for improving their chances for reimbursement.

15.2 Background

In 1974, the Congress passed the Robert T. Stafford Disaster Act, PL 93-288, 42 USC 5121-5207. The act sets forth criteria for federal response to a disaster when neither the state nor the local government can manage the crisis and provides an overview of the PAP. When a disaster occurs, local authorities respond first, but if they are unable to manage, they will ask the state to respond. If the state is unable to manage the disaster as well, the governor may ask the president to declare a national disaster, but the state is expected to exhaust its capacity prior to requesting assistance. Assuming the president declares a federal disaster, a Principal Federal Official (PFO) is assigned to the event who then instructs FEMA to complete a damage assessment. Once the assessment is done, FEMA will negotiate with the state regarding what type of help will be provided and how the response will unfold. Discussions may or may not include a nonprofit role.

A national umbrella organization, the “National Voluntary Organizations Active in Disaster” (NVOAD), coordinates the nonprofit response to disasters. Their website can be found at www.nvoad.com. In each state, a coordinator works with the NVOAD to organize the group effort. Regional and local organizations are supposed to contact with their VOAD member who, in turn, contacts the VOAD director for each state so that everyone is informed and knows their role in a disaster.

The United States is divided into 10 FEMA “regions” and a federal coordinator for each region is assigned who then directs the specific federal response with the governor’s representative and the PFO. Also in each FEMA region, there is a “voluntary agency liaison” (VAL) who coordinates the federal/state response with the state/local response community. Each VAL may cover several

states simultaneously (FEMA 2009a, Pipa 2006). Not all nonprofit organizations are expected to respond in a crisis (Gibbons 2007, Nwokedi 2005). Therefore, in a federally declared disaster, there is a PFO, a VAL, the NVOAD representative, the VOAD representative, the governor's representative, and the FEMA regional coordinator.

15.3 The Devil's in the Details

As with many federal programs, the devil is in the details. Several hundred pages of documentation describe eligibility rules and reimbursement procedures for nonprofits under the PAP, codified in Title 44 of the US Code of Federal Regulations. FEMA's *Public Assistance Policy Digest* (FEMA 321), the *Public Assistance Guide* (FEMA 322), and the *Applicant's Handbook* (FEMA 323) are all available on FEMA's website at www.fema.gov. As stated, few nonprofit directors are likely to have heard of these documents, be conversant in the US Code of Federal Regulations, or have the time or ability to decipher all that is contained therein. The sheer volume of literature inhibits understanding and a short overview is warranted.

15.4 Organizational Eligibility

States, local governments (including public authorities), school districts, intergovernmental bodies, and nonprofit organizations are eligible for reimbursement, but many conditions apply. Assuming a federal disaster has been declared, the PA process can go forward. The first and clearest requirement is that the organization has tax-exempt status under Section 501 (c), (d), or (e) or as certified by the state (44 CFR 221(f) and 222(b); PAG FEMA 322, 91). Nonprofit directors should know whether they are tax exempt. These criteria are fairly mechanical but very broad in that nonprofit status can be conferred on almost any type of non-moneymaking enterprise such as museums, community centers, and school districts.

Once the organization has received legal tax-exempt status, it becomes a yearly obligation to file and maintain records for the IRS using Publication 990. Maintaining one's "990" records is one of the most important things a nonprofit director does when disaster strikes, yet as many as 60% say they do not adequately maintain these documents (Robinson 2003).

However, that is where simplicity ends and confusion begins. The Congressional Research Service summarizes the *Stafford Act*, as amended, FEMA's *Public Assistance Program Guide*, and the *Policy Digest* in their report, *Reimbursement of Local Private Nonprofit Organizations under the Stafford Act* (CRS 2006). CRS reports that "efforts that protect the lives of the public, such as search and rescue operations, evacuation assistance, mass sheltering, or mass feeding, would all be eligible for reimbursement" (CRS 2006, 3). The *Stafford Act* defines an eligible nonprofit as follows:

private nonprofit educational, utility, irrigation, emergency, medical, rehabilitational, and temporary or permanent custodial care facility. (Sec 102(10) (A))

...includes any private nonprofit facility that provides essential services of a governmental nature to the general public (museums, zoos, performing arts facilities, community arts centers, libraries, homeless shelters, senior citizen centers, rehabilitation facilities, shelter workshops, and facilities that provide health and safety services of a governmental nature. (Sec 102 (B))

Discrepancies in the documents describe one situation when a totally different situation exists in reality. The statutory language earlier notes that only nonprofits who run *facilities* may be eligible, not nonprofit *organizations* themselves necessarily and as the CRS report describes them (italics mine). Therefore, according to this section, a nonprofit must operate a facility in order to be reimbursed. Section 102 (9) describes an eligible facility as follows:

- (A) General: "...nonprofit educational, utility, irrigation, emergency, medical, rehabilitational, and temporary or permanent custodial care facilities (including those for the aged or disabled) and facilities or Indian reservations, as defined by the President."
- (B) Additional facilities: "...any private nonprofit facility that provides essential services of a governmental nature to the general public (including museums, zoos, performing arts facilities...and that provide health and safety services of a governmental nature), as defined by the President."

A "facility" is further defined in the Public Assistance Digest as follows:

a building, works, system, or equipment that is built or manufactured, or an improved and maintained natural feature that is owned by an eligible public or private nonprofit applicant. (p. 43)

The *Stafford Act*, Public Assistance Guide, and FEMA liaisons note that FEMA will only reimburse eligible nonprofit organizations *when* they are included in the state or local disaster response plan, *or*, if they meet the conditions to apply for reimbursement as a "self-applicant," and if FEMA *requests* their participation during a disaster (FEMA 2009) (italics mine). One further, but hugely important, requirement is that services provided must be "outside the organization's basic mission" (FEMA 2001, 91). To illustrate the difficulty of the reimbursement process, after Hurricane Katrina, FEMA states that 45% of the participating nonprofits received reimbursement for their services (Pipa 2006); and, while 45% is better than nothing, the statistic means that 55% received nothing and paid for services out of their own budgets (Edwards 2008–2009). Furthermore, no data are available to show which organizations received reimbursement.

15.5 Service Eligibility

There are seven categories of "eligible services" under the PAP, including

Category A: Debris removal

Category B: Emergency protective measures (search and rescue, mass feeding, sheltering, medical evacuation and reentry, traffic control, and securing equipment and facilities)

Category C: Roads and bridges

Category D: Water control facilities (drainage canals and flood control)

Category E: Buildings and equipment

Category F: Utilities (including wastewater, potable water, and power facilities)

Category G: Parks, recreation (this includes the nonprofit's pools playgrounds and cemeteries) (FEMA 1999a, 48–53)

Mass feeding and sheltering are the most common kinds of services provided by nonprofits; however, they are not the only services available. Lutheran Social Services and the North

American Mission Board, an arm of the Baptist Church, routinely provide evacuation, rescue, cleanup, and mitigation services (Danielsen 2009, Henderson 2009). Debris removal, chain saw work, cleaning, disinfecting, and serving as liaison to other agencies and nonprofits indicate that nonprofits are adept at many of the same functions as FEMA and state and local governments. In Katrina and many other smaller disasters around the country, organizations like Feeding America sent tons of food and volunteers who fed thousands and remained on scene for several weeks (Crawford 2009).

FEMA separates critical from noncritical services. If the nonprofit provides “essential services of a governmental nature to the general public,” it is more likely to receive funding (Stafford Act 102 (9): 42 U.S.C. Sec. 5122 (9)). Services are categorized into “critical” and “noncritical.” Critical services include water, power, sewer, emergency medical, communication, and fire protection (Stafford Act Sec. 406(a)(3)(A)(i) and 406(a)(3)(B); 42 U.S.C. 5172(a)(3)(A)(i) and (a)(3)(B); 44 CFR 221(e)). Noncritical services might include providing medical or emergency care, housing, and counselling. (FEMA 1999a, 14). Other potential reimbursables are for public recreational facilities such as museums, zoos, libraries, and parks (Private Non-Profit Eligibility 2003, FEMA 1999a, 14).

15.5.1 Eligible Facility and Equipment Reimbursement

A nonprofit that loses a facility as a direct result of a disaster may be eligible to recoup this loss if the damaged building was in use during the disaster and the costs induced are not purely maintenance costs (FEMA 2001, 38, 40, 45). FEMA will also not officially reimburse for operating expenses; however, once remedial work has been completed and verified by the auditing and reporting system, funds distributed may be used for any purpose the nonprofit deems worthy (FEMA 1999a, 33). If, for example, a nonprofit suffers loss of a roof, and if repair includes increased cost to bring the new roof up to code, FEMA may cover the difference under the Increased Cost of Compliance Program (FEMA 1999a, 27). These nonprofits may also apply to the Small Business Administration (SBA) for a loan (Stafford Act 406 (a)(3)(A)(ii)).

15.5.2 Ineligibilities

Eligibility for FEMA reimbursement also requires the organization to be an open, public group that does not qualify its membership or participation by any discriminating characteristics such as race, religion, or income status (Stafford Act Sec. 309(b):42 U.S.C. Sec 5152(b)). Nonprofits must also uphold environmental and historical legal requirements and must not engage primarily in political activities, lobbying, or advocacy (FEMA 1999a, 102–111). Those in control of the organization must not profit from disaster activity, have any financial stake in the organization, or primarily engage in counseling, job training, or religious events (FEMA 1999a, 9–17, 32–33; FEMA Policy 9521.3, “Private Nonprofit Eligibility”). An organization that falls into any of these categories jeopardizes its reimbursement potential unless it can prove that providing services and benefits of other types is its primary mission.

If an organization suffers the loss of their facilities as a direct result of a disaster, whether man-made or natural, then reconstruction costs may be partially offset by FEMA or the SBA through a loan. However, routine maintenance, equipment not used in a disaster, or other overhead items such as computers and office equipment are not covered. Given that only 68% of nonprofits regularly backed up all of their data and less than 75% have off-site storage, attention to information systems is urgent (Robinson 2003, 57).

15.5.3 Caveat

The Public Assistance Guide and Policy Digest discuss, in numerous places, the eligibility of private, nonprofit organizations to be reimbursed; yet, when speaking directly to FEMA VALs, it is clear that nonprofits may not apply as a “self-applicant” (Gilliam 2009). FEMA officials claim that the only way in which nonprofits are eligible for reimbursement is to be part and parcel of a state or local government’s emergency preparedness plan. Indeed, FEMA VALs told the authors that nonprofits *must* be part of the local plan. Local governments must be connected to the state plan and wait for reimbursement from the state. Local governments would then pass through any qualified reimbursements to an established nonprofit organization. Neither the Public Assistance Guide nor the Policy Digest discusses the necessary arrangements in order for actual reimbursement to occur. These, it turns out, are separate and additional procedures, documented in another lengthy series of documents (387 pages). FEMA’s website shows the breadth of their procedures:

Standard Operating Procedures

The goal of the redesigned PAP is to provide assistance to our customers in a more consistent, efficient and effective manner. We are achieving this goal by clearly documenting our business processes and training personnel to the doctrine. To this end, we are developing Standard Operating Procedures (SOPs) for various components of the redesigned PAP. SOPs have been completed for the following process elements:

- 9570.2 Public Assistance Coordinator—(PDF 285 KB)
- 9570.3 Case Management File
- 9570.4 Kickoff Meeting—(PDF 366 KB)
- 9570.5 Project Formulation—(PDF 1.41 MB)
- 9570.6 Validation of Small Projects—(PDF 556 KB)
- 9570.7 Immediate Needs Funding—(PDF 129 KB)
- 9570.8 Cost Estimating Format for Large Projects—(PDF 103 KB)
- 9570.9 Historic Review—(PDF 260 KB)
- 9570.10 Environmental Review
- 9570.11 Insurance Review
- 9570.13 Section 406 Hazard Mitigation Review
- 9570.14 Program Management and Grant Closeout (PDF 7 MB, TXT 62 KB)
(FEMA 2009)

It would seem to be a drastic miscalculation for only the largest nonprofits are included in some state and local strategizing for emergency response (GAO 2008).

15.6 Applications Process

A nonprofit must complete a “request for assistance” in which the nonprofit claims reimbursement as a project proposal and sends the same to the state and FEMA. No more than 1 week after the event, a “kickoff meeting” should be held between the state and FEMA and at which the nonprofit’s attendance is “optional” (FEMA 1999b, 2). The kickoff meeting SOP manual is instructive and outlines the set of documents a nonprofit must bring if the state allows the nonprofit to attend. Documentation includes damage estimates or other insurance papers, cost information, amount of funds to be provided by the nonprofit or state for the project, and any other pertinent information

regarding the service or facility. The applicant nonprofit will then receive the PAP guide, the applicant handbook, and four other documents necessary to preparing a project proposal and is advised to “thoroughly review the information” (FEMA 1999a, 10). At the meeting, FEMA will discuss reimbursements, audits, completion of paperwork, FEMA coding, and the “validation” process, among other topics (FEMA 1999a, 17).

15.6.1 Matching and “Pass-Through” Requirements

The Stafford Act and the PAP have matching requirements in which the federal government will typically reimburse up to 75% of eligible service or facility costs. The applications process described at the briefing session, discussed later, includes calculations of state, local, or nonprofit “match,” the share of funds that each nonfederal entity must put up as their “share” of responsibility (CRS 2006, PA FEMA 2001). The federal share only follows after a nonprofit has received private donations or insurance proceeds that lessen the amount a nonprofit may get from the PAP.

When a state has received reimbursement, it is up to the state or local government to “pass through” to the nonprofit organization their share of the reimbursement. The wait could be up to several years as in the case of mega-disasters like Hurricane Katrina and states use voluntary hours in their estimating of project costs even though the state has not incurred any cost for these hours (Crawford 2009).

15.6.2 Briefing Sessions

After a declaration of disaster is made, nonprofits, states, and local governments have 30 days to request disaster assistance. The process begins when a FEMA coordinator for the state hosts meetings in conjunction with the state or local government’s request for disaster assistance. The first meeting is known as the “kickoff meeting” to bring applicants together to determine whether each has provided eligible service for reimbursement. Laws and mitigation activities are discussed. The nonprofit fills out a request for assistance that is then reviewed by the state and FEMA. If the nonprofit is denied, it must appeal to the SBA for a loan. If its request is deemed eligible, needs and costs are estimated in a “project worksheet” (1999b, 25). A “project officer” is assigned to the project and nonprofit. If the project’s cost is below a threshold, it is processed by FEMA and the applicant nonprofit waits for reimbursement, usually a few weeks if the amount is under \$10,000 (FEMA 2009). If the amount is over the threshold for that type of service or repair, several months are required to process the reimbursement; and nonprofits must be prepared to keep records for 3 years on how the funds were spent, accept a federal audit, and file with the Office of Management and Budget, Circular A-133 forms (p. 117).

15.7 Analysis

The PAP fails nonprofits on several fronts. First, our published research (Neuby and Hiers 2010) indicates that few nonprofits know about the program. If one does not know about the program, one can hardly take advantage of it. Second, state and local governments are not including nonprofit organizations in their plans—a crucial step in educating these organizations on their potential role and opportunities. Third, the VOAD representative in each state has no power to force nonprofit inclusiveness into state or local plans. Fourth, the program’s inordinate complexity contains several flaws within. If only facilities are eligible, then program documentation should

clearly so indicate. How will FEMA or states ask for nonprofits' assistance if FEMA and the state do not know the nonprofits exist? And, sixth, how can organizations be expected to deliver services outside their basic mission? Would the Salvation Army suddenly be asked to shore up a levee or build a bridge? Would Lutheran Social Services, specialists in case management, suddenly be asked to evacuate thousands on nonexistent buses or to provide medical care to those same thousands? Given the extraordinary number of instructional pages, the intricate detail, and the plethora of conditions, it is perhaps a wonder that any organization successfully navigated the labyrinth required to be reimbursed at all. After Hurricane Katrina, FEMA states that 45% of the participating nonprofits received reimbursement for their services (Pipa 2006). FEMA's requirements present difficult hurdles to reimbursement. When we all do what we do best and work together, everyone benefits; however, our coordination with nonprofits in a disaster needs improvement.

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Chapter 16

Security for Sale

The Pros and Cons of Equipment Contracts

Barbara L. Neuby

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The price of security is high. Since 9/11, states, cities, and counties have upgraded their preparedness and response capabilities. Training, planning, drills, and new equipment were and still are needed. New organizational structures, new offices, and new procedures have revolutionized the preparedness and response of American governments. But more needs to be done. As every jurisdiction jumps on the security bandwagon, most governments find that they need more equipment, new equipment, or any equipment at all. A market is born and the equipment industry is booming. Communications, transportation, biodetection, medical, testing, and hazardous materials equipment form one of the hottest new markets around the world (Schneiderman 2005). Many companies are running full tilt with three shifts around the clock. No job losses here. For example, from 9/11, we learned of the importance of communications interoperability. The lack of communication between fire and police personnel retarded rescue efforts and was also a problem in the series of interagency exercises, called top officials (“TOPOFF”) in 2000, 2003, 2005, and 2007 (FEMA 2007a, States 2005). During

the 2005 TOPOFF drills at New Jersey and Connecticut hospitals, personnel resorted to personal cell phones to communicate with other departments. The 9/11 commission also placed interoperable communications on their list of urgent, but unmet, needs (The 9/11 Commission 2005), and governments continue to place radio equipment on the top of their wish list.

But it is not only radio and dispatch equipment that is urgently needed. Everything from hazmat suits to bomb and biochemical detection systems to riot gear and armored vehicles is on the list. Equipment becomes obsolete, federal mandates change, and new scenarios force reevaluation of one's needs (National Association of Counties 2003; National Governor's Association 2005, 2010; US Conference of Mayors 2004). Additionally, the aerospace and defense industry has been granted permission by the federal government to offer a wider range of previously military-only technologies to state and local emergency managers. Raytheon, Boeing, and Carrier now offer mobile command vehicles and facial and fingerprint recognition technology better than that which governments could previously buy (Croft 2005). Before the age of terrorism, most emergency managers were prepared for the natural disaster, floods, hurricanes, tornadoes, and maybe earthquakes, but today's environment poses new challenges. Governors and mayors have put security and preparedness right up front, particularly now after the close call of the attempted Christmas 2009 explosion of an airliner. Every emergency response team and manager in America realizes that the range of capabilities needed may be very broad indeed (National Governor's Association 2010, Powers 2005). Team members must meet overlapping and broad demands—demands that require many different kinds of equipment and the knowledge of how to make it work.

But who has the money or knows exactly what is needed to make one secure and ready? The current climate is a security equipment maker's dream. Even if a state or local government has the money to purchase needed equipment, it is difficult to know what to buy and who to buy it from. Governments and businesses wishing to beef up security should think about their goals and abilities, equipment standards, federal regulations, whether to join a purchasing alliance, and whether to buy directly from the government. It is to these considerations that we now turn.

16.1 General Considerations

Prior to making arrangements to purchasing equipment, governments must know their goals and capabilities. All too often these are overlooked and equipment is purchased without adequate understanding of what the government wants to do, needs to do, and where it stands on achieving those capabilities (National Governors Association 2005, 2010, The 9/11 Commission 2005). Other concerns include knowing what equipment meets those needs and from which vendor to buy. What are the costs and the terms of acquiring this equipment? Will new equipment be compatible with older, better-understood equipment? System incompatibility is one of the biggest overlooked problems and hidden costs especially in the information technology area (American Waterworks Association 2005). What training will be required for the new equipment and is that an additional cost? Is the equipment user-friendly or too complicated to be operable during a crisis situation? Who will repair the equipment if something should go wrong and from where will spare parts be obtained? Will the equipment or service be obsolete in a couple of years due to planned obsolescence, a new mandate, or a changing need? Make sure to get vendor references, and, if possible, get the vendor to provide a demonstration.

16.1.1 Standards

Do not neglect standards either. The US Department of Homeland Security (DHS) and other federal agencies provide standards required for every type of equipment or procedure related to security.

Does the equipment meet the standards required either by the state, the DHS, or some other organization? Until you have good solid answers to these questions, buy with caution. Their specifications supersede those of any organization or company, especially if one is purchasing equipment with federal grant money (U.S. Department of Homeland Security 2010a,b). To sort out applicable standards, the US National Institute of Standards and Technology (NIST) has created a web portal, www.standards.gov, that can provide businesses and government information on thousands of specifications used by federal government agencies. The American Society of Safety Engineers (ASSE) also posts new federal regulations for equipment and procedures related to security on its website, www.asse.org, and it provides commentary on a wide range of issues (ASSE 2010). The Occupational Safety and Health Administration (OSHA) also posts requirements for equipment use in the workplace, although their requirements are more safety-focused at www.osha.gov.

All new standards promulgated by any federal agency will first appear in the Federal Register at www.gpoaccess.gov/fr/. The register is a compilation of administrative activity at the US federal level and, even to the untrained eye, offers a bird's-eye view of what is going on with respect to equipment changes or standards for performance. After the proposed standards are passed, they will subsequently appear in the Code of Federal Regulations at www.gpoaccess.gov/CFR/.

Experience is a wonderful teacher and the Transportation Security Administration (TSA) has reoriented the way they procure goods and services. From their previous, and usually agency-wide, mindset of enforcing the contract provisions on the vendor, the TSA has switched to a performance-based perspective. Instead of riding shotgun over the vendor on every contract specification, the TSA gave vendors performance-based goals. That way, vendors could focus on the standards that had to be met. For example, “integrate these two data networks so that operators in both subagencies can access the same data in real time” is a performance-based goal that can be assessed. The contract completion burden is shifted to the vendor to show that the goal has been met. Getting everyone involved in the decision-making process and keeping the lines of communication open between employees, contract managers, and the vendor is another TSA tactic. TSA lets go of the contract reins and allows the vendor to do what it is being paid to do. TSA reported greater overall satisfaction with the contract and more quickly met its interoperability goals with less fuss (Schambach and Duke 2003–2004).

16.2 Going It Alone

Governments have the option to partner with other governments or to purchase their equipment in a single contract with vendors of their choice. Although many governments have partnered with other governments, purchasing on one's own can provide several advantages over allying with other governments. A city or county may engage in personal negotiations with any number of vendors as may be allowable under their own laws. Most governments have established bidding procedures and can more easily control the negotiation process. Since local governments have a wide variety of contracting laws and procedures, going it alone offers flexibility and does not require changes in those laws and procedures (Johnson et al. 2001). Government officials may talk to the actual vendors instead of keeping track of ongoing communications through an intermediary.

In addition, many nonprofit organizations provide lists of suppliers with statistics on their products' use and comments on quality and usage. The National Association of Purchasing Managers through their Institute of Supply Management offers a long list of suppliers at www.napm.org as well as courses in purchasing negotiation (National Association of Purchasing Managers 2005). The American Waterworks Association lists providers of water facility equipment and training through

a “buyer’s guide” on their website, www.awwa.org. Complete contact information for vendors streamlines the process. The National Emergency Management Association (NEMA 2010) offers much detailed information on their website www.nema.org. Up-to-date news, training, forms, and contact information serve security officials well. NEMA offers governments opportunities to join the Emergency Managers Assistance Group where mutual aid can be provided through the group structure. Governments can also keep up with equipment purchases through their connections with colleagues around the country through a “Twitter” page.

Word of mouth is perhaps the best advertising and local governments can go to websites of companies recommended by their peers. Or, they may contact one of the suppliers on the website of the National Memorial Institute for the Prevention of Terrorism (MIPT), at www.rkb.mipt.org. This organization formed after the disaster in Oklahoma City in 1995 and now works in tandem with the DHS. MIPT serves as to “go-to” place for many first responders (National Memorial Institute 2005, 106). It provides organizing lists such as the Standard Equipment List (SEL) and the Authorized Equipment List (AEL)—both from the DHS. Most equipment suppliers realize the value of Internet marketing and supply cost, performance statistics, and terms online.

Buying equipment on one’s own gives the jurisdiction control and perhaps more flexibility than purchasing through a government agency or a purchasing alliance, but there are pitfalls as well. Conducting oversight of vendors may require more time and talent than the government has or can afford. And when something goes wrong, such as vendor nonperformance, the government is on its own against the vendor and lacks the power of numbers in a contract dispute (Johnson et al. 2001).

16.2.1 Cooperative Purchasing Agreements

It may be impossible for any state, county, or municipal government to afford all of the equipment they will need; therefore, equipment and cost sharing may be inevitable (Powers 2005). Forming a cooperative purchasing alliance is a step between going it alone and entering into a larger preset alliance. Cooperative agreements have been around a long time and are popular in school districts and have gained popularity with respect to security equipment (Metropolitan Washington Council of Governments 2010). Interested governments join together based on common needs. Each jurisdiction must pass enabling legislation and create an administrative council that consists of key purchasing officials and other important personnel. A progressive fee structure for all participants may be created to facilitate the participation of poorer jurisdictions. A lead jurisdiction makes contact with willing vendors. Once vendors are identified, care must be taken to adhere to provisions of the *Federal Property and Administrative Services Act*, the *Small Business Act*, the *Buy American Act*, and any pertinent circulars from the Office of Management and Budget, the Office of Federal Procurement, and regulations from a federal agency that may be a party to the procurement process. Caveat emptor! Experienced professionals recommend that governments retain qualified procurement counsel (Feldman 2004). The administrative council must review needs, coordinate purchases with vendors, notify appropriate media outlets, and oversee contract implementation. Go to www.mwcog.org for more information.

16.2.1.1 US Communities Purchasing Alliance

For governments that are overwhelmed by these arrangements, there is always the US Communities purchasing alliance, supported by the National League of Cities (www.nlc.org), the National Association of Counties (www.naco.org), the US Conference of Mayors, and the DHS. This community was designed by local government purchasing officials and links 9000 cities and nonprofit

organizations together in a cooperative purchasing arrangement that enables them to purchase security equipment. Governments can save money, reduce their red tape, and get the most up-to-date equipment. There are other advantages as well.

All local governments, nonprofit agencies, and public authorities are eligible. Professional governmental purchasing managers have achieved volume discounts on common security items. One private company officially sanctioned by the supporting government organizations is Hagemeyer North America. Hagemeyer offers to track grant eligibility and spending for all governments that participate—at no fee to the government. Offering up to 39% off of the retail price for goods and services, Hagemeyer has established connections with a majority of the top industry leaders. The following list is not exhaustive but provides a glimpse of the type of equipment available through US Communities (Hagemeyer North America 2010) (their website is www.hagemyerna.com):

- Personal protective equipment
- Explosive device mitigation and remediation
- Search and rescue
- Interoperable communications
- Detection
- Decontamination
- Physical security enhancement
- Terrorism incident prevention
- Logistical support
- Medical supplies
- Reference materials
- Other public safety and law enforcement equipment

There is no membership fee for participation in US Communities, and Fairfax County, Virginia, is the lead organization that initiates negotiations (Fairfax County, 2005). Products are considered high quality by the supporting governmental organizations (NLC, NACO, US Mayors), and the aggregated purchasing power gives US Communities leverage in acquiring top-of-the-line products with the latest advancements (Herckis 2009, Shapiro 2005).

Joining US Communities may have drawbacks. Loss of control of the negotiation process and product specificity may be two of the most important. As a participant, your government agency may be locked into whatever arrangements have been made to purchase a set of goods and services—even if they are not quite exactly what you want. Local government officials should make sure that the products they are ordering will be compatible with existing systems and that personnel can operate them without a steep learning curve. Are the products “user-friendly?” If software is involved, incompatibility is the death knell of preparedness. Communications is one example. Cited by the 9/11 Commission and the National Governor’s Association, as well as a result of the “TOPOFF” exercises, being able to “crosstalk” between different jurisdictions and departments within one’s own government is one problem that is slowly being solved (NGA 2005, National League of Cities 2005; States 2005, The 9/11 Commission 2005).

16.3 Regulations

Navigating the thorny thicket of rules and laws can be a dangerous minefield for unwitting local managers. Perhaps the most daunting but important of these regulations is the behemoth Federal

Acquisitions Regulations, or “FAR” system. The FAR was created in 1997 with the intent of streamlining federal purchasing rules for federal agencies (Figura 1998). State and local governments that wish to purchase often do so using federal grant money. Stipulations on the usage of that money may include purchasing through a federal agency even if the government has chosen a private vendor. Jurisdictions purchasing in this manner would do well to familiarize themselves with the FAR but, at over 2000 pages, FAR is a hurdle in comprehension (Miller 2005). The brave can go to their website at <https://www.acquisition.gov/far/>.

FAR is not the only regulatory pitfall to avoid. In order to spend DHS grant funds, a state or local government must be compliant with the newly established National Incident Management System (NIMS) created by the DHS. NIMS is the result of Presidential Directive 5 in 2003 and is designed to “ensure that all levels of government across the nation have the capability to work efficiently and effectively together, using a *single national approach* to domestic incident management” (National Emergency Managers Association 2010). A series of training exercises that can be taken in modular format on one’s own, the NIMS plan attempts to create one, basic unified framework of protocols for all governments to use in responding to a disaster (FEMA 2007a, 2010d). All governments hoping to use federal grant money to purchase security or emergency equipment must be NIMS certified (FEMA 2007a). NIMS is intended to

- Be applicable across a full spectrum of potential incidents, hazards, and impacts, regardless of size, location, or complexity
- Improve coordination and cooperation between public and private entities in a variety of incident management activities
- Provide a common standard for overall incident management

NIMS requires governments to

1. Ensure that common and proven incident management doctrine, practices, and principles are used to plan and respond to disasters
2. Maintain a response operation capable of expanding to meet an escalating situation and the ability to integrate resources and equipment from intrastate and interstate mutual aid agreements, state-provided assistance, and federal government response
3. Order and track response assets using common resource typing and definitions and draw on mutual aid agreements for additional assistance
4. Establish staging and allocation plans for the redistribution of equipment, supplies, and aid coming into the area from other localities, states, or the federal government through mutual aid agreements
5. Conduct situational assessments and establish the appropriate ICS organizational structure to effectively manage the incident
6. Establish communication processes, procedures, and protocols that will ensure effective interoperable communications among emergency responders, 9-1-1 centers, and multi-agency coordination systems such as emergency operation centers

Equipment purchases and training are therefore very important in the compliance scheme. The NIMS compliance deadline was advanced to September 30, 2010, and to date, over 1,000,000 state and local officials have taken the NIMS online courses. Emergency managers should take the NIMS 700, 701, and 704 training courses and other officials should review the lower-level

series of courses ICS 100–400 (FEMA 2007b,c). Taking the courses is only the first step toward compliance and most governments find that exact compliance involves much preparation that includes training with the right equipment. For more information, go to <https://www.fema.gov/emergency/nims>.

16.4 Buying from the Boss

State and local governments may eliminate much of the paperwork hassle and worry over meeting standards and regulations by buying directly from the DHS and Department of Defense (DOD). The DOD offers state and local governments the opportunity to purchase directly from the Defense Logistics Agency (DLA) and the Defense Supply Center Philadelphia (DSCP) (US Department of Defense 2010). Under the DSCP Fire and Emergency Services Prime Vendor Program, governments that have received grants may bypass middlemen and go directly to military centers for needed equipment. Some equipment is used but not obsolete and other items are new. Advantages of participation include shorter lead times, online ordering, 24-h customer support, a diverse group of brand name products, surge capability, 7-day delivery for routine items, emergency delivery for some, and the chance to add on a specific item to an existing contract (DSCP 2010). Vendors and their equipment lists are available on the DSCP's website at <http://www.dscp.dla.mil/>. Before viewing, a user ID and a password must be obtained from the DSCP or the prime vendor. Purchases can then be made as long as the government is authorized for that purchase by the rules of the grant process. One caveat here is that only grant money may be used; state or local government money may not be used.

DHS and FEMA sponsor the National Preparedness Directorate (NPD) that offers a wide range of equipment, training, and services to state and local governments (FEMA 2010a–c). The State Homeland Security Grant Program (SHSGP), the Urban Areas Security Initiative (UASI), and, now, the American Reinvestment and Recovery Act (Stimulus II) all provide millions of dollars to help states and local governments improve their security and prepare for emergency. Fire, transportation, infrastructure, communications, and port security equipment are profiled on FEMA's website, www.fema.gov (FEMA 2010a).

One primary program is the Commercial Equipment Direct Assistance Program, or CEDAP. This program builds on the philosophy that smaller cities and urban areas must complement each other during crises by personnel and equipment sharing (FEMA 2010b, Staff Report 2006). Purchases made through the Center for Domestic Preparedness (CDP) programs are automatically in compliance with the FAR. Although the applications cycle is closed as of the end of FY 2008, those governments that have applied have been grandfathered into the FY 2009 and FY 2010 funding cycles. A complete list of recipients is available at http://www.fema.gov/pdf/government/grant/cedap/fy08_cedap_awards.pdf.

Other grant programs under DHS offer governments flexibility in purchasing and a wide variety of training. On the “state contract” homepage, a list of government providers and programs suggests possible resources at <http://www.dhs.gov/xgovt/grants/index.shtm>. Tangential to this program is another program under the Department of Energy and the National Nuclear Security Administration (NNSA) that removes unwanted nuclear material to reduce or eliminate risk. Work and training is done under auspices of the Pine Bluff Arsenal in Pine Bluff, Arkansas. Details are available at www.nnsa.doe.gov (U.S. Department of Energy 2005).

Delivering highly specialized equipment, in “pod” form to emergency areas, is possible and is the purpose of the Prepositioned Disaster Assistance (PPDS) capability program. PPDS consists

of standard sets of common emergency response items that are ready to be deployed to target areas within 1–12 h after an event (FEMA 2010e).

Have information needs? DHS has something for you too. Through FEMA, DHS has provided governments with 2.7 billion dollars worth of grant funding for FY 2010 for information technology and security equipment. Grants are competitive but offer “state-of-the-market” technology that, among other uses, can remove communication barriers, make first responders safe, and bolster one’s infrastructure security (US DHS 2010b).

16.4.1 GSA Schedule

The General Services Administration (GSA) is a federal agency that coordinates the sale of thousands of items commonly purchased by the federal government. With respect to security equipment, state and local governments may purchase a wide range of security and emergency equipment directly from the GSA or from one of GSA’s partners such as the National Association of State Agencies for Surplus Property (NASASP 2010). NASASP offers still-usable items from NASA and other branches of the military at greatly reduced costs. They can be found at www.nasasp.org. Besides the cost savings, the greatest advantages of purchasing from GSA and partners include cost savings, short lead times, low overhead, volume pricing, and FAR compliance (General Services Administration 2010). Every company that sells under the GSA schedule is already judged compliant with FAR (Browne 2004, Ostrow 2005). One worry is thus eliminated. Products can be searched by model, manufacturer, and category. If a government needs products totaling less than \$100,000 or is buying single items or small quantities of standard (not custom) items, purchasing through GSA is a good deal. Go to www.gsa.gov.

16.5 Lessons Learned, Operable Clichés

What can security personnel and emergency managers take away from the table? Several concerns stand out.

1. “*Know thyself*”

It is absolutely essential to determine what the jurisdiction’s goals are, as well as the strengths and weaknesses that exist in the emergency management capability. Until these things are known, a list of needs cannot be drawn up. Before one purchases equipment, it is essential that managers know why they are buying particular equipment, what goals it will serve, and what needs the equipment will fulfill (American Waterworks Association 2010). As Nevada Emergency Director Frank Siracusa noted in his recent interview with the Nevada Appeal, much criticism has been leveled at jurisdictions that were buying up equipment just for the sake of purchasing something (Staff Report 2006).

2. “*Do your homework*”

Once you know your goals and needs, research to find out what equipment or training are best suited to meet them. Word of mouth of fellow emergency managers is perhaps the best method of keeping your agency informed. Cultivate relationships with other jurisdictions, visit them, look at their equipment, and ask for a demonstration. Go online to the websites and see which vendor offers which equipment and learn the terms. Check out rating sites for standards and FAR compliance like those offered earlier. Hundreds of thousands, maybe millions, of dollars are involved. Lives may be at stake. The purchase must be right.

3. “Read the fine print”

As tedious as this may be, it is necessary to avoid vendor or purchasing alliance misunderstandings. Give yourself adequate time to review documentation and solicit expert opinion if possible. Get the facts and figures clear in your mind and in the minds of those who will use the equipment. Do not assume information; ask vendors for clarification. Study the options for purchasing, remembering that certain federal DHS programs require only Office for Domestic Preparedness grant money be used for some purchases.

4. “Talk it over”

Everyone who will use, pay for, store, move, or otherwise be involved with the contemplated equipment should be involved in discussions surrounding the purchase. Workers who are left out of the loop may have crucial questions go unanswered. An emergency is no time to be asking questions. Being left out can cause resentment that could impact crisis response. Relationships involving large, expensive equipment such as command mobile vehicles are also important. Get it clear up front who is going to pay for, operate, transport, and store such equipment; otherwise, the result may be that it does not get transported at all.

5. “Take a test drive”

Very few people would buy a house or a car without driving or inspecting it first. Security and preparedness equipment may save lives and property. What better reason to inspect before you buy? Unless it is common, familiar equipment that has been purchased before, physical inspection often reveals and avoids huge problems later on. Size, specifications, operability, model features, and standards compliance are but a few items that should be checked in any inspection. There is no substitute for seeing equipment in operation. When physical inspection is impossible, it is imperative that managers check out online ratings boards or call colleagues. Rumor serves a legitimate purpose here.

Purchasing security equipment is now a major part of government expenditure and will remain so for the foreseeable future. Lives and property may be at stake. The very continuance of the government may someday depend upon the equipment you have and how well it serves your needs. Choose wisely.

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Chapter 17

Managing Refugee-Assistance Crises in the Twenty-First Century

The Intercultural Communication Factor

Peter Koehn and Phyllis Bo-Yuen Ngai

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17.1 Introduction

Most emergency assistance operations are complicated by institutional pluralism and interdependency (Siegel, 1985:109–110). The inherently multicultural nature of refugee-assistance situations, coupled with the involvement of international agencies and nongovernmental organizations (NGOs), adds to the complexity of the crisis management challenge.* While the complications arising from cultural and institutional pluralism are particularly pronounced when crises involve refugees who seek “sanctuary in a totally unfamiliar culture” (Cuny, 1979:359), the diversity of existing human resource and host-community environments in the twenty-first century ensures that persons responsible for managing refugee-assistance crises increasingly will be called upon to engage in intercultural communication.

Communication undergirds all aspects of crisis and emergency management. Most fundamentally, skill in information sharing and active listening is “crucial in enabling people to work together on a common task or towards a common goal” (UNHCR, 2008a:96). In this chapter, the authors first identify critical intercultural communication needs and roles, with refugee-assistance operations providing the basis for analysis. The following section presents practical guidelines for effective communication in each strategic situation. The suggested guidelines are rooted in intercultural communication studies but are specifically adapted to the challenging field conditions that characterize complex refugee-assistance crises. In a separate chapter prepared for this volume, the authors elaborate a training program designed to develop competency in intercultural communication among individuals responsible for managing current and future refugee-assistance crises.

17.1.1 Refugee-Assistance Crises

Roughly 11 million officially recognized refugees[†]; some 5 million uprooted men, women, and children who are seeking political asylum; and 26 million others who have been internally displaced by violent conflict or persecution live in vulnerable conditions around the world (UNHCR, 2008b).[‡] In the case of refugees, it is failure to resolve an internal or international political conflict

* Gil Gunderson observes (2001:631) that “a complex crisis involves many actors, and each participant has its own objectives and means to preserve or transform the situation. Seldom is there a single crisis, but rather each crisis situation comprises various crises, each one conceived from a different perspective depending upon the participants’ perspectives.”

[†] This figure refers only to refugees under the mandate of the UNHCR; more than 4 million Palestinian refugees fall under the separate mandate of the United Nations Relief and Works Agency (UNRWA) for Palestinian refugees in the Near East (*Go between* 114, July–September 2007, p. 26).

[‡] Politically and militarily uprooted persons are often joined by those forced to migrate by crises brought about by environmental and natural-resource destruction and mismanagement (see Boano et al., 2008). As Betts and Kaytaz (2009:4) point out, “the combination of livelihood collapse, environmental disaster, and state failure is increasingly contributing to non-refugees leaving their country of origin because of an existential threat for which they have no domestic remedy.” At the currently projected rate of atmospheric warming, roughly 150 million people residing in coastal zones less than 1 m in elevation will be directly vulnerable to displacement due to thermal expansion of the oceans before the end of this century (Piguet, 2008:7–8).

of one type or another peacefully that typically produces a crisis of emergency and development assistance. Today's externally and internally displaced persons most frequently are the casualties of homeland political crises. They flee persecution and life-threatening situations that arise for a variety of reasons, including one's political opinions, expressions, and/or associations, religious convictions, and ethnic identity(ies). Many are the victims of political, religious, and nationality strife in disintegrating or reconsolidating states that engulfs noncombatants and generates extreme polarization and heightened animosity among neighbors with differing characteristics.

Forced migration simultaneously engages cumulative social-change processes (including isolation, marginalization, segregation, concentration in unhealthy environments, and discrimination) and risk-taking behaviors that are associated with increased susceptibility to and spread of noncommunicable as well as communicable disease (Smith and Yang, 2005:115–116, 122–123, 131; Toole, 2006; Levy and Sidel, 2007). An African war zone study carried out by Physicians for Human Rights concluded that the “first killer is flight” for desperately poor persons driven by conflict from a fragile existence into a hostile and personally threatening environment where health services are nonexistent or not functioning (Lacey, 2005).

It is safe to assume that management of the catastrophic situations requiring immediate action that arise from the presence of politically dislocated persons in countries of asylum will continue to demand attention. Refugee-assistance crises in the twenty-first century are likely to remain distinguished by (1) extreme vulnerability and serious threats to survival prospects due to loss of access to material resources and to kinship-support systems (Chambers, 1979:386; Hansen, 1979:369; Bemak et al., 1996:248–249), (2) a narrow time frame for responding to multiple threats (UNHCR, 2006:91), (3) recurrent, rather than exceptional or occasional, emergency conditions that generate long-term community and cultural disruptions, (4) unpredictability (Gunderson, 2001:631–632) and political complexity (see Koehn, 1991), (5) a high probability that violence and forced dislocation will recur, (6) humanitarian action accompanied by political/military action,* and (7) funding cuts accompanied by declining refugee-protection standards (Whitaker, 2008).

In this chapter, the authors focus on refugee assistance in countries of first asylum. Most victims of political dislocation confront a state of perpetual crisis in first-asylum situations. Organized settlements for displaced individuals and families vary in land area, population size and composition, available resources, and organizational presence, including camps that “can be likened to virtual cities in view of their population and demographic density” (Perouse de Montclos and Kagwanja, 2000:205, 208–209). Refugees typically face an unending series of threats to their health, psychological well-being, physical safety, family life, economic security, and survival capacity. Relations within and among groups occur in a context of fear, exploitation, competition over scarce resources (Whitaker, 1999), mistrust, hatred, violent conflicts (e.g., Berry, 2008:14), individual tenacity, and social resilience (Porter et al., 2008:231). Concomitantly, the impact of assisting refugees further burdens and damages inadequate local infrastructures and environmental conditions in most first-asylum situations (see, for instance, Zetter, 1995:1658–1659, 1661). Crisis management, therefore, needs to be broadly defined to include most aspects of refugee assistance along the relief-to-development continuum and to encompass returnees and impacted local population as well as the externally and internally dislocated (see also Anderson and Woodrow,

* See Lionel Rosenblatt's controversial proposal for the creation of an “international rapid reaction force” charged with protecting humanitarian-assistance workers, weeding out intimidators from the general refugee population, and preventing emergencies (such as the 1994 genocide in Rwanda) from exploding (Rosenblatt, 1977:8; also see Minear and Guillot, 1996:168–169; UNHCR, 2006:101).

1989:73; McKelvey, 1994:16; van Rooyen, 1994:43; Zetter, 1995:1658–1659, 1661, 1665; Koehn and Ojo, 1997:116).

17.1.2 Multicultural Refugee-Assistance Environments

In countries of first asylum, persons involved in refugee-assistance crisis management find it necessary to interact in at least three overlapping multicultural environments. These are the internal workplace, interorganizational forums, and community relations.

Internally, international organizations, such as the United Nations High Commission for Refugees (UNHCR), and many NGOs field a multinational staff of technical and administrative personnel that consists of employees hired from the local host community(ies) and assistants drawn from refugee communities* working on multifunctional teams (UNHCR, 2008a:102–103) alongside expatriate professionals and, occasionally, volunteers. The multiethnic composition of most first-asylum countries also frequently results in multicultural staffing within the host-country national and local government agencies assigned to work with refugees and with NGOs.

Although NGOs are assuming increasing responsibilities as governmental bilateral and multilateral aid budgets shrink, persons working for humanitarian-assistance organizations in international crisis and emergency management capacities often lack the transnational professional skills required to manage their organizations effectively and with success in realizing urgent goals (see Koehn and Ojo, 1997:124; Koehn and Rosenau, 2010, especially Chapter 9). The growing need among multicultural NGOs for facility in intercultural communication and decision making can be illustrated with reference to the Association of Medical Doctors of Asia (AMDA).

AMDA, a multinational NGO established in 1984 by young doctors from Japan, India, and Thailand, provides health care for refugees and assists the victims of natural emergencies in Asia, Africa, and Central Europe. AMDA also serves as the Secretariat for the International Network of NGOs for Emergencies and Development formed under the 1994 Okayama Declaration. In their field sites, AMDA's Asian Multinational Medical Missions (AMMMs) operate on the basis of the "coexistence of diversity" (*sougo-fujo* in Japanese). An AMMM might consist of a physician from Nepal, a Filipina nurse, a midwife from Bangladesh, and a project coordinator from Japan (Yamamoto, 1995:139). In serving the population of a refugee camp, an AMMM typically is assisted by a small expatriate fiscal and administrative staff. The expatriate team also depends heavily upon locally recruited personnel who serve in medical and support capacities. AMDA's experience with multicultural field staffs indicates that the cross-national professional standards adhered to by personnel in medical fields (including physicians, nurses, and paramedics) are relatively uniform, widely recognized, and of high quality. However, AMMM managers, other administrative personnel, and professional medical staff typically lack the communication and related skills required for crisis management in multicultural contexts (Yamamoto, 1995:140; see also Koehn and Rosenau, 2010, chapter 10).[†]

The nationally and culturally diverse employees of international, donor, indigenous and Northern NGO, and host-state organizations also must regularly interact and consult with each

* At the turn of the century, CARE employed more than 1000 refugees in Dadaab camp (Perouse de Montclos and Kagwanja, 2000:218).

[†] In another telling case, Peter Woodrow reports on the multicultural perspectives faced by the staff of Catholic Relief Services working on a health-care project among Khmer refugees in Surin, Thailand. Woodrow observes that "refugee workers, locally hired national staff, the expatriate staff (further divided among Third World and European/American people), the country office personnel in a capital city, and the headquarters staff in the United States or Europe: each had a different viewpoint" (Anderson and Woodrow, 1989:312).

other. Crisis management initiatives must be coordinated with the responsible host-government authority as well as with the UNHCR (and/or another UN agency) and/or the UNHCR-designated lead NGO (or Coordinating Agency for International Assistance).^{*} This communication interface, which presents the second crucial multicultural operational context in the management of refugee crises, can be harmonious, respectful, cooperative, and productive or competitive, conflictual, and damaging (see Aall, 1979:429–434; Karadawi, 1983:543–545; Anderson and Woodrow, 1989:153, 255; Eade and Williams, 1995:870; Riker, 1995:49, 51; Zetter, 1995:1664, 1653; Minear and Guillot, 1996:64).[†] The involvement of many NGOs in a complex crisis situation exacerbates the difficulties encountered in providing policy coordination, a comprehensive management overview, and useful networking among implementing agencies (Zetter, 1995:1663).

Thirdly, the professional and administrative crisis management staff of field organizations must work in partnership with displaced persons who have (often spontaneously) self-settled,[‡] refugees living in official and planned resettlement areas or camps, political factions, and/or host-community populations—whose nationality and cultural background(s) usually differ from those possessed by most of the stakeholders in the two environments discussed previously (see Ngai and Koehn, 2005:233–236). Although the nature of agency–client interactions largely determines the outcome of crisis management interventions (Mazur, 1987:451–452; Koehn, 1994b:103), emergency managers often fail to consider the diverse community contexts they must operate within (Neal and Phillips, 1995:332–333). In order to succeed in managing refugee-assistance crises, field staff must be capable of understanding and working in partnership with populations possessing different ethnic, subcultural, economic, and linguistic backgrounds in situations where time and information are especially constrained (Phillips, 1993:108; Burge, 1995:157; van Bergen, 1995:27; Yamamoto, 1995:140). Specifically, they must be sensitive to local cultural requirements (Neal and Phillips, 1995:333), emergent norms (Schneider, 1992:135, 137–138), and potential intercultural conflicts (Karadawi, 1983:540; Phillips, 1993:101–104) in emergency management situations. In Tanzania, for instance, two NGOs working in refugee camps and surrounding villages (CARE International and Relief to Development Society) convene *conflict resolution meetings*. Attending stakeholders include “village leaders and representatives, refugee leaders and representatives, UNHCR staff, camp management [CARE & REDESOS] officials, Tanzania’s Ministry of Home Affairs and District Natural Resources Offices employees and other NGO staff” (Berry, 2008:14–15).

To sum up, the overlapping transnational and multiethnic relationships that characterize the three principal refugee-assistance environments present a complex challenge for crisis

^{*} See the informative case studies describing the complex and shifting relations that exist among these actors presented in Zetter (1995) and Juma (1995:99–114).

[†] Also see Riker’s discussion of the “five main modes of interaction or exchange between the central government and NGOs” (Riker, 1995:29–35). The effectiveness of intercultural communication links among NGO personnel and indigenous government professionals depends, to a large extent, on the level of trust that exists among work group members. When mistrust prevails, “cultural differences in values, experience, and working practice become a source of stress, divisiveness, and miscommunication rather than an opportunity for valuing diversity and more creative decision making” (Ojelay-Surtees, 2007:6).

[‡] Kuhlman (1994:124) points out that “most refugees in Africa are spontaneously settled.” For instance, approximately 300,000 Rwandan refugees settled outside camps in the North Kivu region of (then) Zaire in 1994 (Porignon et al., 1995:357). Self-settlement also prevailed among refugees from Mozambique who fled to Malawi (Zetter, 1995:1655) and among Eritrean refugees in Sudan (Karadawi, 1983:538). The government of South Africa pursues an unofficial “no camps” policy (Betts and Kaytaz, 2009:15).

management. In these multiple connectivity settings, intercultural communication (nonverbal as well as verbal) assumes critical importance (UNHCR, 2008a:97). Intercultural misunderstanding and miscommunication result in conflict, squandering of scarce resources, human suffering, and administratively induced disaster.

17.2 Critical Intercultural Communication Needs and Roles in Refugee Assistance

All communication is culturally shaped and defined (Philipsen, 1992). Communication and culture constantly interact and exert mutual influence in transnational cooperation efforts. The transmittal of intended information is rendered complex and risky by cultural and linguistic diversity (Dupont and Faure, 1991). In crisis management situations requiring intercultural interaction, differences in values, verbal and nonverbal styles, and notions of power* can seriously impair communication competency. Cultural orientations can affect the process of achieving transnational and interethnic cooperation in at least four crucial ways: by shaping one's perception of reality, by filtering out inconsistent or unfamiliar information, by projecting unintended meaning onto the other communicator's verbal and/or nonverbal behavior, and by leading an ethnocentric person to adopt an incorrect explanation of motive (Cohen, 1991).

Although of vital and growing importance, the role of intercultural communication is relatively unexplored in the crisis management context. Using functional and temporal analysis, we are able to identify key focal points for intercultural communication in the management of refugee-assistance crises. On the basis of the analysis of crucial communication needs and roles presented in this section, the following part of our chapter will provide practical intercultural-communication guidelines for refugee-assistance practitioners.

17.2.1 *Functional and Temporal Analysis*

In the management of complex assistance crises, preparation for effective intercultural communication requires process awareness. The particular intra- and interinstitutional process at stake shapes demands for communication among the actors involved in each specific situation. Institutional processes and communicators are elucidated through functional and temporal analysis.

The strategic management of refugee assistance encompasses a wide range of vital functions. The key functions identified by the authors are needs assessment and vulnerability/capability analysis, resource identification and mobilization, service provision, conflict management, training, and accountability.† These management functions must address the interests of both staff and service recipients. Each function requires tailored and timely (see Anderson and Woodrow, 1989:49) interventions of (1) information (collection and sharing), (2) authority (provision and allocation), (3) supplies and materials (arrangement and distribution), and (4) human resources (mobilization and utilization). In this discussion, temporal analysis will be limited to two broad action phases: immediate and advanced. The immediate phase roughly corresponds with emergency response

* Whose knowledge is valid? Whose time frame to go by? Whose language to use? See Barnett and Cheney (2005: Introduction).

† Due to space limitations, it has been necessary to withdraw the discussion of training and accountability from both the analysis and guidelines sections of this chapter. Interested readers can receive a copy of this discussion by submitting a request directly to the authors.

and emergency relief operations (see Neldner, 1979:396; Dynes, 1983:654; Karadawi, 1983:541), while the advanced stage encompasses settlement, community (re)establishment and recovery (Dynes, 1983:654), economic adaptation and social integration, preparation for sustainable development (Koehn, 1994a), and repatriation.

17.2.1.1 Function 1: Needs Assessment and Vulnerability Analysis

Basic needs assessment and vulnerability analysis are *information-intensive* activities. The goals are to articulate and convey reliable information about priority needs that is required for planning and decision making and to ensure that relief measures are linked to development and community self-reliance (see Anderson and Woodrow, 1989:326–327; Eade and Williams, 1995:825, 835). In the immediate phase, the staff members of refugee-assistance agencies are deeply involved in the initiation of needs-assessment undertakings. Their involvement includes collecting basic data on crisis conditions (“what has happened”—Dynes, 1983:655) through observation, conducting interviews with arriving refugees, listening carefully to those who “have less voice or feel less free to use their voices” (UNHCR, 2008a:97), undertaking surveys and constructing needs profiles, and initiating useful community-based information-gathering techniques such as rapid health appraisal. Since they are the exclusive source of urgently required information, refugees also play an instrumental role in the immediate-action phase. NGO staff typically are most active in the process of giving voice to pressing needs and concerns at the onset of a crisis (see, for instance, Zetter, 1995:1656) and in focusing attention on vulnerabilities that, if not addressed, could result in future disasters (Anderson and Woodrow, 1989:10–14, 47).

Staff members participate less directly in information gathering during the advanced stage of needs assessment; they focus on interpreting, refining, and amending priorities based upon client input. Through methodologies such as participatory rural appraisal (see Chambers, 1994), the refugee community assumes the lead role in gathering information from and about newcomers and regarding changes in needs over time (Anderson and Woodrow, 1989:48). Advocacy tends to be shared in the advanced stage of a crisis and aimed increasingly at local government authorities (Munteanu, 2008:22, 16). Information exchange, dialogue, problem sharing, external briefings, constructing databases of NGO activities, and the communication of successful initiatives among government authorities, donor officials, and local and international NGO personnel take place in established and newly created informal and formal forums (Bennett, 1995a:15–22; Bennett and Benson, 1995:175; Burge, 1995:151, 159; Riker, 1995:30–49). Refugee and host communities articulate their concerns through local political structures, coordinating committees, and/or subcommittees (on the latter, see Eade and Williams, 1995:879).

In refugee assistance, as in other complex emergencies, the need for informed and rapid decision making requires extensive delegation of *authority* for needs assessment to the field level during the immediate-response phase. At this stage, individual refugees also are relied upon to articulate urgent needs. In the advanced phase, assistance personnel transfer needs-assessment authority and responsibility for project identification and selection to the refugee community and are expected to refrain from intervention. Once participatory community appraisal and early warning systems are in place, refugees assume primary authority for identifying and ranking needs, and internally selected leaders are relied upon to communicate priorities to assistance agencies.

In the immediate phase of a refugee-assistance crisis, agency staff procure, transport, and distribute the *supplies and materials* required for needs assessment. With support from refugee assistants, they also initiate and organize planning activities. In the advanced phase, the refugee community assumes a larger direct role in the logistics of needs assessment.

The *human resources* required to conduct needs- and vulnerability-assessment exercises often are deployed by refugee-assistance agencies in the immediate phase of a crisis (UNHCR, 2006:94), even when efforts to engage communities in identifying their own leadership structure are initiated at once (Eade and Williams, 1995:879). In the advanced phase, agency staff confine their involvement to training in the methodology of assessment techniques such as participatory community appraisal, and the principal human resources involved are drawn from the affected communities. The emphasis at this stage shifts to enhancing human capacity for self-reliance over the long term (UNHCR, 2006:96).

17.2.1.2 *Function 2: Resource Identification and Mobilization*

Refugee-assistance crisis managers are challenged by immense resource needs. The task of assembling accurate *information* regarding existing resources and distribution systems falls largely upon the staff of assistance agencies during the immediate phase of action (also see Anderson and Woodrow, 1989:47; Riker, 1995:23; Yamamoto, 1995:140). Although typically initially dispossessed of personal or collective material assets, refugees often can offer access to vital information concerning local resources—particularly how potentially available contributions of community shelter, labor, and expertise are organized/allocated and can be mobilized (Dynes, 1983:657–658). Refugee involvement in information gathering increases when they have succeeded in overcoming the initial disorientation that typically accompanies dislocation. Much of the information needed for sustained resource mobilization must be provided by refugees and hosts. Furthermore, involving community members in data gathering “can empower local people and increase their understanding of and ability to cope with their own situation” (Anderson and Woodrow, 1989:45).

The formal *authority* to identify and secure material resources and human skills to be applied in addressing refugee crises rarely is delegated either within assistance agencies (see, for instance, Zetter, 1995:1664) or to the client group. Lack of delegation in this functional area exists in both action phases. Gil Loescher (1993:186) adds that “in many cases, international organizations and NGOs have delayed assistance to people whose lives were at risk, either because governments have not given their consent or because no central authority exists to request and authorize outside aid.” Out of necessity, therefore, industrious and entrepreneurial local staff members and resourceful refugees assume independent resource mobilization roles in the face of urgent and chaotic conditions that often prevail during the immediate assistance phase as well as during unanticipated and pressing situations that arise in the advanced phase.

The *supplies and materials* required for resource identification/mobilization and capabilities analysis tend to be commanded by agency staff during the immediate-action phase and largely retained even during the advanced stage of assistance. Individual refugees from the client community rarely are provisioned for resource mobilization. In the immediate post-disaster period of refugee assistance, supplies and materials are gathered locally; externally mobilized resources begin to arrive at a later date (see Neldner, 1979:396–397). The critical intercultural-communication challenge in both phases involves identifying and overcoming obstacles to the mobilization and effective distribution of supplies, materials, and skills that are available from diverse sources.

The *human resources* of value in conducting capabilities studies and in identifying prospective material resources are distributed among refugee-assistance agencies and client communities. At the immediate-crisis stage, stakeholders count on agency staff to begin to identify specific decision-making and task-performance capabilities (see Anderson and Woodrow, 1989:47, 71). In the

advanced phase, members of the refugee and host communities are expected to assume primary responsibility for these human resource identification functions.

17.2.1.3 Function 3: Service Provision

The most fundamental and encompassing responsibility in the management of refugee-assistance crises is basic service provision. Before outsiders arrive, refugees and impacted-community members offer limited rescue and emergency assistance that frequently is unevenly distributed and not accurately concentrated relative to need (see Siegel, 1985:108; Anderson and Woodrow, 1989:50). In light of the broader overview they typically possess, once coordinating NGO and government staff members appear on the scene, they usually play the lead role in sharing and applying essential *information* in a *timely and synergetic* manner (Riker, 1995:44) that facilitates service provision in the dynamic environment that prevails during the initial stage. In the immediate-action phase, moreover, agency personnel generally command official sources of information about available services. However, extensive informal means of communication, including rumors, also exist within the community(ies) being served. In the advanced phase, staff share the dissemination of official information function with representatives of the refugee and host communities, and the informal circulation of information about service provision and/or lack of service provision persists.

In the immediate phase of refugee-assistance crises, *authority* within agencies is delegated to the field level to allow for rapid decision making and decisive action in terms of emergency service provision. In some cases, authority to deliver services is shared with refugees and flexible emergent entities. For instance, UNHCR's quick-impact projects (QIPs) are fast disbursing, designed to evoke community participation, and implemented by NGOs (McKelvey, 1994:15; van Rooyen, 1994:44). In the advanced phase, the personnel of most agencies continue to possess considerable authority in the realm of service provision, although the refugee and host communities increasingly become directly involved through field-based coordinating structures (see Bennett, 1995b:xxi).

At the outbreak of an emergency or disaster, the host community frequently will provide emergency supplies of food and shelter (see Anderson and Woodrow, 1989:50; Zetter, 1995:1655). After they arrive on the scene, agency staff tend to control mobilization and distribution of the *supplies and materials* that accompany service delivery during the immediate-action phase. One international or, more rarely, indigenous agency is likely to be responsible for the overall coordination of efforts (see Zetter, 1995:1656). Refugees are likely to assume both official and informal roles in the recipient-registration process and in the distribution of supplies and materials at this stage when urgent and large-scale operations are involved (see, for instance, Anderson and Woodrow, 1989:276). In the advanced phase, assistance-agency personnel attend to the logistics of arranging and distributing the supplies needed for service provision (see Neldner, 1979:397; Eade and Williams, 1995:962–969), and the refugee community assumes a central role in the distribution process.

The mobilization of *human resources* for urgent service projects during the immediate phase of a refugee-assistance crisis involves both agency staff and the refugee and host communities. Staff focus on recruiting and supporting personnel from outside the area (see, for instance, Anderson and Woodrow, 1989:87, 327) and on applying their own expertise, while refugees and hosts attempt to engage the participation of community members. During the advanced-action stage, reliance on external personnel is reduced and the refugee community is expected to become increasingly involved in and adept at mobilizing members to assist in the provision of vital services.

17.2.1.4 *Function 4: Conflict Management*

The refugee-assistance process is filled with potential for conflict and threats to security (see, for instance, Anderson and Woodrow, 1989:303–312; Minear and Guillot, 1996:65). Some of the conflicts that arise are healthy and result in improved decision making, while others are destructive in terms of refugee assistance and local resources (Chambers, 1993:32, 36–37; Berry, 2008:14, 16). The management of complex assistance crises is marked by the constant need for vigilance and culturally sensitive negotiation. Conflict management is important in both action phases.

In the immediate and advanced phases, both agency staff and members of the refugee community typically play vital roles in contributing *information* of value in the conflict management process (see Yamamoto, 1995:140). The level and type of conflict and threat determine which actors possess the information required by crisis managers.

Agency staff tend to retain formal *authority* for conflict management during the immediate stage of complex assistance crises. Although high-level NGO and government officers intervene on an occasional and selective basis, the authority to deal with conflicts is decentralized within agencies in order to facilitate rapid decision making and decisive action. In addition, one typically finds that community leaders perform important informal negotiation roles during the immediate-action phase. Later, agency staff discover that delegating authority for intra-camp conflict management to the refugee community allows them to avoid becoming embroiled in distracting issues and facilitates the management of refugee assistance. Gains also are made by encouraging representatives of both refugee and host communities to participate in conflict resolution by explaining the factors contributing to problems or conflicts that spill over camp boundaries and by engaging one another in a search for solutions (Berry, 2008:15).

In both phases, the *supplies and materials* required for effective conflict management tend to be controlled by agency staff. However, as relations of trust are built over time, such resources are likely to be shared with refugee leaders who are active in informal negotiation and balance restoration.

In the immediate-crisis phase of refugee assistance, conflict managers tend to rely upon external arbitrators and mediators. For this reason, assistance-agency personnel initially are more involved in *human resource* mobilization than are refugees. In the advanced phase, in contrast, local actors assume the most critical conflict management roles and the refugee and host communities become centrally involved in identifying effective negotiators.

17.2.2 *Path Analysis*

In the management of refugee-assistance crises, the intercultural communication of required information occurs along vertical, horizontal, and informal paths. The discussion presented in this section includes reference to the semiformal connections, or networks, that are typically present within each path.*

17.2.2.1 *Vertical Communication Paths*

In refugee-assistance crisis management, there are three principal vertical communication paths. The first connects NGO field offices with local, provincial/state, and national government offices and with multinational agencies. The second involves hierarchical communication within NGO

* Deborah Eade and Suzanne Williams (1995:377) point out that “networking enables groups and organizations to maximize or ‘scale up’ their impact by sharing their knowledge, complementing each others’ work, and building links and alliances in a systematic way.”

agencies and government organizations. The final vertical communication path links impacted communities with NGO and government operations.

The multinational staff of refugee-assistance NGOs engage in constant communication concerning both policy and technical issues with local, regional, and national government offices as well as with multinational and bilateral donor agencies. These vertical communication exchanges deal with a wide range of policy requirements and options, the needs of settled and spontaneous refugees and members of impacted communities, delicate land-use issues, resource and technical-assistance requests, human rights concerns, repatriation prospects, protection and security issues, and evaluation efforts. In addition to information sharing, such interorganizational, intersectoral, and intercultural contacts are vital for negotiating consensus on plans and decisions that affect the work of persons from various organizations at different levels as well as in the allocation of needed resources (Siegel, 1985:109, 111).

The second type of vertical communication involves hierarchical exchanges within government structures and NGOs. Intragovernmental communication patterns tend to be complex and cumbersome in many host countries. They are influenced by the system of local government, which can involve a mix of delegation, deconcentration, and devolution (see, for instance, Hyden et al., 1996:31). Vertical communication within multicultural NGOs generally involves field-office and in-country-headquarters staff and poses special challenges in light of the limited opportunities available for face-to-face interaction among both administrative and technical personnel at different hierarchical levels and in distant geographic jurisdictions. Another important set of vertical communication exchanges involves interactions among in-country NGO officials and out-of-country headquarters personnel and, in some cases, agency governing boards. This set of hierarchical-communication transfers emphasizes refugee-needs assessment, resource and technical-assistance requests, environmental protection, accountability, training, and the security and quality of life of assistance workers.

The third, and most extensively multicultural, set of vertical communication exchanges links refugees and the local host population to local NGO and government personnel. Information transfers among these groups tend to be devoted to physical- and mental-health conditions, service and resource provision, environmental protection, repatriation, and community protection and security issues.

17.2.2.2 Horizontal Communication Paths

In the management of refugee-assistance crises, there are three basic types of horizontal communication. The first involves intra-agency interaction. The second concerns communication between refugee and local host communities and assistance personnel at the grass roots. The third type of horizontal communication consists of interagency contacts.

Intra-agency horizontal exchanges focus on the coordination of staff efforts; collective decision making; working conditions; resource mobilization; accountability; connections among administrative, technical, and client considerations; conflict management; and the protection and security of refugees and staff. Such communication will be predominantly intercultural in multicultural assistance agencies. In particular, effective intercultural communication links need to be forged among the NGO's expatriate staff, workers drawn from the local population, and refugee employees and volunteers.

In virtually all instances, the information exchanges that arise among diverse refugees and poorer and less poor members of local host communities (on the latter, see Chambers, 1993:40), and among both separately with agency staff, will require intercultural communication. These two-way horizontal communication paths also require sensitivity to the special requirements

of refugee women, young adults, the elderly, and the disabled (Chambers, 1993:41–42; Koehn, 1994a:60, 64, 73). Staff–community partnership relations rank among the most complex and important links in the management of refugee-assistance crises, where misunderstandings due to lack of effective intercultural communication are rife.* Such grassroots communication transfers are likely to encompass needs/vulnerability/capability assessment, collaborative-service provision, resource mobilization, land use, environmental protection, conflict management, and community protection and security. In this vital horizontal communication realm, multicultural NGOs often perform a central facilitating role in network creation. The broad range of local, national, and international contacts developed by experienced NGO staff enables them “to take the initiative in putting people in touch with each other, meeting the costs for groups to get together, providing resource materials, and supporting the necessary follow-up” (Eade and Williams, 1995:379).

In the interests of (1) coordinated action, (2) the effective utilization of scarce resources, and (3) sharing updates on recent developments and unmet needs, specialized networks are developed for rapid and reliable horizontal communication among NGOs and between local NGO personnel and the field officers of government agencies. These communication networks, which typically require intercultural competence, are found in the vital functional performance areas of needs and vulnerability assessment, resource mobilization, service provision, environmental protection, conflict management, repatriation, community and staff protection and security, training, and monitoring and evaluation.

17.2.2.3 *Informal Communication Paths*

Three major types of informal communication paths can be identified in refugee-assistance situations. The first is intraorganizational and occurs among the staff of NGO and government agencies. The second is limited to the refugee community. The third involves informal networks among refugees, members of the host population, emergent groups, and agency workers.

Although all three types of informal communication paths often parallel formal channels and require intercultural competency, the third deserves special attention because of its critical importance in the successful management of complex assistance crises and its fundamentally multicultural nature. Given the urgent requirements placed on crisis managers for reliable information and the preference for spontaneous interaction that exists among many client and host communities, the most effective channels of intercultural communication often are the novel and informal networks among refugees, agency workers, the host population, and flexible emergent groups that arise to fill unmet needs (Neal and Phillips, 1995:328–331). In terms of informal communication, UNHCR (2008a:101) recommends that staff “stop by the teashop or market, walk around the camp, offer to assist in small ways and spend time talking to people.”

17.3 Guidelines for Effective Intercultural Communication in Refugee-Assistance Crises

Guidelines for effective intercultural communication in refugee-assistance crisis management need to take into consideration prevailing cultural practices as well as the state of emergency

* As components of an intercultural communication strategy, UNHCR (2008a:101) suggests: “Be enthusiastic and reflect it in your voice and attitude. Be welcoming and reflect this in your facial expressions and body language. Pay attention to those who remain silent.”

conditions and the type of activity required. Therefore, the practical suggestions set forth in this section are derived in large measure from an analytical framework that has proven helpful in sharpening intercultural sensitivity and in differentiating among cultures for communication purposes. The framework (presented in Table 17.1) draws from Edward Hall's high-/low-context and high-/low-contact insights and Geert Hofstede's (1982) individualistic/collectivistic, high-/low-power-distance, masculine/feminine, and high-/low-uncertainty-avoidant contributions. By applying this analytical framework, the authors are able to suggest guidelines for effective intercultural communication that are tailored to the temporal and functional dimensions of refugee-assistance crises.

17.3.1 Analytical Framework

Edward Hall (1977) generally is credited with first distinguishing cultures as *high-/low-context* cultures. High-context (low *text*) communication refers to exchanges in which most information is embedded in the context, while "very little is provided in the coded, explicit, transmitted parts of the message" (Lustig and Koester, 2010:109). In high-context situations, effective communication requires ability to *read* unwritten underlying rules that are shared and often taken for granted by insiders. In low-context cultures, in contrast, "people look for the meaning of others' behaviors in the messages that are plainly and explicitly coded" (Lustig and Koester, 2010:109). Low-context messages are elaborate (high *text*), frequently spelled out in written form (Ojelay-Surtees, 2007:30), and highly specific. Both clarity (low context) and rapport (high context) are valuable in the refugee-assistance situations that confront transnational crisis management teams (Ojelay-Surtees, 2007:30).

In addition, Hall (1966, 1973) characterizes cultures that display considerable interpersonal closeness or immediacy as *contact* cultures and those that inhibit closeness as *noncontact*. According to Peter Andersen (1988), "contact cultures also differ in the degree of sensory stimulation people prefer. *High-contact* cultures create immediacy by increasing sensory input, while *low-contact* cultures prefer less sensory involvement."

To add to Hall's description of cultural patterns, Hofstede (1991, 2001) came up with additional taxonomies. The most widely used is individualism/collectivism, which refers to "the degree to which a culture relies on and has allegiance to the self or the group" (Lustig and Koester, 1993: 117). While *individualistic* cultures are characterized by independence, privacy, and self-centeredness, *collectivist* cultures emphasize *we* and group relationships.

Power distance, according to Hofstede (2001), refers to the degree to which power, prestige, and wealth are unequally distributed. In *high-power-distance* cultures, power, wealth, and influence are concentrated in the hands of a few rather than relatively equitably distributed throughout the population as they are in *low-power-distance* cultures (Andersen, 1988). Thus, crisis management participants with high-power-distance backgrounds tend to expect that authorities will make decisions without their input, while persons with low-power-distance backgrounds tend to expect that authorities will consult with them and seek out their opinion (Ojelay-Surtees, 2007:31).

Hofstede (1991, 2001) also distinguishes between masculine and feminine cultures. In *masculine* cultures, people regard power, competition, assertiveness, and materialism as important values (Gudykunst and Kim, 1992). Members of masculine cultures admire displays of manliness (Lustig and Koester, 2010). In *feminine* cultures, in contrast, people place more importance on nurturance, compassion, and quality of life. In feminine cultures, both men and women can express more diverse, less stereotyped sex-role behaviors (Andersen, 1988).

Table 17.1 Cross-Cultural Communication Differences on Six Major Cultural Dimensions: An Analytical Framework

<i>High context</i>	<i>Low context</i>
<p>Tune into nonverbal communication. Rely heavily on nonverbal cues to express disagreement. Prefer inaccuracy and evasion to painful decision. Express opinions indirectly. Non-disclosive. Facial expressions, tensions, movements, speed of interaction, and location of interaction have implicit meanings. Prefer face-to-face over written. Tend to avoid conflict. Deal with conflicts subtly.</p>	<p>Verbal codes are prevalent. Communicate in explicit code. Preoccupied with specifics and details. Prefer precise time schedule. Precise with verbal and nonverbal expression. Used to literalness. Talkative. Fast pace. Short meetings. Perceive conflicts as natural and not damaging. More willing to confront the party to conflict.</p>
<i>High uncertainty avoidant</i>	<i>Low uncertainty avoidant</i>
<p>Low toleration for change. Upset when uniformity breaks down. Display normative emotion. Tolerate disagreement with outsiders. Tolerate disagreement if consensus is the ultimate goal. Behavior is codified and rule-governed. More codified behavior across rankings. Emphasize importance of rituals/ ceremony.</p>	<p>Tolerate nonconformity and change. Value risk and ambiguity. Uncomfortable with ritual or stylized behavior. More flexible. Diversity of opinions is accepted. Dislike rituals and ceremony.</p>
<i>High power distance</i>	<i>Low power distance</i>
<p>Prohibit interclass contact. Speak with a tense voice, especially with superiors. Show more respect nonverbally to high-status people. Sources more influential if higher status. Show only positive emotions to high-status others, negative to low-status others. Downward communication dominates. Elegant style more effective than inelegant. Prefer serious- to humorous-style message.</p>	<p>Free interclass contact. Use more relaxed voice. People in power try to look less powerful. More careful listening by high-status persons. Type of style is not important. Not hesitant to complain to superior. More two-way communication.</p>
<i>Masculine</i>	<i>Feminine</i>
<p>Machismo emphasized. Speak with louder voice.</p>	<p>Express less stereotyped sex-role behavior. Exhibit relaxed vocal pattern.</p>

Table 17.1 (continued) Cross-Cultural Communication Differences on Six Major Cultural Dimensions: An Analytical Framework

<i>Masculine</i>	<i>Feminine</i>
Value competitiveness and assertiveness. Bargain with firm position. Women rely more on nonverbal communication. Tend toward more aggressive style. Emphasize competition over cooperation. More impulsive.	Value compassion and nurturance. More submissive and willing to compromise. Emphasize overall quality of life. More reflective.
<i>Individualistic</i>	<i>Collectivistic</i>
Smile more. Express emotions freely. More remote and distant. More affiliative nonverbally. Value small talk and initial acquaintance. More open communication. More likely to use confrontational strategies when dealing with interpersonal problems. Rely more on non-face-to-face communication. More frank. A humorous style is preferred to a serious style. Emphasize individual achievement and competition among individuals. More communication among groups because in-group boundary is weak.	Suppress emotional displays that are contrary to the mood of the group. Work in close proximity. Stay further from opponents. Develop friendly working relationship. Behavior tends to be synchronized within the system. Communication is less open because social network is more fixed. Value compliance with norms. Prefer avoidance. Slow/moderate pace and long negotiation process. Defer commitment to firm agreement. Consult superiors and/or colleagues before finalizing a decision. Intergroup communication is minimal. Unwilling to share information with out-groups. Emphasize cooperation within an organization but competition between organizations.
<i>High contact</i>	<i>Low contact</i>
Stand close. Touch more. More expressive nonverbally. Long handshakes. Sit face-to-face with counterparts. Prefer face-to-face meetings to written communication.	Rarely touch in public. Prefer less sensory involvement. Less expressive. Stand farther away. Compensate for lack of immediacy by relaxed postures and seating arrangement.

Sources: Adapted from Andersen, P., Explaining intercultural differences in nonverbal communication, in *Intercultural Communication: A Reader*, L.A. Samovar and R.E. Porter, eds., Wadsworth Publishing Company, Belmont, CA, pp. 272–282, 1988; Ngai, P.B.-Y., Nonverbal communication behavior of professional administrators from Ethiopia, Tanzania, Hong Kong, and China in negotiations with U.S. negotiators: Cross-cultural perspectives, Unpublished master's thesis, The University of Montana, Missoula, MT, 1996; Triandis and Albert Cross-cultural perspectives. In: F. M. Jablin, L. L. Putnam, K. H. Roberts & L. W. Porter (Eds.), *Handbook of Organizational Communication: An Interdisciplinary Perspective*. Newbury Park, CA: Sage, pp. 264–295, 1987.

An uncertainty-avoidance orientation, according to Hofstede (2001), concerns the cultural predisposition toward valuing risk and ambiguity, conformity, and rituals. Members of cultures characterized by *high uncertainty avoidance* tend to avoid risks and ambiguity. They also display emotions shared by other group members more openly than expressed by people in *low-uncertainty-avoidant* cultures. However, disagreement and nonconformity tend not to be expressed in high-uncertainty-avoidant cultures (see Andersen, 1988).

These taxonomies allow us to compare communication patterns across cultures. Culture can be defined at the level of a nation, a community, an ethnic group, or an organization. For instance, it is helpful to know that one is working in a country that has a strong collectivistic orientation, an organization that subscribes to practices that are shaped by a high-context orientation, or a community of a mixture of ethnic groups, some of which are more masculine or feminine than others are. When we describe group behaviors with these cultural taxonomies, are we stereotyping? If individual uniqueness is overlooked, generalizations become misleading stereotypes. However, well-founded generalizations can be “described as ‘resources’ that actors draw upon in their everyday act of communication” (Sahay et al., 2003:230).

Table 17.1 elaborates the basic variations in communication style that prevail under each of the six cultural dimensions that exert a powerful impact on intercultural communication. The analytical framework presented in Table 17.1, coupled with practical insights based on field reports, is designed to facilitate the articulation of specific intercultural communication guidelines for refugee-assistance personnel who work in diverse multicultural environments. These guidelines are presented in the following sections.

17.3.2 Communication Guidelines Based on Functional and Temporal Analysis

The first set of guidelines for intercultural communication in refugee-assistance crises takes into consideration the temporal and functional requirements as well as the principal communicators identified previously. In this section, the authors suggest practical communication guidelines aimed at both the immediate phase and the advanced phase of assistance for each of the four interventions (information, authority, supplies and materials, and human resources) involved in the six functions of needs assessment, resource identification and resource mobilization, service provision, conflict management, training, and accountability. These guidelines draw upon and apply the insights presented in Table 17.1 in an effort to maximize intercultural communication effectiveness in refugee-assistance crises. Given space limitations, the guidelines provided in the following text are illustrative rather than exhaustive. They are principally directed toward the crisis assistance staff of NGOs and government agencies. Those involved in managing complex assistance crises are encouraged to seek further guidance for specific multicultural communication needs not covered here through continuous referral to the framework presented in Table 17.1.

17.3.2.1 Function 1: Needs Assessment

Information interventions—immediate phase

During the process of obtaining information for needs assessment and vulnerability analysis in immediate-crisis situations, staff members need to take into account refugees’ willingness to

* See Eade and Williams (1995:952) for a checklist of information that is vital in conducting independent assessments of overall emergency conditions.

disclose thoughts and feelings. Refugees from collectivistic cultures, high-context cultures, and ethnic minority cultures will be less open with outsiders. Thus, to obtain accurate, in-depth information, NGO staff members are advised to communicate through a trusted interpreter selected from among the refugees. The interpreter not only should interpret verbal information but also should report nonverbal observations, including the underlying values that are shaping communication and actions. The latter provide especially valuable information concerning the needs of refugees in high-context cultural contexts where many things are left unsaid.

*Down-to-earth staff members who dress and act like members of the refugee community are more likely to secure information about the negative as well as positive conditions facing refugees from high-power-distance cultures, who tend to hide negative feelings and assessments from high-status others.

Information interventions—advanced phase

*Staff members need to devote sufficient time to familiarizing themselves with the customs, values, perspectives, and experiences of the refugees whom they aim to assist. In particular, this effort allows staff members to decode interview and observational information regarding high-context (implicit and at times symbolic) cultures more accurately and deeply.

*Useful participatory needs- and capabilities-assessment techniques among groups with a high proportion of members who are not literate and do not speak the national language include “seasonal calendars, ranking of resources using a matrix, and diagrams to show social and political relationships in a village or community” (Eade and Williams, 1995:255, 881–882; see also Hyden et al., 1996:44).

*In many cultures, women are more likely to express their needs and vulnerabilities effectively when consulted separately by female members of survey and assessment teams and/or when provided with opportunities to communicate indirectly through “socio-drama, role-play, painting, dance, music and song...” (Eade and Williams, 1995:882).

*Data collected for needs-assessment purposes should be disaggregated to ensure that relief and development efforts are tailored to the specific social groups that exist within the refugee and host-community populations (Chambers, 1993:43; Eade and Williams, 1995:883).

Authority interventions—immediate phase

*Quick two-way communication is vital in this phase of refugee-needs assessment. In particular, field staff personnel and other refugee-assistance workers from high-power-distance cultures need to set aside the fear and formality of communicating with people of higher status and to be assertive in communicating urgent needs directly to government and higher authorities.

Authority interventions—advanced phase

*At this stage, the process of collecting and reporting accurate and comprehensive information about needs principally involves collective action among refugees. Community leaders must explain the importance of reaching and supporting agreement on priority needs to refugees from individualistic and low-uncertainty-avoidant cultures who are prone to challenge commands.

Supplies and materials interventions—immediate phase

*Staff members need to adjust the amount of detail involved when explaining the logistics required in mobilizing supplies and materials for needs assessment according to the cultural background of the refugees who take part in the process. Relatively ambiguous instructions will suffice for refugee assistants from low-uncertainty-avoidant cultures who desire few predetermined rules and

value flexibility and creativity. Refugee assistants from high-context cultures will benefit from detailed, specific instructions and sound anticipatory plans when dealing with the logistics of needs assessment in the immediate phase.

*Comprehensive needs assessment in emergency situations requires the coordination of knowledge regarding the current and planned material interventions of all organizations and groups involved in the relief effort (see Eade and Williams, 1995:952). Special efforts must be undertaken and incentives provided in high-context cultures, therefore, that encourage members of host-country government and local NGOs to communicate fully across agency boundaries and in coordinating forums.

Supplies and materials interventions—advanced phase

*When working with members from the refugee community, agency staff must be aware of cultural differences that shape the use of time. The communicative and scheduling behavior of people from collectivistic cultures tends to be synchronized within their community. Therefore, staff members need to understand community work rhythms that affect the supply of materials needed for needs assessment and vulnerability analysis and to avoid pressuring members of collectivistic cultures to meet externally imposed deadlines. At the same time, they should communicate openly about the need for and value *to the community* of timely interventions.

Human resource interventions—immediate phase

*During the process of assigning human resources for needs-assessment purposes, NGO and host-government staff members need to devote special attention to matching cultural preferences for communicating individually/collectively and for adopting masculine or feminine roles with the predominant cultural orientation of the refugee and local communities that are at risk.

Human resource interventions—advanced phase

*In high-power-distance cultures, trainers are likely to find it helpful to utilize written forms of communication, including questionnaires, to elicit questions from refugee- and host-community trainees that will ensure comprehension of the needs- and vulnerability-assessment methodology.

*Staff trainers should pay special attention to understanding the meanings of key nonverbal indicators of training needs conveyed by trainees from high-context cultures.

17.3.2.2 *Function 2: Resource Identification and Mobilization*

Information interventions—immediate phase

*High-context messages regarding potentially available resources often create confusion or even distortion in intercultural communication. A simple, standardized information recording sheet can be used to help people from high-context cultures communicate explicitly and accurately. The sheet should be designed in a way that prompts the detailed and specific identification of existing community resources. In the same vein, all substantive decisions regarding resource provision in emergency situations that are communicated by landline, mobile phone, or in person should be properly logged and made part of the formal written record (Eade and Williams, 1995:953).

*Information gathered locally about the short-term supply of urgently needed resources should be organized in “a way that helps people diagnose the causes of their problems and begin to plan ways to overcome them” (Anderson and Woodrow, 1989:47). Short narratives offer a useful way to organize information about resource needs and availability in high-context situations.

Information interventions—advanced phase

*In order to collect comprehensive information concerning local resources and about existing and potential group mobilization, staff members need to identify and develop trusting relationships with community leaders. This is particularly important in collectivistic cultures because people tend to be unwilling to share information with out-groups and intergroup communication is infrequent given the relatively fixed nature of social networks.

Authority interventions—immediate phase

*Urgent, chaotic conditions require that high-level NGO and government personnel from high-power-distance cultures make a special effort to listen carefully to the messages communicated by field staff and reliable representatives of the refugee and local communities.

*Updates should be consistently released to the public and media (Kalantari, 2001:619) in formats that are appropriate given the prevailing low-context or high-context situation of the concerned community(ies) (UNHCR, 2008a:103).

*Given the difficulties involved in introducing new supplier relationships on short notice, persons who occupy boundary roles in interagency communication should concentrate immediate attention on facilitating the rapid exchange of information with persons in local authority positions “who are able to release materials and equipment” (Siegel, 1985:108). Careful attention to cross-boundary communication is likely to be especially fruitful in relations with members of collectivistic cultures.

Authority interventions—advanced phase

*Field workers, volunteers, and community leaders from high-power-distance cultures need to be assured that providing advice and suggestions about locally available resources to high-status sources is not disrespectful behavior and directly benefits the community.

Supplies and materials interventions—immediate phase

*When confronting emergency conditions, agency staff from collectivistic cultures who are used to a slow or moderate working and communicating pace will need to be prepared to speed up the resource-distribution process to accommodate their coworkers from fast-pace, low-context cultures. At the same time, staff members from low-context cultures need to learn to be patient with counterparts and clients from slow-pace cultures.

Supplies and materials interventions—advanced phase

*Disagreements over resource-distribution plans and timetables are likely to occur between NGO headquarters and field staff and among field workers. Frequent and comprehensive information exchange will facilitate the process of reaching consensus, especially among actors from individualistic and low-uncertainty-avoidant cultures.

*Agency staff should make certain that the introduction of any externally mobilized materials and/or tools is “consistent with local socio-cultural practices” (Hartkopf and Goodspeed, 1979:445; Dynes, 1983:659) and involves existing communication channels.

*Bicultural participants in the suggested Global Refugee Corps often play a useful bridging role in managing the logistics of resource mobilization (see Koehn, 1994a:76, 1994b:108–110).

Human resource interventions—immediate phase

*To avoid duplication in resource mobilization, communication in emergency situations should be directed through a multicultural and multilingual communications center (see Siegel, 1985:108).

Human resource interventions—advanced phase

*Headquarters personnel with high-power-distance cultural backgrounds need to appreciate that upward communication from the field level yields indispensable information regarding the availability of local expertise for the mobilization of physical resources.

*In general, the use of culturally familiar and acceptable communication styles is indispensable for success in mobilizing participation by refugees in development activity.

17.3.2.3 Function 3: Service Provision*Information interventions—immediate phase*

*To the extent possible, face-to-face communication allows staff to distribute information about available services more effectively to refugees from high-context cultures and high-contact cultures. Distributing the information in person also allows staff members to answer questions from refugees on the spot, to build trust, and to correct inaccurate rumors about available and non-available services.

*Understanding the informal communication network that exists within the refugee community allows staff members to identify key individuals who can successfully distribute information regarding service provision to the entire group or subgroup.

Information interventions—advanced phase

*When establishing long-term communication links with refugee communities in high-power-distance cultures, staff members should select some individuals from each social stratum since members tend to avoid interclass communication in ways that would distort service provision. Among refugees from collectivistic cultures, who tend to avoid communication with out-groups, staff should link with selected representatives from each ethnic group, clan, or extended family.

*Attention to and skill in securing feedback concerning the receptive accuracy of one's cross-cultural messages will minimize unintended communications that jeopardize the provision of essential services (see Pedersen, 1994:91).

Authority interventions—immediate phase

*Given the frequent absence of advice and assistance from headquarters in emergency situations and the need to work with local government personnel from high-power-distance cultures, NGO staff members from low-power-distance (and feminine) cultures need to replace their normally respectful communication style with a more assertive approach in order to provide the victims of dislocation with emergency services under chaotic conditions.

*Communicating through existing host- and refugee-community authority structures increases the speed of decision making about service provision (Dynes, 1983:659). However, staff expectations for rapid decisions should be reduced when working with members of collectivistic, high-context, or high-power-distance cultures.

Authority interventions—advanced phase

*When refugee and host communities in feminine cultures assume increasing authority for service provision, field workers and refugee assistants from masculine cultures must learn to tone down or soften their communication style and be ready to compromise.

*In collectivist and contact cultures, participation in official refugee forums enables crisis managers to advocate for refugee service provision interests with a unified voice (in contrast, see Munteanu, 2008:16).

Supplies and materials interventions—immediate phase

*Given the logistical difficulties and added expense involved in importing supplies and materials from outside the area of operations as well as the inappropriate nature of many imported goods (Eade and Williams, 1995:942–943), assistance staff are advised to communicate directly with a broad range of refugee- and host-community groups in an effort to identify and mobilize adequate supplies, materials, and equipment that are available locally, can be adapted easily to indigenous designs, and, whenever possible, are renewable (Hartkopf and Goodspeed, 1979:445; Neldner, 1979:398).

*During emergency situations, agency staff members rely on refugees and host communities for quick distribution of supplies and materials. Refugees from high-context or collectivist cultures may not be able to keep up with fast-pace, frequent instructions from agency staff. In this case, a pyramid communication structure will allow extensive information about supplies and equipment to flow from agency staff to a small number of competent intercultural refugee communicators, who, then, divide distribution tasks among a larger number of individuals or among groups of refugee helpers.

*When working with masculine cultures, special efforts need to be made to involve women in distribution networks (Eade and Williams, 1995:969).

Supplies and materials interventions—advanced phase

*When many refugee volunteers are involved in large-scale service delivery operations, agency staff from high-uncertainty-avoidant cultures need to be prepared for the breakdown of uniformity. Instead of providing local assistants with rigid instructions regarding how to distribute the supplies and equipment needed for service provision, they should focus on verbal explanations of what is to be distributed and to whom and allow for flexibility in terms of means of delivery.

Human resource interventions—immediate phase

*When external and internal human resources are mobilized for urgent service projects, agency staff members should see their role as that of an intercultural communication and coordination center. By serving as cultural interpreters, they can minimize confusion among all parties.

Human resource interventions—advanced phase

*Refugee assistants often play the crucial role of intercultural broker in the advanced-action phase. To ensure that the high-power-distance community mobilizes competent and reliable participants for service provision, they must communicate with high-status community leaders who possess authority to assign responsibilities to a broad spectrum of community members.

17.3.2.4 Function 4: Conflict Management

Information interventions—immediate phase

*To enhance work-group unity, members should establish a *communication charter* that articulates their shared understanding “about what should be communicated, by when, and by whom” (Ojelay-Surtees, 2007:29, 70–74).

*In an emergency situation, arbitration is likely to be the most efficient conflict management approach. The arbitrator should be a neutral third party who bases his/her decision on information obtained through formal and informal channels. In a high-power-distance community, a high-status arbitrator must rely on a staff member or a refugee whose status and affiliation are on a par with the information source. Otherwise, sources are not likely to disclose information perceived as unfavorable to high-status inquirers.

Information interventions—advanced phase

*Mediation is the most effective approach for managing conflicts over the long run. During the advanced stage, specific information about the conflict at issue is crucial in helping the conflicting parties reach an agreement with one another. Information directly released by the conflicting parties themselves in front of their *rivals* can be especially useful in building understanding between them. Thus, the appointed mediator needs to raise questions that will facilitate dialogue among all parties—especially among those from high-context cultures who are inclined to avoid sharing their feelings.

Authority interventions—immediate phase

*At the initial stage of an emergency, staff should focus on identifying host-community and refugee leaders who are capable of calming the parties involved in a conflict, and the arbitrator should emphasize the value of ceasing hostilities and gradually adopting confidence-building measures.

*Staff need to forge consensus among themselves on the parameters of *unreasonable risk* and to reach a collective decision about whether to withdraw from situations where their personal safety is threatened (Eade and Williams, 1995:974). In reaching such decisions, participants should bear in mind that the communicative strengths of staff members from high-context and collectivistic cultures include reflective consideration of group interests.

*Team members should identify, discuss, and agree on behaviors that are acceptable and unacceptable within the working group (Ojelay-Surtees, 2007:28).

Authority interventions—advanced phase

*When refugees from high-context cultures continue to turn to external authorities to act as arbitrators in intra- and intercommunity conflicts, agency managers need to communicate openly concerning ways to minimize and diminish external involvement in local conflict resolution capacities.

Supplies and materials interventions—immediate phase

*In high-context cultures, information regarding the supplies and materials available for the process of arbitrating conflicts will need to be communicated in terms that will encourage usage. Thus, in high-context cultures, where people are prone to avoid confronting conflicts, applications should be honored for material resources that facilitate *optimizing coordination* and/or restoring balance rather than *resolving conflicts*.

Supplies and materials interventions—advanced phase

*Agency staff should reduce the detail of the messages they distribute in order that community leaders become increasingly involved in reaching decisions concerning the allocation of supplies and materials needed for conflict mediation. This approach is particularly important when communicating with high-context cultures.

Human resource interventions—immediate phase

*In high-power-distance and collectivistic cultures, emphasis should be placed on identifying respected community members who are willing to serve in informal conflict management roles.

Human resource interventions—advanced phase

*In the advanced phase, both agency staff and community leaders should seek to mobilize indigenous mediators who are skilled in intercultural communication. In masculine cultures, charismatic individuals are likely to become effective local mediators. In feminine cultures, caring and empathetic individuals will be most likely to succeed as indigenous mediators.

■ Given that working partners from diverse cultures must manage crises through collaborative action, each one needs to use precise, direct, and frank communication immediately regarding the communication style that one prefers and to make a determined effort to recognize the style(s) that others are most comfortable with. In the multicultural workplace, coworkers constantly are called upon to adjust ingrained communication practices and to be tolerant when others forget one's preferred ways.

■ Explicit messages minimize misunderstanding among refugee-assistance personnel. However, consideration must be given to staff from high-context cultures who will need time to learn to use low-context messages.

■ Staff members from masculine cultures may express sex-role stereotypes when working with coworkers in the field. Female field workers should use appropriate opportunities to educate their masculine culture coworkers about gender equity as a means of preventing potential conflicts from festering.

Refugees <-----> *Local host communities*

■ Refugees, as the newcomers, need to learn nonverbal—as well as verbal—communication skills in order to interact effectively in the host society without being perceived as vulgar or abnormal by locals from high-uncertainty-avoidant cultures.

■ Persons from collectivistic cultures tend to avoid communication with strangers or out-groups. This communication shyness should not be interpreted as hostility. Community and refugee leaders need to pursue initiatives that break the ice.

■ Refugee communicators must be trained to be sensitive to local cultural taboos. For instance, joking about certain subjects or mentioning certain words may violate local customs and jeopardize relations with the host community.

Refugees and local host communities <-----> *NGO agency staff*

■ Demonstrating respect for local capabilities through intercultural communication is more likely to result in sustainable project outcomes than is any other staff qualification (see Anderson and Woodrow, 1989:76).

■ NGO staff need to be aware that the less powerful in masculine cultures, such as women, children, the elderly, and the disabled, tend to rely more on nonverbal communication than on explicit verbal or written messages.

■ In collectivistic cultures, warning messages usually are more effectively communicated through traditional social structures than through government agencies or impersonal media. In general, it is advisable for NGO staff to utilize existing social units (such as families, voluntary associations) and authority structures rather than to create new ones and to enhance valued channels of communication rather than to replace them (see Dynes, 1983:658–659).

■ Misunderstandings between NGO agency staff and refugees (or local host communities) are likely to arise in emergency situations. In such cases, it is particularly important that NGO agency staff members succeed in explaining their perspective to community representatives in order that the latter can resolve the misunderstanding with their own people. This communication channel is especially important in collectivistic cultures where community members tend to be suspicious of out-groups.

imperatives, the time frame involved, and the communication path activated, we presented concrete suggestions for maximizing intentional communication among crisis managers from different cultures that are grounded in insights emerging from intercultural communication studies. In light of space limitations, the specific guidelines set forth here can only illustrate the utility of the approach advanced by the authors. When confronting unique field situations that require emergency and crisis management, practitioners are encouraged to refine and expand upon the guidelines we have suggested by linking intercultural communication needs analysis to culturally sensitive insights based on application of the analytical framework elaborated herein.

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Chapter 18

Managing Human and Natural Disasters in Developing Nations

Emergency Management and the Public Bureaucracy

Lenneal J. Henderson

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18.1 Introduction

Managing human and natural disasters represents a pervasive and complex challenge to the public bureaucracies of all nations, particularly developing nations.* Ironically, natural and human disasters are often perceived as sporadic, episodic, and occasional by many comparative administration scholars and analysts (Bryant and White, 1982; Heady, 1982; Farazmand, 1991). Consequently, the management of emergencies or disasters is often characterized as adjunct to *more routine*

* The terms *bureaucracy*, *administration*, and *management* are used interchangeably in this chapter. The terms *disaster* and *emergency* are also used interchangeably.

bureaucratic functions such as planning, financial management, human resources management, and economic development even when some *mainstream* bureaucracies are drawn into emergency management activities such as the health department's involvement in pandemics, the transportation department's involvement in road restoration, or the military's involvement in security or conflict situations. Given global concerns about climate change, financial stability, ethnic conflict, global health care, gender equality, and the use of technology to develop and improve transportation, communication, energy, and environmental infrastructure, the role of public bureaucracies in development cannot be overstated.

This chapter proposes emergency, or disaster, management as a basic and critical dimension of comparative and international management, particularly in developing nations. The pervasive vulnerability of the populations, institutions, economies, and governments of these nations to risks of natural, technological, and security disasters is an artifact of the following factors (Lohman, 1992; Comfort et al., 2012). Consequently, for most nations, particularly those with vulnerable populations, emergency management is moving to the center of policy and administrative criticality, if not role and function. Among the key dynamics contributing to this trend include

1. The unusually high exposure of populations in developing nations to disaster risk resulting from widespread conditions of poverty, poor health care, illiteracy/low educational attainment, and poor housing. These conditions are complicated by higher fertility rates in less-developed nations, and consequently, large cohorts of population under the age of 20 and larger family size (Population Reference Bureau, 2012).
2. Hyperurbanization of the population, that is, the overpopulation and overbuilding of cities, which challenges and complicates effective governmental response to human need.
3. Aging and inferior physical infrastructures such as roads, dams, bridges, telecommunication systems, irrigation facilities, and buildings.
4. Public bureaucracies that are often underfinanced, poorly trained, inappropriately organized, and generally overmatched by the scale, immediacy, and intensity of disaster events and the resulting social, economic, and political impact.
5. Breakdown of civil government, including administrative disruption, attributable to ethnic conflicts, civil war, and continuous military actions in nations like Somalia, the Sudan, Palestine, Columbia, Myanmar, the former Yugoslavia, and Sri Lanka. These conflicts preclude stable bureaucratic function as well as emergency response and often lead to acts of terror on civilian populations (Flynn, 2007). If resolved, post-conflict resolution such as the post-civil war development of Sierra Leone, Liberia, Kosovo, Rwanda–Burundi, or El Salvador requires massive financial and administrative resources (Goldman, 2006).
6. The need for massive coordination of both internal governmental and nongovernmental agencies and multiple international disaster relief and assistance agencies to both respond to a variety of disaster events and to recover and reconstruct the economies of developing nations. E-government, information, and intelligence management and social media are essential to this coordination and emergency management strategy.

Indeed, routine and emergency management are frequently characterized as opposite ends of the public management continuum. Emergencies suspend *normal* operations and impose extraordinary imperatives. Conversely, routine management *stabilizes* bureaucracies by avoiding crisis behavior. However, in developing nations, the line between emergency and routine management is often blurred: the adequacy of routine management is immediately reflected in the quality of emergency management. And emergency management response

often conditions public policies and administrative procedures in more day-to-day bureaucratic functions (Denhart, 1993).

Schneider (1992) observes that disasters result in conflicts between *bureaucratic norms* and *emergent norms*. Emergent norms transcend bureaucratic norms as the disaster event and its impact unfold. Immediate, widespread, and unusual challenges face bureaucracy in a disaster. Resort to *emergent norms* is often impeded by the severity of the disaster, disruption of normal lines of information and resources, and the often frenzied and extreme expectations citizens impose on bureaucracy during and following a disaster. Beyond family and place of worship, government is regarded as the resource of first resort in emergency contexts.

18.2 Disaster Context

The multidimensional role of public bureaucracy in disasters reflects the varied nature of disaster contexts. Disasters vary in type, time frames, intensity, locus, and human impact (Figure 18.1). The disaster event proceeds on a time frame from very sudden and immediate to emergent. Earthquakes, explosions, volcanic eruptions, power plant accidents, and toxic and hazardous releases resulting from train, ship, or airplane accidents and pandemics usually occur suddenly and without much warning (Comfort, 1989; Comfort et al., 2010). Tsunamis, hurricanes, floods, and typhoons provide some warning time, both as seasonal occurrences and through increasingly more sophisticated weather forecasts. Other disasters proceed in slower time frames, such as drought, famine, desertification, and insect or rodent infestations. Epidemiological disasters such as cholera,

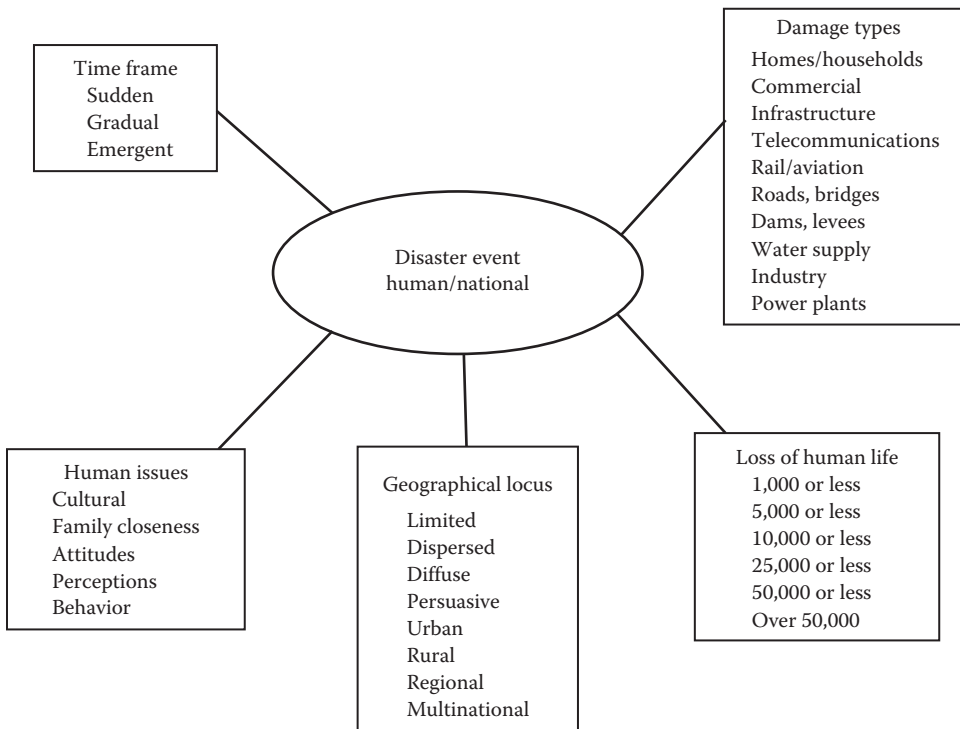


Figure 18.1 Matrix of figure characteristics.

yellow fever, human immunodeficiency virus (HIV) infection, severe acute respiratory syndrome (SARS), H1N1 virus, and malaria proceed in time frames determined by the nature and frequency of human interaction. Although not always labeled disasters, the more endogenous conditions of poverty, malnutrition, infant mortality, water contamination, and lower life expectations are disaster embedded in the socioeconomic conditions of developing nations and characterized by time frames associated with the overall development of affected populations that often exacerbate the adversity of disaster in developing nations. Thus, the varied time frames of disasters provide varied temporal dimensions for administrative response (Waldo, 1970; Kreimer et al., 2000).

The intensity of a disaster is often determined by its combined impact on human life, property loss, physical infrastructure, geographical location, and institutional function. The catastrophic earthquake in Haiti on January 12, 2010, killed 316,000 people, destroyed the capitol, and eliminated or incapacitated more affluent and better-educated first responders. Hospitals, clinics, and educational facilities suffered most from the earthquake. Roads, bridges, and commercial infrastructure were destroyed, and hundreds of buildings collapsed. The work of 47 international rescue and medical teams from more than 35 nations was essential in locating and rescuing survivors trapped in the debris (Sadiq and McEntire, 2012, p. 459). The intensity of this event, combined with its sudden occurrence, posed formidable challenges for Haitian officials and the responding international community. External access to the nation by air and sea was compromised by the destruction.

On December 26, 2004, an earthquake estimated to be over 9.0 on the Richter scale triggered a massive tsunami killing more than 230,000 people in 11 nations, requiring more than \$14 billion in international disaster assistance, particularly in Indonesia, Sri Lanka, India, and Thailand. Pandemics such as HIV, SARS, and the H1N1 virus have disproportionately impacted vulnerable populations in China, Vietnam, many nations in Africa, and Brazil and Mexico.

The intensity of disaster often represents the simultaneous or sequential intersection of human and natural disaster. Conditions of poverty, poor housing, lack of information about disaster risk, poor telecommunications, and inadequate physical infrastructures, including bridges or roads, frequently exacerbate natural disasters such as floods, earthquakes, hurricanes, and volcanic eruptions. Evacuations of large populations are complicated by low-capacity infrastructure or family, financial, institutional, or cultural impediments.

In addition to the temporal and intensity issues in emergency management, the geography of disaster often represents another challenge to bureaucratic response and management. The locus of the disaster event can be local, regional, national, or international. Famine, malnutrition, and war have gripped the entire nation of Somalia between 1991 and 1994, with no legitimate government in place to respond (De Waal and Omaar, 1993). Similarly, Sudan has descended into a civil war leading to its partition into two nations in 2011. The 2010 Chilean earthquake resulted in 527 deaths but was located in the more rural south–central coastal regions of the nation. The Bhopal chemical release in India killed more than 2500 persons in a local community. In contrast, the release of radiation from the Chernobyl nuclear power plant in Ukraine has reached several nations. The 1992 earthquake in Cairo, Egypt, was confined to a relatively small, but densely populated, part of the metropolis. Thus, there is often a coincidence of disaster locus and the national or subnational levels of government expected to respond and to conduct emergency management, recovery, and reconstruction. However, some nations invoke emergency powers and suspend all but national authority to respond even to the most local disaster.

However, it is the combined impact of disaster on human life that evokes the most profound expectations for bureaucratic response. The significant loss or damage of human life; the dislocation of families and individuals; the widespread homelessness following disaster, food, and water shortages; the disruption of information systems; and the widespread and profound uncertainties

usually occur in the wake of a disaster no matter how resilient the population or institutions of the nation may be (Comfort, 1990; Comfort et al., 2010; Zolli and Healy, 2012). Louise Comfort (1991) observes that “the complexity of disaster environments poses an extraordinary burden on human decision-makers to take timely, appropriate action in uncertain conditions.” It is this direct and observable impact on both human victims and decision-makers that focuses most disaster relief and emergency management efforts. Moreover, policy-makers and administrative agencies must often coordinate the efforts of many internal and external public and nongovernmental, multilateral, and relief agencies both to respond to disaster and to initiate recovery and reconstruction efforts (Henderson, 2004; Pinkowski, 2009).

18.3 Emergency Management Context

Once disaster occurs, the quality of the national emergency management system becomes evident. Four distinct but interrelated phases of emergency management involve public bureaucracies, particularly in developing nations: mitigation, preparedness, response, and recovery (Figure 18.2). Mitigation involves decisions by government to prepare and to preposition its emergency management resources to minimize or reduce the multiple impacts of anticipated disasters. The stockpiling of emergency supplies; the training of medical, security, and transportation personnel; and the conduct of drills or disaster simulations are examples of mitigation activities.

Closely connected to mitigation is disaster preparedness. Preparedness includes efforts to put in place organizational response systems involving various types, levels, and skills of governmental, nongovernmental, and international organizations likely to be involved in responding to a disaster. Preparedness also includes public notification and warning on the most appropriate ways and means of preparing for natural disasters and preventing or responding to human-induced disasters (Petak, 1985; Siegel, 1985; Steiner, 1985). As Figure 18.2 indicates, mitigation and preparedness are two predisaster roles that, when pursued effectively by emergency managers, not only reduce the adverse impacts of disaster but also facilitate postdisaster response and recovery management (Comfort et al., 2012).

The immediate response to a disaster includes a situation assessment, allocation of critical resources to the disaster locus and population, and the command and control of both governmental and nongovernmental actions, money, equipment, and information by administrative agencies designated by political leaders to coordinate the immediate response to the disaster event, particularly in mass fatality events (Wallace and DeBalogh, 1985; Sadiq and McEntire, 2012). The response phase is disaster-immediate and usually frenzied and chaotic and often requires the most patient, composed, and competent capabilities of administrative officials. Time frames are

Disaster phases		Intergovernmental /Organizational/Stakeholders							Military sector	Global sector
		Central government	State/ Provincial government	Local government	Regional government	Corporate sector	NGO sector			
		Migration								
Pre-disaster	Preparedness planning and warning	Roles and responsibilities of developing bureaucracies in managing human-induced and natural hazards								
Post-disaster	Response and recovery	Level of chaos and complexity bureaucracies must manage in and after disaster								

Figure 18.2 Administrative matrix for emergency management in developing nations.

rapid, the context is intense, and the potential for complete breakdowns of organizational and information systems is omnipresent. Bureaucracy must coordinate and orchestrate many actors very quickly and very effectively to minimize both loss of life and loss of control at disaster sites.

Finally, the postdisaster recovery phase includes longer-term reconstruction of human, financial, and physical infrastructure, the restoration of order and information flow, and the slow and tortuous rebuilding or relocation of communities at, or from, disaster sites. Bureaucracy is often called upon to calculate household, commercial, industrial, and public sector financial recovery needs often analogous to the actuarial activities of insurance agencies. The public sector is also expected to provide, or to coordinate, relief from the homelessness, hunger, dislocations, and death and injury wrought by disaster in the recovery phase, particularly in developing nations. Often, recovery is incomplete: physical devastation and human dislocation remain months and years after the disaster event even in developed nations like the United States following Hurricane Katrina in 2005 (Waugh et al., 2006). However, the effective management of the recovery phase is linked with both the mitigation and preparedness phases. Mitigation, preparedness, response, and recovery each has its own information requirements and decision-support systems (Wallace and DeBalogh, 1985).

Moreover, as Figure 18.2 suggests, these four phases of emergency management involve all levels of government and various nongovernmental sectors such as the corporate, religious, scientific, academic, and international sectors. Among the essential roles expected of bureaucracy in each of these phases are information management, the application of varied expertise to and within each phase, organizational coordination, logistical support, and the identification of natural and technological risks.

Rae Zimmerman (1985) observes that many of the issues normally facing bureaucracy become accelerated and more complex when disaster mitigation, preparedness, response, or recovery is involved. Management choices often involve emergency procedures that temporarily suspend, or alter, organizational hierarchies, division of labor, or more routine public mandates. Political leaders will often deploy military forces to disaster sites both to provide security at the site and to enforce temporary emergency management mandates. Such a choice is often not popular with those in, or affected by, the disaster site. The return to *normalcy* often includes the suspension of such temporary emergency measures and the return to more familiar and normal administrative patterns. However, within and between mitigation, preparedness, response, and recovery are a profusion of bureaucratic tasks involving training, information dissemination, coordination, regulation, financial management, media control, technology use, and direct service delivery to the wounded, relatives of the deceased, and others affected by disaster events (Siegel, 1985). Even when these phases of disaster management are executed and even when international response to disaster has been substantial and generous, serious damage to human and infrastructural life can occur. Commenting on the 1985 Mexican earthquake, Comfort (1986) suggested that “comparatively weak ratio of results achieved to assistance extended compels a reconsideration of the international disaster assistance process.”

18.4 Environment of Emergency Management in Developing Nations: The Concept of Pervasive Risk

Whether national, regional, or local bureaucracies or international relief and assistance agencies, emergency management in developing nations confronts a complex and unique administrative environment. Five interrelated dynamics constitute this environment (The World Bank, 1991):

1. The demographic and socioeconomic characteristics of developing nations
2. The varied cultural and institutional contexts in which mitigation, preparedness, and recovery tasks are pursued in developing nations
3. The direct and indirect economy of disasters on the often fragile economic systems of developing nations
4. The impact of disaster on household, village, urban, regional, and national infrastructures
5. The establishment or extension of emergency management capabilities in developing nations

Taken together, these five dynamics challenge any routine or emergency action or decision of public bureaucracies. Ongoing human challenges in developing nations are amplified and complicated by disasters. The disaster aftermath only sustains and aggravates already tragic human conditions. These nations are continually exposed to hazards and risks. *Hazards* may be broadly defined as threats to humans and what they value—life, well-being, material goods, and a sound environment. *Risk* is the probability that a particular technology, activity, or existence will lead to a specified adverse consequence over time (Kasperson and Pijawka, 1985). A key hypothesis in the analysis of emergency management in developing nations is that *embedded or endogenous demographic, socioeconomic, cultural infrastructural, and administrative problems aggravate human exposure to hazards and result in pervasive risk to human populations and systems when disasters occur*. Pervasive risk is a continuing challenge to the capacity of operation of public bureaucracy (Farmbry, 2013).

First, demographic and socioeconomic characteristics of human populations in developing nations contribute to pervasive risk. More than 70% of the world's population resides in the developing world. Population projections through the year 2020 suggest that even more of the world's population will reside in these nations. Population growth rates, attributable to both fertility and immigration rates, are conspicuously higher in the developing world (Mosley and Cowley, 1991). Another key demographic attribute of the developing nations is the larger proportion of the population in the 0–14 age group and the smaller proportion in the age group 65 and over. Young populations not only are more susceptible to injury or death during and following disaster but are often more difficult to evacuate or relocate following disaster. Their availability as part of the instant human resource response capability is also limited.

Three additional demographic and socioeconomic characteristics of developing nations challenge emergency managers. First, developing nations are experiencing, and will continue to experience, higher rates of urban population growth, poverty, and density (Kreimer and Munasinghe, 1992; Tien et al., 1992). Whether human or natural disaster, these patterns of urbanization make disaster risks more pervasive. Second, higher rates of poverty in the populations of developing nations not only provide fewer resources for the poor to reduce their exposure to both hazards and risks but they also prolong disaster recovery. Third, junior and middle-level public servants and administrative officials are often very young, not well trained, and lacking in emergency management experience and skills. They are often closely connected to family, village, or neighborhood populations who constitute their priority in a disaster.

In addition to these demographic and socioeconomic dynamics, varied cultural and institutional contexts challenge emergency managers. These contexts can either enhance or impede emergency management. Disaster prediction may include traditional ways of calculating when an event will occur and its likely intensity and impact. Local forecasting methods may be nontechnological but may be quite complex—for example, the reading of animal behavior and weather patterns, the cycle of calamities as recorded in religious collections, or the predictions of a local

soothsayer (Rahmato, 1987). Warning systems may include local channels of alert such as spreading the news of flood by word of mouth or through religious organizations. Village elders in the Indian state of Andhra Pradesh assess potential needs and capabilities within the community in the event of a hurricane and make their own indigenous contingency arrangements. At the recovery level, family and kinship relationships often provide mutual assistance and social contact, which play different functions in periods of stress and disaster. Mutual aid and self-help groups represent other methods of social adjustment mechanisms. Leadership arrangements also establish explicit lines of obligation as in the traditional *patron* relationship in Latin America. During periods of hardship, particularly following a disaster, the *patron* will materially assist the workers (Kieffer, 1977; Kreimer and Munasinghe, 1992).

Moreover, religious or traditional beliefs and values; the uneven and often inadequate socialization of populations by national or local schools; communal institutions; local, regional, or national bureaucracies; and such nongovernmental organizations as business, agricultural cooperatives, and factories constitute an institutional network in developing nations. This network must often be quickly and effectively contacted and orchestrated by public bureaucracies in each of the four phases of emergency management. Often, these institutions routinely compete or are engaged in conflict with public bureaucracies. They are skeptical about the scope, priorities, or adequacy of emergency response or recovery or opposed to some, or all, international relief efforts. Local institutions may oppose or criticize national preemption of authority in disaster response or recovery and may insist on sustaining the intergovernmental system of the nation (Hopkins, 1990). Clearly, whether supportive or critical of emergency managers, indigenous cultural and institutional dynamics must be incorporated into the strategic operations of emergency management.

Another essential dynamic of the disaster context is its economic impact. The former United Nations Disaster Relief Organization (UNDRO) has urged that the effects of disasters be viewed not only in humanitarian and broad social terms but also—and primarily—in economic terms. UNDRO has transitioned to the UN Department of Humanitarian Affairs and, in 1999, to the United Nations Office for Disaster Risk Reduction (UNISDR) in the office of the secretary of the United Nations. UNISDR has developed a unique partnership with the World Bank, in particular its Global Facility for Disaster Reduction and Recovery (GFDRR). It has also been developing close partnerships with regional international organizations around the world such as the Association of Southeast Asian Nations (ASEAN), Organization of the Islamic Conference (OIC), Pan American Health Organization (PAHO), Applied Geoscience and Technology Division of the Secretariat of the Pacific Community (SOPAC), Economic Community of West African States (ECOWAS), and African Union (AU) (Henderson, 2004; Boix, 2011).

Albala-Bertrand (1993) has observed that a slowly developing disaster, such as a drought, by affecting agricultural capital in a gradual and cumulative rather than instantaneous way, may have more important and longer-lasting economic effects than a *sudden* disaster. Whether short, near, or long term in effects, the macro- and microeconomic effects of natural or human-induced disasters are often disruptive to developing economies and institutions (Boix, 2011). They damage or render useless essential economic input such as land, trained labor, or capital assets. They make imperative the diversion of foreign exchange and public finance to disaster response and recovery. Combined with demographic and socioeconomic challenges already endemic to the nation, they may retard local, regional, or national economic development projects such as housing, power plants, environmental protection systems, industrial plants, or public works projects.

Economic dislocations induced by disaster often result in severe damage to household, village, urban, regional, or national infrastructures. Bridges, tunnels, roads, power plant facilities,

dams, rail lines, airports, water treatment plants, and water and gas mains are costly fixed-capital investments that are either managed or regulated by public bureaucracies. The World Bank (1991) has observed that 1.3 billion people in the developing world already lack access to clean and plentiful water, and nearly 2 billion people lack an adequate system for disposing of their feces. Even without disaster events, pervasive risk resulting from inadequate public facilities and infrastructures is evident. When disaster occurs, damaged or destroyed infrastructures not only cease to function but become major secondary hazards to the population. Broken dams release rampaging floodwaters; damage to power lines and plants precipitates fires and electrocutions; water treatment plants and reservoirs become contaminated; and collapsing buildings trap, maim, or kill hundreds of persons.

Disaster mitigation and preparedness assign a large and significant role to physical infrastructures. Mitigation measures may include the storage of emergency generators, flashlights, water supplies, and rescue vehicles. Preparedness warnings may urge the population to avoid disaster locations, be wary of damaged power lines, or refrain from drinking or using contaminated water. The construction of temporary roadways, railways, and airstrips may be necessary in the disaster response and recovery phases. Louise Comfort (1986, 1991) and Comfort et al. (2012) has emphasized the need for a strong and adaptable information system in every phase of emergency management.

Consequently, the concept of *pervasive risk or vulnerability* offers unique and complicated challenges to the public bureaucracies of developing nations. Many of these challenges are embedded in endogenous demographic, socioeconomic, institutional, and infrastructural conditions in the nation. Some are the result of the cumulative impact of recurrent environmental degradation resulting from inadequate economic development, poorly managed infrastructure, misuse of technology, or rapidly expanding industrialization (Khator, 1991; Kreimer and Munasinghe, 1992; Kreimer and Arnold, 2010). Therefore, the fifth and most critical dynamic in the disaster context is the continuing development of emergency management capability in developing nations in concert with the development of other administrative infrastructure and capability.

18.5 Developing Emergency Management Capacity as a Core Bureaucratic Competence

One day following the devastating Kobe Earthquake in Japan in January 1995, a major world conference on disaster and risk management was convened in that beleaguered city with profound implications for developing countries as well. The result was the Hyogo framework for action (HFA) as a blueprint for disaster risk reduction and emergency management for all nations extending to 2015 (Farmbry 2013, p. 18). The framework was the latest in a series of global disaster and emergency management conferences convened by the United Nations. To quote the HFA:

The World Conference on Disaster Reduction was held from 18 to 22 January 2005 in Kobe, Hyogo, Japan, and adopted the present Framework for Action 2005–2015:

Building the Resilience of Nations and Communities to Disasters (hereafter referred to as the “Framework for Action”). The Conference provided a unique opportunity to promote a strategic and systematic approach to reducing vulnerabilities and risks to hazards. It underscored the need for, and identified ways of, building the resilience of nations and communities to disasters. (HFA, 2005)

The Yokohama Strategy for a Safer World: Guidelines for Natural Disaster, Prevention, Preparedness and Mitigation and its Plan of Action (“Yokohama Strategy”), adopted in 1994, provides landmark guidance on reducing disaster risk and the impacts of disasters, which emerged from the HFA. The Yokohama Strategy identified major challenges for the coming years in ensuring more systematic action to address disaster risks in the context of sustainable development in both more- and less-developed nations and in building resilience through enhanced national and local capabilities to manage and reduce risk. Like the HFA, the review stressed the importance of disaster risk reduction being underpinned by a more proactive approach to informing, motivating, and involving people in all aspects of disaster risk reduction in their own local communities. It also highlighted the scarcity of resources allocated specifically from development budgets for the realization of risk reduction objectives, either at the national or the regional level or through international cooperation and financial mechanisms, while noting the significant potential to better exploit existing resources and established practices for more effective disaster risk reduction (HFA, 2005).

Both the Yokohama and Kobe conferences stressed several themes for developed and developing nations including

1. Governance: organizational, legal, and policy frameworks
2. Risk identification, assessment, monitoring, and early warning
3. Knowledge management and education
4. Reducing underlying risk factors
5. Preparedness for effective response and recovery

These are the key areas for developing a relevant framework for action for the decade 2005–2015. The principles contained in the Yokohama Strategy retain their full relevance into domestic and global policy-makers and bureaucracies characterized by increasing commitment to disaster reduction.

(b) Taking into account the importance of international cooperation and partnerships, each state has the primary responsibility for its own sustainable development and for taking effective measures to reduce disaster risk, including the protection of people on its territory, infrastructure, and other national assets from the impact of disasters. At the same time, in the context of increasing global interdependence, concerted international cooperation and an enabling international environment are required to stimulate and contribute to developing the knowledge, capacities, and motivation needed for disaster risk reduction at all levels.

(c) An integrated, multi-hazard approach to disaster risk reduction should be factored into policies, planning, and programming related to sustainable development, relief, rehabilitation, and recovery activities in postdisaster and post-conflict situations in developed and developing nations. Post-conflict venues such as Rwanda–Burundi, Darfur, Sudan, the former states comprising Yugoslavia, Sri Lanka, and others continue to leave populations at intense risk of mass fatalities resulting from both human-induced and natural disasters (HFA, 2005).

The continuing development of emergency management capability in developing nations is inseparable from the ongoing general development and reform of the public sector (Jain, 1976; Nunberg, 1990; Asmerom, 1993; Haddow et al., 2008). Five foci of development and administrative reform enhance emergency management:

1. Continued *decentralization of disaster mitigation and preparedness* capability at regional and local levels of the nation. Given the wide variations in the demographic, socioeconomic, cultural, and infrastructural conditions within the regions and local areas of a nation, local and regional levels of government should be encouraged and supported to extend their roles in the mitigation of disasters, disaster prevention, and the preparation of local and regional populations for disaster.
2. Continued *integration of disaster response and recovery management* at the national level of management. Although the entire intergovernmental system should be involved in disaster response and recovery, the national administrative system should be the focal point for both the coordination of subnational emergency management capability and international or multinational relief, assistance, and reconstruction activities. *National emergency management is the essential pivot for international, national, and subnational disaster response and recovery.*
3. Emergency management should be carefully interconnected with more routine administrative systems. Points of bureaucratic interconnection are determined by *issue networks* (Hecló, 1978; Palumbo, 1988). This point is particularly poignant in developing nations where government assumes many financial, economic, and business functions conducted elsewhere by the private sector. These issue networks interrelate emergency management with environmental management, national security, urban policy, social services policy, public works, energy policy, and other issue areas. *The incorporation of emergency management into these policy issue networks will also facilitate the integration of emergency and other bureaucracies in developing nations.*
4. The development of emergency management capability is integral to overall administrative reform (Caiden, 1969, 1976). Such reform efforts focus on the role of bureaucracy in managing as effectively as possible most of the four phases of emergency management within the nation. In mitigating risk, urging preparedness, responding to disaster events, and orchestrating recovery, bureaucracies gain experience and insight that can contribute to emergency management reforms. Moreover, widespread emphasis on *structural reform* by the World Bank and other multilateral agencies urges a bureaucratic reform and rationalization that will facilitate a vigorous economic and financial climate in developing societies (Asmerom, 1993). Included in reform is the increasing privatization of bureaucratic activity and decentralization of overcentralized administrative systems. *Emergency management contributes experience to administrative reform through experience with disaster response and recovery, through interaction with private national, subnational, and international relief, assistance, and cultural agencies and through the raising of continuing issues about routine administrative operations and systems.* Even more recent shifts in strategy from larger-scale external support from the World Bank, Regional Banks, and other large contributors to more microfinance and microcredit strategies (Yunus, 2003) underscore the need for nations to coordinate development of economic capacity and infrastructure with emergency preparedness and planning.
5. *The development of citizen capacity in emergency management.* As part of the resilience of bureaucratic capacity, citizen training and development as first responders and as participants in recovery and reconstruction following emergencies, in mitigation, and in preparedness are essential (Comfort et al., 2010). The concepts of resilience and adaptation are fundamental to the role of bureaucracy in developing nations (see Figure 18.3).

These five interrelated issues underscore the continuing need of administrative systems throughout the world to participate in emergency management technology transfer, both directly and through multilateral organizations such as the United Nations' Department of Humanitarian Affairs (formerly

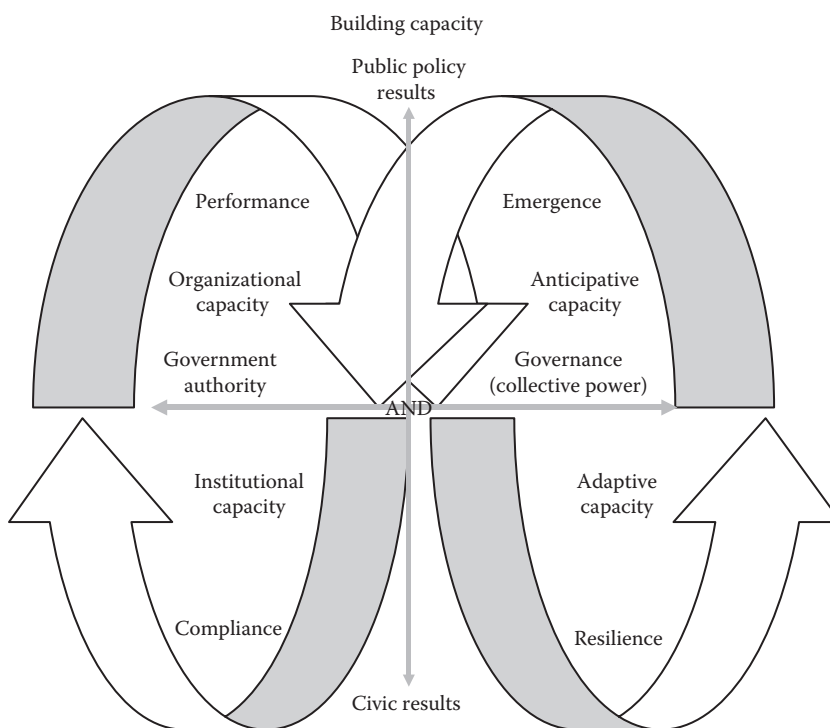


Figure 18.3 Building capacity diagram. (From Bourgon, J., *Int. Rev. Adm. Sci.*, 26, 209, 2010.)

the UNDRO). Human and natural disasters will continue to challenge the most adept administrative systems. As part of the overall development of the nation–state, natural and human-induced disasters are continuing challenges to state stability and prosperity (Ghani et al., 2006). They are likely to continue to be a particularly troublesome nemesis to the bureaucracies of developing nations as these nations struggle to pursue an adequate and meaningful quality of life for their citizens.

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***Part II: Hurricane Katrina,
New Orleans—United States,
and the Fukushima Tsunami—
Japan: Global Cases in Crisis
and Emergency Management***

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Chapter 19

Image Construction in the Wake of Hurricane Katrina

Steven G. Koven

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19.1 Introduction

All events are composed of both factual and interpretative components. The facts only somewhat constrain the debate as a significant battle is constantly waged over how to “spin” or interpret any story. In the case of Hurricane Katrina, various actors presented images that would ultimately shape citizen realities. The establishment of this reality in turn has significant consequences in regard to money, reputation, and professional careers. Viewed in this context, Katrina was much more than a devastating natural disaster but represented a professional disaster for some and moderate success for others. It can be viewed as an opportunity to view government agents in action, the media in a feeding frenzy, and the posturing of politicians. The action and interaction of each of these actors helped to create Katrina’s enduring images.

The imagery of Katrina is that of government incompetence, efforts to deny accountability, lack of leadership, lawlessness, lack of concern, and general chaos. For example, invidious comparisons

were made between the Katrina response and the response to the California wildfires that raged in October 2007. In contrast to Katrina's perceptions of "staggering ineptitude displayed at all levels of government," Governor Arnold Schwarzenegger was perceived as projecting "competence and brio as he hopscotched around the state." Schwarzenegger was seen "high-fiving" firefighters, visiting evacuees, and escorting President Bush around disaster zones. Shaking hands and giving autographs, the governor, made famous for his role in the movie "Terminator," stated that the key thing was to "be out there with the people" and that emergencies call for leadership that is "hands on" and "in the trenches" (Walsh 2007).

The actual behavior of Schwarzenegger and the behavior of those responding to Hurricane Katrina differed significantly. These contrasts can be perceived as both real differences of approach and dissimilar results of efforts to manipulate perceptions. The manipulation of perceptions is implicit in the theory of reality construction that has gained interest within the field of public administration. This theory is discussed in the following text.

19.2 Theory of Reality Construction

The idea that "reality" can be constructed is not new. Its roots go back to the German philosophers Immanuel Kant (1724–1804) and Edmund Husserl (1859–1938). Both Husserl and Kant contended that consciousness was not a passive receptor of information. Rather, these philosophers recognized the need to examine the ways in which human consciousness is structured. This examination of consciousness formed the foundation for what became known as interpretive theory and embraces the notion that observing behavior itself is too limiting because it excludes subjective interpretations. Under the perspective of interpretive theory, an understanding of the meaning and motives of individuals is most important. For interpretive theorists, real understanding of the social world occurs only through subjective interpretations of everyday experiences. The social world therefore is viewed as a product of consciousness rather than "objective" accounts that underpin positivism (Harmon and Mayer 1986, 291–294; Farazmand 2002, 47; Miller and Fox 2007, 83).

The idea of subjective reality was advanced in the 1960s by Berger and Luckmann with the publication of their influential book *Social Construction of Reality* (1967). Contemporary writers have focused on the policy frames or how policy is perceived (Edelman 1977, 1988; Ingram and Smith 1993; Rochefort and Cobb 1994; Yanow 2000; Burnier 2006). For example, Bosso (1994, 182) asserted that definitions of all public problems are highly interpretive and they may be "up for grabs," as a "free-for-all" of meaning. From this perspective, definitions of problems are the consequence of the interplay of value systems with culture, ideology, and political socialization playing key roles in an ongoing battle over reality construction.

Edelman (1988, 1) helped define the role of the media in defining reality. According to Edelman, the media continuously constructs and reconstructs phenomenon such as social problems, crises, and enemies in a manner that creates threats or reassurances. For Edelman, political developments mean what observers construe them to mean. Definitions, in turn, have real consequences for society as a whole as well as interest groups who are engaged in formulating definitions. From this perspective, phenomenon such as unemployment is socially construed. Unemployment is a problem for those out of work, but for employers, it denotes reduced labor costs and a docile work force. Discrimination against women or minorities may be perceived as a grievous problem for them but may not be so perceived by men and nonminorities (14). Phenomenon therefore must be interpreted by affected groups and their meaning is found in the outcome of the struggle over perceptions.

Political leaders have a vested interest in seeing that favorable interpretations of their actions are generally accepted. The interpretative “spin” therefore is all important. Edelman provided a number of examples noting that the Bay of Pigs fiasco of 1961 somehow helped bolster John Kennedy’s image as a decisive leader, while Jimmy Carter’s failed 1980 attempt to free the hostages in Iran had the opposite impact. Civil rights and affirmative action policies of John Kennedy and Lyndon Johnson were applauded in the 1960s. Opposition to these policies helped win popularity for Reagan in the 1980s. Herbert Hoover appeared unable to deal with the Great Depression and became a symbol of failure, while Franklin Roosevelt presented an image of action and confidence (42).

Consistent with interpretive theory, Edelman (1988, 94) rejected the idea of “objective” fact finding and asserted that it is the meanings people attribute to observations that make them important. These meanings spring from the clash of differing perceptions as officials, interest groups, and critics do their best to shape images. Interpretations of government officials are grounded in their social situations and beliefs with officials committed to constructions that justify their actions (96). According to Schneider and Ingram (1993, 334), a good deal has already been written about the social construction of social problems (Spector and Kitseuse 1987; Best 1989) but less about the construction of target groups.

It is hypothesized in this chapter that the degree to which Hurricane Katrina reflected a managerial disaster contained both factual and interpretive elements. Politicians and bureaucrats had vested interests in constructing their own realities. These realities often came in direct conflict with others who possessed different perceptions. Some of the perceptions were constructed in a manner that reinforced popular stereotypes such as government incompetence and racism.

The media became an important player in the struggle over interpretation and the social construction of reality. Popular books as well as newspaper coverage of the hurricane indicate a good deal of conflict over defining the performance of the government response. A total of 50 *New York Times* articles about Hurricane Katrina were reviewed for the time period September 1–September 2. This represents the total population of *New York Times* articles published during this period of time and reflects interpretations formed in the immediate aftermath of the storm (Times Topics 2007). The extent to which key actors sought to shape perceptions is assessed. This account is instructive in evaluating the “spin” or interpretive commentary that assisted in creating lasting images of the response to Hurricane Katrina.

19.3 Hurricane Katrina-Related Coverage in the *New York Times*

The print media’s reaction to Hurricane Katrina is delineated in the 50 *New York Times* articles that were identified on their web page. These articles were classified into five distinct categories: (1) public service, (2) human interest, (3) primarily factual, (4) mix of opinion/criticism/fact, and (5) primarily opinion. Articles ranged in content from those that reported pure facts such as the size of the storm surge to “puff” pieces about how women named Katrina felt about the storm to highly emotional stories about “despair and lawlessness.” Table 19.1 profiles the September 1–September 2, 2005, *New York Times* coverage of the hurricane utilizing the conceptual framework identified earlier.

As displayed in Table 19.1, only 19 of the 50 articles were classified as primarily factual, while 10 articles were identified as containing a mix of opinion, criticism, and fact and 10 articles were identified as primarily opinion. Seven of the opinion articles were editorial/op-ed columns.

Table 19.1 Katrina-Related Articles, September 1–2, 2005

<i>Article Type</i>	<i>Content of Articles</i>	<i>Total Number</i>
Public service	2 corrections of old stories 1 where to help directory	3
Human interest	1 women named Katrina reaction 1 family relocation 1 reaction on street in New Orleans 1 long lines in search for necessities 1 rescuers searching for survivors 1 searching web for loved ones 1 lawmakers losing homes 1 photo of evacuation	8
Primarily factual	5 impact on price of gasoline 2 looting and police response 3 offers for assistance 2 storm surge and barrier island impact 2 health conditions 2 phone and utility problems 1 impact on business mergers 1 hospital evacuation needs 1 impact on shipping	19
Mix of opinion, criticism, and fact	3 critiques of levees and evacuation efforts 2 conditions of evacuation centers 2 analysis of television coverage 1 future of New Orleans 1 conditions of New Orleans 1 challenges to Bush	10
Primarily opinion	4 government and political failures 2 community people helping each other 2 implications for blacks and poor 1 need for conservation 1 breakdown in New Orleans	10

Source: *New York Times* articles, September 1–September 2, 2005; Times Topics (2007).

Two of these editorial/op-ed columns discussed the positive aspects of people working together. In contrast, three columns discussed the lack of leadership and preparation, and two columns discussed the disproportionate impact of the disaster on the poor and blacks.

A general negative perception was cast in the majority of the op-ed articles. The president was castigated for his complacency and casual demeanor. America was pictured as changing its “can-do attitude” to a “can’t-do government” that made excuses “instead of doing its job.” Leaders were characterized by the view, “they like waging war, but they don’t like providing security, rescuing those in need, or spending on preventive measures.” Leaders were perceived as not “serious about some of the essential functions of government.” Reports of the situation in New Orleans were categorized as “what seems like a total breakdown of organized society.” A minority of the op-eds cast a positive shadow discussing coastal communities that “draw closer together” and “people doing wonderful things for each other.” People were praised for “getting food out to the needy,” for “giving ice to people,” and for “sending out free burgers to police officers directing traffic.” The storm was said to have the impact of “bringing out the best, not the worst, in the natives” (Barthelme 2005; Hoffman 2005; Krugman 2005; *The man-made disaster* 2005; *Waiting for a leader* 2005).

Articles that contained a mix of criticism and fact largely focused upon the suffering and despair of residents. Images of corpses left rotting in daylight, weeping women, dehydrated children, war zone atmospheres, enraged or helpless refugees, looters, lawlessness, despair, contaminated water, anarchy, rapes, shootings, and general chaos dominated. Only a few somewhat positive images, such as statements of Red Cross officials that the government response was “heroic” or the secretary of Homeland Security’s assurance that the federal authorities had matters under control, were presented (Carter 2005a; Dao et al., 2005; Shane and Lipton 2005; Stanley 2005).

A significant (7) number of the primarily factual articles about Hurricane Katrina addressed the pricing and business implications of the storm. Other articles focused upon offers of outside assistance or infrastructure problems. Some images of lawlessness were presented in the articles about desperate and opportunistic individuals who were taking advantage of “an overwhelmed police force.” Police officers and national guard troops were described as giving priority to saving lives. This facilitated looters who “ripped open gates and ransacked stores for food, clothing, television sets, computers, jewelry, and guns.” Articles quoted looters who justified their actions in the name of survival (Barringer and Longman 2005; McFadden and Blumenthal 2005).

Finally, a smattering of human interest stories supplemented the other coverage of Hurricane Katrina. For example, one article discussed how Katrina Leskanich (former lead singer of the group Katrina and the Waves) felt about sharing her name with the storm. Another article discussed how people turned to the web to search for loved ones who were missing after the storm. Still another article recounted the travails of a woman who was forced to move in with her mother in Baton Rouge and abandon the cocktail parties in her uptown New Orleans neighborhood as well as her afternoon sails along Lake Pontchartrain (Goodnough and Zernike 2005; Urbina and Alford 2005).

A few of the articles attempted to present a picture of people working together in the face of hardship and generous offerings of help. The overall image presented, however, stressed danger, health risks, anarchy, helplessness, suffering, and desperation. The embrace of sensationalism and the movement to adapt apocalyptic coverage were rewarded by an increase in the television audience. American Broadcasting Company (ABC), Columbia Broadcasting System (CBS), and National Broadcasting Company (NBC) all scheduled hour-long specials after several days of only broadcasting hourly updates in the evenings.

The efforts of key stakeholders to construct realities that were personally advantageous are assessed later. This assessment is based on accounts from prominent books about the storm as well

as popular media reporting. Accounts of the hurricane suggest intense jockeying for position in efforts to displace perceived failures on others and accept responsibility for any action that could be positively interpreted.

19.4 Reality Construction Efforts of Key Stakeholders

19.4.1 *Electronic Media*

Brian Williams of NBC News anchored a 1-h edition of NBC Nightly News from a New Orleans suburb telling viewers that his news division had determined that it was not safe in New Orleans itself. CNN reporters described the inside and outside of the New Orleans Convention Center as a “complete free-for-all.” Shepard Smith of Fox News anchored his program from a highway overpass crowded with displaced people from the city’s housing projects. CNN’s Anderson Cooper lashed himself to buildings in order to show viewers the strength of the wind gusts. Diane Sawyer of ABC secured an exclusive interview with President Bush for “Good Morning America” at which time he uttered his much criticized remark that “I don’t think anyone anticipated the breach of the levees” (Barthelme 2005; Stanley 2005). Both Fox and CNN showed a split screen of Secretary of Homeland Security Michael Chertoff (who was trying to reassure viewers that the federal authorities had matters under control) with images of stranded refugees and looters. The cable news networks showed scene after scene of mostly black victims stranded without adequate food, water, or shelter, “helpless and enraged” (Stanley 2005).

Viewers for both cable news and broadcast networks’ regular evening news soared. In the immediate aftermath of the storm, Fox recorded a 112% increase, CNN a 336% increase, and MSNBC a 379% increase in average weeknight viewers. Viewers at NBC, CBS, and ABC regular evening newscasts increased between 25% and 30% from the previous week’s totals (Carter 2005a). The hurricane also provided Brian Williams of NBC News with what some claimed was a defining moment as a network reporter and anchor. Williams was credited for being out on the scene, reporting and anchoring without a teleprompter. His coverage of the hurricane helped establish him as a worthy successor to previous anchors (Dan Rather, Tom Brokaw, and Peter Jennings) that recently left network news (Carter 2005b).

The media certainly did not create the great hurricane that wrecked so much damage on the Mississippi Gulf Coast. However, the media benefited from their depictions of suffering, despair, anger, helplessness, and general government incompetence. The viewing audience soared along with its corollary advertising revenue. The images projected by the media comported with the dominant stereotypes. Among these stereotypes included the view that government is the problem not the solution, a construct popularized by Ronald Reagan in the 1980 election. This view of the hapless or power-hungry Washington bureaucrat has a long historical tradition that in the 1970s was promoted by presidential candidates Jimmy Carter and George Wallace and can trace its anti-government origins at least as far back as Thomas Jefferson. Images of governmental incompetence certainly fell on fertile soil and, judging from the increase in television viewers, proved to be a popular construct.

An array of popular books have discussed the response to Hurricane Katrina from a variety of perspectives (Brinkley 2006; Cooper and Block 2006; Dyson 2006; Horne 2006; van Heerden and Bryan 2006). Best-selling authors such as Douglas Brinkley and Michael Dyson as well as academics such as Ivor van Heerden provide an in-depth account of the storm itself, the reactions of key stakeholders, and the efforts of key stakeholders to “spin” their stories.

19.4.2 Mayor Ray Nagin

The mayor of New Orleans, Ray Nagin, is associated with what came to be called the “blame game” as he attempted to shift culpability onto others even before the hurricane made land-fall. Both Nagin and Louisiana Governor Kathleen Blanco recognized they were unable to cope with the storm and began to chastise the federal government for the city’s lack of preparedness (Brinkley 2006, 56). Nagin’s “spin” on the disaster can be viewed in a September 1, 2005, call-in to local radio host Garland Robinette as well as his January 16, 2006, “chocolate city” speech to commemorate Martin Luther King day. Both of these were characterized as somewhat representative of what has been termed “Ray Speak.” According to Brinkley (2006, 21), “Ray Speak” was best described as “a confusing inversion of words and ideas, all gathered up in tortured syntax, typically producing a mixed message, but marketed to his constituents as candor. You might call it pandering with seemingly earnest zeal.”

In his call to the radio host on September 1, Nagin strongly condemned George Bush. The parent company of the local station (Clear Channel) then broadcast the interview over the Internet. In the interview, Nagin claimed that there was an incredible crisis in New Orleans and Bush’s flying over the city in Air Force One did not do it justice. The New Orleans mayor noted that thousands of people were “stuck in attics,” while others didn’t “have a clue what’s going on.” Nagin appealed for reinforcements, troops, and buses and announced that a national disaster existed that was “a major, major, major deal.” He advocated getting “every doggone Greyhound bus line in the country and get their asses moving to New Orleans” (531). Nagin also directed frustration at what he believed to be misdirected national priorities. He complained, “we authorized \$8 billion to go into Iraq lickety-quick. After 9/11, we gave the president unprecedented powers lickety-quick to take care of New York and other places. . . . You mean to tell me that a place where you probably have thousands of people that have died and thousands more that are dying every day that we can’t figure out a way to authorize resources that we need?” He implored the president and the governor of Louisiana to “get off your asses and do something” to fix “the biggest goddamn crisis in the history of the country” (534).

Nagin concluded that “God is looking down on all this, and if they [President Bush and Governor Blanco] are not doing everything in their power to save people, they are going to pay the price. Because every day that we delay, people are dying. . . . We told everybody the importance of the 17th Street Canal issue [where the levee failed]. We said ‘Please, please take care of this. We don’t care what you do. Figure it out’” (532).

The only actors in the Katrina drama that were projected in a somewhat positive light by Mayor Nagin were Lieutenant General Russel Honore (commander of the Department of Defense’s Joint Task Force Katrina), New Orleans police officers, and the people of New Orleans. He gave the president a slight bit of credit in his statement that “he [Bush] sent one John Wayne dude down here that can get some stuff done, and his name is General Honore.” Nagin claimed that his police officers “were dead tired from saving people, but they worked all night because we thought this thing was going to blow wide open.” In regard to the people seen looting and doing “weird stuff,” Nagin asserted that “people are desperate and they’re trying to find food and water” (532).

Following the radio call-in, Nagin was congratulated by one of the city councilwomen for “sticking it to Blanco, FEMA, all of them.” The councilwoman felt the world and government needed to hear what the mayor had to say. The mayor’s communications director felt proud that the mayor told Bush and Blanco to “get off your asses and do something.” Brinkley concluded that Nagin’s “meltdown” was “a much appreciated tonic to the poststorm bureaucratic abyss of

both FEMA and Homeland Security.” Although Nagin had engaged in hyperbole and exaggerated statements about Katrina compared to other incidents such as Pearl Harbor or 9/11, he had at least found his voice. The total number of deaths attributed to the hurricane was estimated to be 1,351–1,103 in Louisiana, 228 in Mississippi, 16 in Florida, 2 in Georgia, and 2 in Alabama (535, 571).

On January 16, 2006, (Martin Luther King) Nagin displayed more “Ray Speak” in a speech where he described an imaginary conversation with Martin Luther King. His conversation with Dr. King dealt with issues such as black leaders criticizing each other, the botched government response to people trapped in the New Orleans Superdome, young black men shooting each other, the need to take care of children, and the need to reduce the incidence of black children living in single family households. Nagin next told the audience that it was time to rebuild “a chocolate New Orleans”; that the “city would be a majority African American city” because it was “the way God wants it to be”; that “God was mad at America” that because of the anger was “sending hurricane after hurricane after hurricane”; and that God was “not approving of us being in Iraq under false pretenses” (Horne 2006, 314).

Nagin was not alone in tying the government’s response to the hurricane to race. On September 2, 2005, the rapper Kanye West appeared on a telethon in support of the American Red Cross’s disaster relief efforts. Instead of reading from a script prepared by the network about the impact of Katrina, West stated that he “hated the way they portray us in the media.” He observed that “if you see a black family it says ‘they’re looting.’ You see a white family it says, ‘they’re looking for food.’” The slow response of the government was attributed to the fact that “most of the people are black.” West stated that he recognized that the Red Cross was doing “everything they can” but that “a lot of people that could help are at war right now.” The rapper concluded with the statement that “George Bush doesn’t care about black people” (Dyson 2006, 27).

Laura Bush and George H.W. Bush both strongly defended the president and tried to construct an alternative image. In an interview with American Urban Radio Networks, Laura Bush expressed her view that West’s remarks were “disgusting.” She stated that as the person who lives with him, “I know what he is like, and I know what he thinks, and I know he cares about people.” George H.W. Bush on the Larry King Live talk show defended his son against the “particularly vicious comment that the president didn’t care, was insensitive on ethnicity... Insensitive about race... because I know this president, I know he does care” (28).

On May 20, 2006, Ray Nagin was narrowly reelected by a margin of 52%–48% over his white rival Lt. Governor Mitch Landrieu despite raising less money and lacking the support of the business community that backed him strongly in 2002. Nagin won about 21% of the white vote and over 80% of the black vote. In 2006, black residents were still in the majority in New Orleans, although by a slimmer margin than before the hurricane. Nagin was credited with remaking his political persona from a candidate favored by whites to a candidate that appealed to black unity and pride. In his acceptance speech, Nagin thanked President Bush for delivering on his promises to the citizens of New Orleans (Nossiter 2006).

19.5 Governors Haley Barbour and Kathleen Blanco

The governors of the two beleaguered states of Louisiana and Mississippi did their best to maximize the amount of federal aid they received. On November 6, 2007, Haley Barbour was reelected with approximately 58% of the vote, winning a larger share of the vote than in 2003

when George W. Bush assisted in his campaign. Barbour was credited with acquiring at least \$15 billion of federal aid to his state (Selway 2007). He was praised by voters for the way he handled the Hurricane Katrina crisis.

Barbour's style and construction of events differed significantly from that of Mayor Nagin. Barbour was characterized as adopting a posture of "stoic optimism" and a "can-do" spirit as a means of coping with the disaster. Brinkley reported that Barbour put a cheerful spin on Mississippi's fortunes, perhaps because of his country-boy pride that made him reluctant to sound dependent, whining, or defeated. When asked about the performance of FEMA and the White House, Barbour consistently referred to the national government as "a good partner." Because of his reluctance to complain, Barbour was awarded the sobriquet "stoic bubba." When Bush came to Mississippi on September 2, Barbour told the president that "Y'all are helping," and "The federal government has been great" (553–554).

Barbour's background and demeanor proved to be a great benefit. The Mississippi governor was a staunch disciple of Ronald Reagan's "eleventh commandment": a Republican shall not criticize a fellow Republican. He was a long-time ally of George Bush and a fixture in Republican circles, having served nearly 2 years in the Reagan White House as director of the Office of Political Affairs. From 1993 to 1997, Barbour was chairman of the Republican National Committee at a time when Republicans won control of both houses of Congress. He understood quickly that hurricanes can produce long-range economic benefits. An important post-Katrina goal of Barbour's was to induce the federal government to provide as much disaster relief as possible. The director of the John C. Stennis Institute of Government at Mississippi State University noted that "the stars were all aligned for him to really make a raid on the federal Treasury and bring it to Mississippi" (Selway 2007).

Comparisons have been made between Kathleen Blanco and Haley Barbour's political acumen. While Barbour was known as the Republican insider, Blanco was described as "schoolmarmish" with bedrock decency and charmless courtesy. In her younger days, she became a teacher but left the profession to raise her six children. Despite being described as an uninspiring speaker, to the surprise of many in 2006, she became Louisiana's first woman governor and one of the few Democrats to hold a governorship in the South. Although she projected an image of a grandmother figure, she was also known as being tough with good political instincts (Brinkley 2006, 89).

Some considered Governor Blanco's lack of media savvy to be "a serious Achilles heel." She did not accord special treatment to them. For example, she only allowed "lifesaving people" to fly with her to investigate the devastation. She did not curry favor and it is believed that they retaliated. A perception was generated that Governor Blanco was a "hack" (225). Critics of Blanco also called her indecisive and a weak leader in a time of crisis. In reality, she faced many obstacles. Horne (2006, 98) reported that Governor Blanco's staff believed that the White House orchestrated a disinformation campaign with Karl Rove putting falsehoods in the minds of Republican stalwarts. Bush failed to inform Blanco about one of his trips to Louisiana and he denied that he was coming.

It was clear that as a Democrat in a region targeted by the Republicans, Blanco would not receive favorable treatment. Although Mississippi had incurred a fraction of the damage (61,386 compared to 204,737 severely damaged homes), on a per capita basis, Mississippi received three times Louisiana's share of allocations designated for community development block grants. Horne observed that the imbalance, however, was attributable to Barbour's clout and Mississippi senator Thad Cochran's seniority as much as to White House maneuvering against the Democratic

governor of Louisiana. In late January 2006, Blanco stated the lack of funding delivered to the state of Louisiana “makes me sick to my stomach” (99).

According to Blanco’s communication director, Bob Mann, a decision was made by the governor that they would not preen for the media; the governor would not engage in “grandstanding” by staging too many press conferences or photo opportunities. Mann, however, believed that the White House had launched a public relations onslaught against Governor Blanco. The Louisiana communications director stated, “We were getting phone calls from reporters who were citing the White House as their source. It was just coming at us in waves. . . . They were sticking it to us. But then at the exact same time they were publicly saying, ‘This is not the time for a blame game’” (Brinkley 2006, 414).

After the storm, Blanco accepted some culpability and she made some proposals for reform. She tried to present a positive picture of her post-Katrina performance yet grudgingly admitted some mistakes were made. Blanco asserted that within 2 days of Katrina, she had thrown everything she had into the relief effort and insisted that the evacuation, overall, had been a triumph. Mistakes included the failure to empty nursing homes and hospitals, the breakdown in emergency communications, an inability to quickly license out-of-state doctors, and an inability to quickly provide credentials for law enforcement personnel. Brinkley (2006, 289) claimed that Blanco deserves credit for her ability to improvise in the days after Katrina, stating, “She barely ate or rested. She did absolutely everything she could to help the victims. Mistakes were made, but she also dealt with each crisis that occurred in a thoughtful, rational manner. Not once did she crack under the strain. She didn’t swear. She didn’t denounce Bush, Chertoff, or Brown.”

In testimony before Congress, Governor Blanco recommended investment in permanent housing rather than spending money “on sweetheart deals with plugged-in fat cats in the trailer business.” In an effort to frame the impact of the “Bush smear campaign,” Blanco claimed, “They [Bush team] have wounded my capacity to be a governor.” The governor surmised that because of the deficit, money needed for the war in Iraq, and a refusal to raise revenue necessary to cover costs, the people of Louisiana were “like children with bad timing” (Horne 2006, 354, 357).

19.6 President George W. Bush

The Bush administration and the president tried to shift blame onto others, yet in the end suffering significant damage. The president was castigated for his “flyover” of the damage caused by Hurricane Katrina. Dyson (2006, 71) observed that as Bush flew back from his vacation in Texas to Washington on August 31, he might have stopped in New Orleans or other locations along the devastated Gulf Coast. This would have shown that he was an engaged commander in chief, identifying with the suffering of his fellow Americans. Bush, however, directed Air Force One to swoop down so that he could have a closer view of the devastation that had occurred several thousand feet below. Many in the country did not interpret his self-described “flyover” as compassion but as a “symbol of his tone-deaf empathy for the vulnerable.”

During the infamous “flyover,” Bush and his political advisor Karl Rove had invited photographers to take shots of Bush surveying the vicious hurricane’s damage. This photo op was intended to show Bush as a man connected with the tragedy of the storm. Brinkley (2006, 408), however, reported that his effort “backfired,” stating “No one expected to the President go to New Orleans, pick up a bucket, and start bailing water, but detouring over it in a jet was a meaningless gesture

at the other end of the spectrum. ... Bush already 2 days late in seriously addressing the Katrina situation, was finally entering the recovery foray from an unfortunate springboard of high-altitude disconnect. He should have smelled the death. He should have touched the floodwater. He should have showed he cared a bit more. White House political advisors admitted later, 'It looked like he didn't know what was going on.'" Republican strategists privately called the image of Bush (Bush as the "tourist") peering down on the flood's destruction as among the most damaging images of his presidency.

The Bush administration's failure to control the "spin" or reality construction regarding Katrina was not due to lack of effort. Horne (2006, 93) observed that Karl Rove devised an "artful strategy" to defuse blame for the mismanagement of the hurricane response. Step one of the strategy was to deplore the "blame game" and declare it over and done with since it was unworthy of a great nation at a time of tribulation. Step two of the strategy was to try to win the "blame game." Defenders of the president adopted this as they consistently tried to blame Louisiana Governor Kathleen Blanco and New Orleans Mayor Ray Nagin. A shift in focus, they believed, would take pressure off of the inadequacies exhibited by federal government officials.

In their attack on Mayor Nagin, the Bush White House focused on the flooded city of New Orleans and public school buses. Nagin had ignored Federal Emergency Management Agency (FEMA) guidelines, which urged the city to coordinate the use of school buses and drivers to support evacuation efforts (Brinkley 2006, 20). Some New Orleans police officers tried to place police cars out of harm's way and cursed Mayor Nagin for keeping all of the Regional Transit Authority (RTA) rescue buses in areas likely to flood. They noted that the hurricane evacuation plan required RTA buses to take people to safer locations 60 h prior to the storm's arrival (117).

Some disputed the importance of the bus issue noting that for those buses that had been pulled up onto the levee, where they stayed dry, there were no bus drivers. Furthermore, they argued that if decrepit buses did not break down and if ill-paid drivers had agreed to abandon their families in order to ferry evacuees, there was no place large enough to receive the numbers of people. The numbers of evacuees would also have grown when it was known that the city was willing to take citizens out of town (Horne 2006, 94).

The Bush administration's attack on Governor Blanco focused mainly on her refusal to hand over formal command of the Louisiana National Guard. Blanco, however, believed that Bush's plan to "federalize" the Louisiana Guard was a "paper reorganization" and part of the White House's effort to blame her for post-Katrina problems in Louisiana. The White House did not make any suggestions to Governor Haley Barbour to relinquish command of the Mississippi Guard. Furthermore, Blanco was reluctant to step aside and allow the president to play the role of hero. Federalizing the guard would not put more troops on the ground, and once merged with the regular army, the guard would not be available for policing the city. The 1878 Posse Comitatus Act forbade federal troops from getting involved in the policing of US citizens unless the Riot Act was invoked. The Riot Act had been invoked only three times since World War II; in 1957 to integrate schools in Little Rock, Arkansas; in 1963 to integrate colleges in Mississippi; and in 1992 during the Rodney King riots (Brinkley 2006, 569; Horne 2006, 96).

Bush aides denied that they engaged in politics by pressuring Governor Blanco to turn over Louisiana state troops to national authority. Bush had made this request to Blanco when he met with her and Ray Nagin on Air Force One in the early days of the crisis. Blanco refused to sign a memo of understanding regarding the federalization of the Louisiana Guard. This memo was faxed to her by Bush's chief of staff Andy Card. A house committee reviewing the hurricane response later concluded that federalizing the state militia would provide no advantage at all (Horne 2006, 96).

Despite the best attempts to shift blame and “spin” the story in a positive light, Bush and his allies had difficulty gaining traction. Major gaffes seemed to stick to the president and official representatives of the federal government. Perhaps the most memorable was Bush’s comment to the head of FEMA, Michael Brown. Brinkley (2006, 549) noted that the president’s comment, “Brownie, you’re doing a heck of a job” became the catchphrase associated with Bush’s leadership in the Katrina disaster. Brinkley stated, “The phrase became emblematic of the president’s ignorance about the situation and his tendency to take a casual attitude toward it. . . . The ‘Brownie’ remark generated widespread criticism at the time. It remained in common parlance, an expression that served to describe anyone doing a horrendous job, especially when the speaker didn’t care one way or the other. If a person was making a mess of fixing his or her own car, for example, the new American idiom was to say with a smile, ‘Brownie, you’re doing a heck of a job.’ It wasn’t much of a legacy for either man” (550).

A *Newsweek* poll conducted soon after the hurricane found for the first time less than half (49%) of respondents stating that Bush had strong leadership qualities. This number was down from 63% in the previous year. His job approval rating (38%) was the lowest at that time for his presidency. About two-thirds of the respondents (66%) also stated they were dissatisfied with where the country was heading (Fineman 2005).

19.7 FEMA Director Michael Brown

It appears that the reputation of FEMA and its director, Michael Brown, was the most damaged in the Katrina debacle. Brown tried to put a positive spin on his performance but was overwhelmed by what had become accepted as a common reality. In February of 2006, Brown testified before a Senate Committee on Homeland Security and Government Affairs. In his testimony, Brown insisted that he had been warning for years about how the Bush administration’s obsession with terror was harming FEMA. He claimed that his remarks or e-mail messages had been taken out of context and that he was “sick and tired” of hearing that he lacked the leadership skills for the job. Brown contended that one assertion of Homeland Security officials—they did not know of the extent of the flooding until August 30—was “baloney” because he had notified them the day before. He concluded that the Bush administration, as a whole, did not seem to care enough about natural disasters and had relegated disaster relief to being a “stepchild” of national security. He stated that he believed that if “we’ve confirmed that a terrorist has blown up the 17th Street Canal levee, then everybody would have jumped all over that and been trying to do everything they could” (Lipton 2006).

Brown’s comments before the Senate Committee could be interpreted as “sour grapes” in that his image as an incompetent manager was already firmly established and that he had become bitter. An array of incidents helped to cement this perception and led to his resignation on September 12. The first sign of Brown’s future problems arose when *Time* magazine published a story questioning the validity of Brown’s official resume. His “padded” resume listed that between 1975 and 1978, he had been overseeing the emergency services division of a small town in Oklahoma, that he received an outstanding political science professor award from Central State University (located in Oklahoma), and that he was a director of Oklahoma Christian Home. Research from *Time* magazine staff revealed that his service at the small Oklahoma town was more like that of an intern; that he was a student, not a professor at Central State University; and that he was never affiliated with the Oklahoma Christian Home in any capacity (Brinkley 2006, 246).

Brown's ascension to the position of FEMA head was highly circuitous. He was hired by his old college friend Joseph Allbaugh as FEMA general counsel in 2001, and when Allbaugh resigned as director of FEMA, Brown was nominated to head the organization. Brown was sworn in as director of FEMA in 2003. He had benefited greatly from his ties with Allbaugh who was George W. Bush's chief of staff when Bush was governor of Texas and the national campaign manager for Bush's 2000 presidential campaign. Along with Karl Rove, Allbaugh was considered one of Bush's most trusted aides. Brown's previous experience could best be described as inauspicious. From 1989 to 2001, Brown was the Judges and Stewards commissioner for the International Arabian Horse Association (IAHA). Brown was forced to resign from the IAHA after numerous lawsuits were filed against them. Background checks revealed that a boss from the early 1980s characterized him as "not serious and somewhat shallow" (246).

This character feature of Brown became apparent during the tragedy of Katrina. A number of flippant e-mails from Brown to others were uncovered by the media. During the week when those trapped by the storm were dying, Brown sent out the following e-mails to friends and subordinates: "If you'll look at my lovely FEMA attire, you'll really vomit. I am a fashion god" (sent August 29); "Can I quit now? Can I come home" (sent August 29); "Do you know of anyone who dog sits" (sent August 30). Most damning of all, Brown received the following frantic message from FEMA's only staffer in New Orleans, "thousands gathering in the streets with no food or water. Hundreds still being rescued from homes. ... Estimates are many will die within hours. Evacuation in progress." In response, Brown e-mailed back to the staffer on August 31, "Thanks for the update. Anything specific I need to do or tweak" (272). Perhaps most damaging to Michael Brown's image was the fact that he became the butt of jokes for popular comedians. For example, Jon Stewart stated, "No word yet on Mr. Brown's future plans, though sources say he does want to spend more time doing nothing for his family." Jay Leno noted, "This is very exciting, you may have heard today President Bush announced a plan to put a man on Mars—the head of FEMA." Bill Maher announced that "Michael Brown, the head of FEMA, has been relieved of his command. He has been asked to return to Washington immediately. He is expected to arrive in about a week. He had a good excuse, though. He said he thought freezing in the face of national crisis made him look presidential." Conan O'Brien quipped, "Many Americans are calling on President Bush to fire the head of FEMA Michael Brown because of the slow response to the crisis. Unfortunately, due to the red tape, firing Brown will take 6–8 months." Finally, in a parting reference to the slowness of the rescue effort Jon Stewart observed, "Michael Brown, the director of FEMA, was nominated by President Bush in 2003 and plans to start the job any day now" (Kurtzman 2006).

A timeline of efforts by Brown and others to "spin" Katrina's reality is instructive. This timeline is provided in Table 19.2.

19.8 Conclusions

Key stakeholders all had a vested interest in shaping perceptions about the government's response to Hurricane Katrina. These stakeholders included the media; the mayor of New Orleans, Ray Nagin; the governor of Mississippi, Haley Barbour; the governor of Louisiana Kathleen Blanco; the president of the United States, George W. Bush; and the director of FEMA Michael Brown. Most tried to spin their roles in the best possible light. Some had moderate success, others abject failure.

Table 19.2 Timeline of “Spin” Efforts

August 29, 2005	Katrina makes landfall as a Category 4 hurricane.
August 31, 2005	President Bush has photo-op “flyover.”
September 1, 2005	Mayor Nagin interviewed by radio host Garland Robinette
September 2, 2005	Rove-led campaign to blame local officials begins.
September 2, 2005	Bush praises “Brownie.”
September 2, 2005	In front of the media, Governor Barbour tells Bush, the federal government has been great.
September 3, 2005	Bush blames state and local officials.
September 3, 2005	Kanye West tells audience Bush doesn’t care about black people.
January 16, 2006	Ray Nagin delivers his “chocolate city” speech.
February 2, 2006	Kathleen Blanco testifies before Congress, asking for more equitable funding for housing.
February 10, 2006	Michael Brown testifies before Congress, calls statements of Secretary of Homeland Security Michael Chertoff, “just baloney.”

The media had a clear interest in attracting attention and producing more advertising revenue; elected leaders at the local and state level had an interest in projecting an image of leadership and attracting as much disaster relief funding as possible. Federal officials also had a stake in projecting strong leadership. In the end, most of the officials associated with the hurricane tried to blame others for the perceived debacle. Mayor Ray Nagin played the “race card” to his advantage, Governor Barbour capitalized on his strong connections with the White House, Governor Blanco reflected about being “ambushed” by White House officials, the media had a field day and increased their audience, Michael Brown complained about the subordinate role FEMA played in the war on terrorism, and President Bush’s White House chose FEMA Director Brown as the scapegoat but could not escape heavy criticism. Federal officials attempted as best as possible to shift culpability to municipal- and state-level leaders.

The positions taken by key stakeholders helped in the construction of imagery that surrounded Hurricane Katrina. Differential winners and losers emerged in the battle of reality construction. The television media was a clear winner attracting more viewers, at least for a short period of time. The mayor of New Orleans tried to amplify the enormous pain and suffering that the storm produced as well as the inadequate attention it received from leaders at higher levels of government. His “chocolate city” speech was viewed as bizarre by some but it helped to solidify political support with black voters. Ray Nagin was reelected mayor in 2006 despite a much reduced black electorate. The governor of Mississippi, Haley Barbour, was reelected in 2007, and a considerable sum of federal money was appropriated to his state for disaster relief. FEMA, FEMA Director Brown, and President Bush, however, suffered from perceptions that they “dropped the ball” and in general exercised poor leadership during the crisis.

The saga of Hurricane Katrina represents an excellent vehicle to view reality construction. Politicians, especially, are in the business of image manipulation and creation of perceptions. This case study reveals that reality construction defines clear winners and losers. Perception becomes reality and the game of reality construction has profound consequences.

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Chapter 20

Hurricane Katrina

Preparedness, Response, and the Politics–Administration Dichotomy in New Orleans Emergency Management

Steven G. Koven and Michael Brennan

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20.1 Introduction

Hurricane Katrina exposed the soft underbelly of American preparedness. Labeled “a disaster within a disaster,” the storm revealed the extent to which responsible positions within the federal bureaucracy were filled by persons with questionable qualifications. In addition, the storm exposed a lack of coordination between essential actors in the tragedy, callousness on the part of some leaders, and efforts to shift the blame for the government inadequacies. Hurricane Katrina became indelibly stamped into the consciousness of Americans for the inability of American officials to efficiently take care of its people. Images of residents trapped on their roofs, pleading for assistance, were not quickly erased. Pictures of helplessness, arson, and looting jumped out on

television screens in the aftermath of the storm. Commentators in the media asked how this could happen in America, a nation that not only prides itself on its wealth but also its “can do” attitude. Officials were widely blamed for a lack of competence as well as general lack of concern with the suffering of their fellow citizens.

Dealing with natural disasters is a key governmental responsibility. In addition, it is incumbent upon the nation’s leaders to assure its citizens that agents of the government have the ability to carry out their responsibilities. This mandate appeared to be egregiously violated with the appointment of Michael Brown to head up the Federal Emergency Management Administration (FEMA). Brown’s actions during the response to the storm served as a quintessential reminder about the excesses of patronage and the need to instill an ethos of competence in government.

Perhaps the incompetence displayed by FEMA officials will bolster support for the idea that government jobs should be filled by civil service testing, evaluation of relevant experience, “hands-on” training, and promotion based on merit. These ideals were promoted by the Progressive Movement of the early twentieth century. The ethos of merit and neutral competence in government, however, came under fierce attack in the latter part of the twentieth century as political conservatives, in general, castigated the efficacy of government. Public sector employment became portrayed as a caricature of lazy, incompetent, underworked, nonresponsive, officious bureaucrats. Hurricane Katrina both reinforced this stereotype and, at the same time, argued for the desirability of instilling more competence in government.

This chapter describes the devastation of Hurricane Katrina, the state of hurricane preparedness in the city of New Orleans, the background of the director of the FEMA, and the implications of Katrina for future federal hiring. The continuous danger political patronage poses to effective governance is highlighted. It is hoped that further understanding of the ramifications of patronage may act to constrain future, unwarranted use. Support for the ethos of merit in government is cited as a bedrock principle of public administration. This principle, however, finds itself under attack today by critics who wish to return to the practices of the pre-civil service era.

20.2 Hurricane Katrina and the Readiness of New Orleans

20.2.1 The Storm

Hurricane Katrina made landfall southeast of New Orleans on August 29, 2005. Katrina brought severe but not catastrophic winds, record rainfalls of up to 14 in., and stormwater damage linked to the city’s pumping station failure to keep up with the rain. Katrina was the costliest and one of the five deadliest hurricanes in American history (Kates et al., 2007, 8). The high winds generated when the storm was out at sea (winds reached 175 mph at sea) created the powerful storm surge that led to the collapse of the three major levees in the city of New Orleans (van Heerden and Bryan, 2006, 85). When the levees were breached, a wall of water surged out, eventually occupying approximately 80% of the city. The deputy director of the Louisiana State University Hurricane Center reported that 87% of all the water that flooded the greater New Orleans metro area was caused by levee failure rather than rainfall. Water poured out of the breached levees for more than 60 h at which time the city’s water level equaled the water level in adjoining Lake Pontchartrain (van Heerden and Bryan, 2006, 95).

The aggregate impact of the hurricane cannot be precisely measured. Most of the city was inundated with water 2–3 m deep; in some areas, the depth of the water was more than 5 m. Immediately, health concerns were raised about the “toxic gumbo” of the water that was susceptible to contamination from pollutants such as hydrocarbon fuels (from fuel storage units) and chemicals from commercial chemical storage units. There were also fears expressed about contamination from elevated levels of metals such as lead and arsenic. Other sources of contaminants included gasoline from automobiles and herbicides found in home gardens (Reible, 2007, 54).

According to an official government report, Hurricane Katrina caused 1,326 deaths, displaced more than 700,000 people, and destroyed or damaged an estimated 300,000 homes. Disaster declarations covered over 90,000 square miles (Department of Homeland Security, 2006, 4–5). Monetary costs associated with Katrina were enormous. Some estimates put the cost of the storm’s property damage alone at about \$97 billion: \$67 billion from housing damage, \$7 billion from damage to consumer durable goods, \$20 billion from damage to business property, and \$3 billion from damage to government property (Koven, 2008, 119). Other estimates of direct property damage, however, approximated the cost at \$20–\$22 billion (Kates et al., 2007, 9).

It was expected that a devastating storm would hit New Orleans at some point in time. Officials from Louisiana State University’s Coastal Studies Institute had been warning people all over the world that New Orleans was a “nightmare” waiting to happen. The nightmare happened on August 29 and exacted a high toll, especially for the elderly, the poor, and minorities. In Louisiana, about 71% of those who died in the storm were older than 60 and 47% were older than 75. Some of the dead were found in nursing homes allegedly abandoned by their caretakers (Department of Homeland Security, 2006, 8). More than 100,000 residential structures were flooded. Of those structures, about 78,000 were severely damaged or completely destroyed. Of the 126 public schools in New Orleans, only seven had no damage and more than half had damage that exceeded 25% of replacement value. In July 2007, nearly 2 years after the storm, New Orleans had an estimated 300,000 residents, only two-thirds of its estimated 452,000 pre-hurricane total (Nelson et al., 2007, 24).

20.2.2 Hurricane Studies and Preparedness

The history of New Orleans is replete with natural disasters. The French who settled New Orleans in 1718, however, were undeterred by the fact that much of city sat below sea level. The response from the French founders and later settlers was to build levees and following a flood to increase levee heights approximately 1 ft higher than the last high-water level. This strategy provided some safety but also led to future catastrophes. In the 4 years preceding Hurricane Katrina, there were extensive warnings from scientists that the “big one” would eventually hit the city (Kates et al., 2007, 8).

As New Orleans grew in population, the responsibility for levee construction shifted to the state and eventually the federal government. Incremental improvements in the levees were made on the basis of the size of the last storm. In addition to increasing the height of levees, two major floodways were built to divert waters. This diversion appeared to have made the city safer from river floods but did little to protect that city from hurricanes.

Significant pieces of congressional legislation were passed in order to enhance flood protection. Following the great floods of 1927, the Flood Control Act of 1928 supplemented the levee

system with reservoirs, channel improvements, and floodways. The Flood Control Acts of 1936 and 1938 continued to make improvements. In 1968, the Federal Insurance Administration and the National Flood Insurance Program were created. These initiatives encouraged communities to explore different approaches to flood management, such as land use planning and flood-proofing of buildings (Haeuber and Michener, 2006).

On paper, the city of New Orleans had a plan in place (Comprehensive Emergency Management Plan) to deal with the destruction of a major storm. This plan was included in the Flood Control Act of 1965; however, it was not adequately implemented. Implementation was hindered by delays, cost overruns, legal challenges, local opposition, environmental concerns, and other issues (Carter, 2005, 5; Mittal, 2005, 2). Between 1996 and 2005, government funding for natural disasters declined despite warnings from the US Army Corps of Engineers about the need to invest in aging infrastructure (Carter, 2005, 5). Faced with difficult budget choices, both Republican and Democratic administrations ignored the threat posed by a Katrina-sized hurricane.

Prior to Katrina, a variety of studies were conducted by the US Army Corps of Engineers. These studies estimated that improvements in the levee system could be made to protect against a Category 5 storm. It was estimated that improvements would cost at least \$2.5 billion and take 10–20 years to complete. Funding, however, did not materialize, and in Fiscal Year 2005, Congress appropriated only \$100,000 toward a feasibility study (Carter, 2005, 5–6). There was little sense of urgency in Congress to find the \$2.5 billion that would provide real protection for residents of the city of New Orleans. In hindsight, this money would have been well spent since the cost of the hurricane in property damage alone exceeded \$2.5 billion.

Some preparations had been made prior to the storm. In July 2004, federal, state, and local officials, as well as leaders from volunteer organizations, participated in a mock hurricane exercise. This drill (Hurricane Pam Exercise) was designated to equip officials with the ability to respond to a Category 3 hurricane making a direct hit on New Orleans (Glasser and Grunwald, 2005, A1). Under such a scenario, it was anticipated that more than one million residents would have to be evacuated from the city (FEMA, 2004). The exercise found that a Category 3 hurricane would require about 1000 shelters to be open for 100 days. A hurricane plan called for the state of Louisiana to supply the shelters for the first 3–5 days after which the federal government and other providers would replenish supplies. The hurricane plan also provided for search and rescue of stranded residents (FEMA, 2004). Officials anticipated that 300,000 people would remain trapped in the city if a Category 3 storm hit the area (LSU, 2005). The White House was informed of the possible damage that a powerful hurricane could produce but took no action (Glasser and Grunwald, 2005, A1).

The existing levee and floodwall system in New Orleans was not designed to protect the city against a slow-moving Category 4 or Category 5 storm (Carter, 2005, 1). Furthermore, a study conducted by a team of Louisiana investigators indicated that the levee system in New Orleans was flawed. The investigative group (known as Team Louisiana) concluded that sheet piles (the interlocking sheets of steel driven into the soil to anchor the levees and prevent water from flowing underneath) were too shallow. The US Army Corps of Engineers agreed that problems with piling depth were present but concluded that the problem represented only one of the numerous factors that contributed to the disaster (Schwartz and Drew, 2005).

Despite exercises and the existence of a disaster plan, most officials seemed ill prepared for Hurricane Katrina. The police department drew special criticism. Officers did not seem to know about contingency plans; hundreds of police patrol cars were either flooded or stranded; the police

department's primary radio system did not function; the exchange that handled the New Orleans cell phone area code was inoperative; and many of the existing police cars were either running out of gas or had flat tires from running over debris (Baum, 2006). The American media displayed pictures of desperate people sitting on rooftops, surrounded by water, holding up handwritten signs that pleaded for help.

20.2.3 Critics of the Hurricane Response

As the images of Katrina victims appeared on television, Americans asked how such a calamity could occur. Blame was heaped on the professional planners as well as state, city, and federal officials who seemed to be incapable of addressing a disaster of such magnitude. Few focused on the fact that the seeds of the city's destruction had been building for decades. The erosion of wetlands, inadequate design of levees, confusion over responsibility for maintaining levees, a navigation canal that rapidly funneled water, and insufficient funding to update the levee system all were cited as factors contributing to the catastrophe (Carter, 2005, 3; Reible, 2007, 56).

A US House of Representatives report, titled *A Failure of Initiative*, concluded that numerous levels of government failed to meet their obligations and that the response to Hurricane Katrina constituted "a litany of mistakes, misjudgments, lapses, and absurdities all cascading together, blinding us to what was coming and hobbling any collective effort to respond" (Ink, 2006, 800). According to the report, the inadequate response to Katrina was primarily the result of a failure of policy implementation, not a failure of public policy. The report was critical of the Department of Homeland Security (DHS) citing the following problems: (1) poor movement of information across departments and between jurisdictions; (2) poor coordination between the Defense Department, DHS, and the state of Louisiana; (3) a lack of joint training with other groups; (4) government red tape that delayed needed medical help; and (5) a failure of initiative (Ink, 2006, 801–802).

In retrospect, many things could have been done differently. The mayor of New Orleans waited until Katrina escalated to a Category 5 storm before ordering a mandatory evacuation. Michael Brown, the director of the FEMA, waited until 5 h after Katrina hit land to request additional Homeland Security employees. Brown did not allow fire and emergency service personnel to respond to calls for help unless they were lawfully dispatched by state and local authorities. Municipal and school buses were flooded and out of commission. New Mexico's governor, Bill Richardson, offered the governor of Louisiana (Governor Blanco) the assistance of his state's National Guard, yet the paperwork needed to implement the plan was delayed for 4 days (Brinkley, 2006; Dyson, 2006; Koven, 2008, 120).

Offers of help to hurricane victims were not given enough attention. For example, the head of the American Bus Association volunteered to assist in an evacuation. FEMA did not accept the offer, outsourced the responsibility, and did not order buses until 18 h after the hurricane made landfall. Assets from an 844 ft ship with helicopters, marines, physicians, hospital beds, food, and the ability to make 100,000 gal of water a day were underutilized. Only the helicopters were used to rescue stranded citizens (Dyson, 2006, 120). Airboat pilots volunteered to rescue storm victims and transport supplies but were prevented (by FEMA) from entering the city. The Red Cross was denied entry to the city because FEMA claimed it was not safe. FEMA rejected assistance from the city of Chicago and blocked a 500-boat citizen flotilla that tried to deliver aid. FEMA also kept the Coast Guard from delivering diesel fuel, turned back a German plane transporting rations, failed to properly use hundreds of volunteer firefighters, and used about a thousand firefighters from other communities to distribute flyers (Koven, 2008, 121).

20.3 Katrina: The Politics–Administration Dichotomy

20.3.1 Dichotomy, Representation, and Neutral Competence

The hapless response to Hurricane Katrina is at least indirectly linked to patronage. More than 100 years ago, revulsion about the abuses of spoils produced an outcry that led to the creation of a politically neutral civil service system. The ethos that spurred this reform, however, has been undermined since the 1980s, encouraged by the nascent philosophy of small government. For many libertarians and conservatives, government is the enemy. For some laissez-faire critics of the public sector, a poor government response may even be welcomed since a show of effectiveness, in theory, could lead to more government and higher taxes. The limits of laissez-faire positions, however, were revealed in Hurricane Katrina. Media portrayals of gross ineptitude and insensitivity seemed too much for the American people who began to look for answers.

One answer to Katrina’s “disaster within a disaster” can be traced to the overuse of patronage and blatant disregard for the ethos of merit. This issue of allegiance to a patronage system versus the ethos of merit stands at the heart of the discipline of public administration. The genesis of public administration is traced to Woodrow Wilson’s appeal for separating day-to-day administration from the “rough and tumble” of politics. For Wilson, government employees could be more businesslike and more efficient if they were allowed to have greater autonomy from the pressures of politics (Wilson [1887] 1992). This insight later became codified in the infamous “politics–administration dichotomy.” City managers today are viewed as professionals that are trained in administration in contrast to popularly elected officials whose decisions may be swayed by powerful voting blocks.

Under the framework of the “politics–administration dichotomy,” day-to-day decisions should be placed under the domain of more “businesslike” professional administrators such as city managers. It was feared that elected leaders would be more interested in currying favor with key constituent groups and less interested in efficiency. Wilson’s seminal article, written in the journal *Political Science Quarterly*, called for Americans to learn about efficiencies of governance from Europeans but to still remain aware of the differences between autocratic (European) and democratic (American) societies. Wilson stated that there needed to be a “science of administration which shall seek to straighten the paths of government, to make its business less unbusinesslike, to strengthen and purify its organization, and to crown its dutifulness” (Wilson [1887] 1992, 13). Wilson contended that although politics sets the tasks for administration, it should not manipulate its offices (Wilson [1887] 1992, 18). Furthermore, Wilson stated that public administration must be “Americanized” by embracing the “good” of efficiency while at the same time rejecting the “bad” of centralized power (Wilson, [1887] 1992, 23).

The German scholar Max Weber also supported the idea of separating politics from administration. In Weber’s view, politicians give direction to policy and passionately express values, and bureaucrats impartially administered the law. This neutral application of rules, according to Weber, constitutes legal–rational authority that is a hallmark of modern societies. Weber contended that administration under legal–rational authority produced organizations that were fairer and more efficient than those governed by charismatic or traditional forms of authority (Fry, 1989, 32).

In contrast to the ethos of neutral competence advocated by scholars such as Wilson and Weber, the ethos of patronage maintains that winners in electoral contest should receive their “spoils.” In accord with an ethos of spoils, political parties are able to reward their follower with jobs and contracts. Political appointments follow the logic that for elected officials to be representative of

the people that voted for them, they should be able to appoint their own people and have more control over administration (Goodnow, 1900, 110).

Spoils or merit, however, are not either/or issues but one of degree. The question that arose in the aftermath of Katrina concerns the proper balance between patronage and merit. Insights from Hurricane Katrina suggest that hiring practices in the Bush administration tilted too strongly in the direction of spoils. In the past, a bias toward spoils raised questions about competence of government workers and stimulated efforts to control hiring practices of elected officials (Kaufman, 1956, 1060). One such effort to control hiring practices led to passage of the Pendleton Act of 1883. This landmark piece of legislation sought to inject a greater degree of neutral competence in the public sector.

Other reforms of public sector hiring practices include the Hatch Act (1939) and the Civil Service Reform Act of 1978. The Hatch Act forbids federal employees from participating in and contributing to political campaigns. The Civil Service Act created a corps of senior executives (Senior Executive Service) that were selected for their qualifications rather than their political connections.

The use of political appointees, however, is consistent with the idea of representation. Fear of elitism and unrepresentative rulers has a long tradition in American politics. James Madison wrote in the *Federalist No. 39* that those who administer government should be chosen from the society at large, not from a favored class. An extension of this principle would allow elected officials broad discretion in administering the state and freedom to appoint officials that share their values.

The principle of patronage is clearly identified in the administration of George W. Bush. FEMA Director Michael D. Brown, lacking experience in emergency management but possessing strong political connections, represents the quintessential political appointee. His background and behavior are described in the following text in detail. This discussion unambiguously identifies limitations of patronage. It also highlights the need to refresh our collective memory regarding the good judgment of the eminent scholar and former US president Woodrow Wilson.

20.3.2 FEMA Director Brown's Background and Behavior

After Hurricane Katrina, FEMA Director Michael D. Brown became a poster child for the incompetence of political appointees. Numerous accounts cast serious doubt on his truthfulness and ability to manage. For example, his biography posted on the FEMA website reveals that Brown served as an assistant city manager in Edmond, Oklahoma, with emergency services oversight. When questioned about Brown's position, however, a representative from Edmond stated that Brown had no authority over other employees and was more like an intern.

In early September 2005, an article in *Time* magazine questioned Brown's credentials. The *Time* article observed that Brown listed under the "honors and awards" section of his profile, "Outstanding Political Science Professor, Central State University." However, Brown was only a student at Central State. Under the heading of "Professional Associations and Memberships," Brown stated that he had been director of a nursing home in Edmond. An administrator with the home, however, informed a reporter for *Time* magazine that Brown is "not a person that anyone here is familiar with." His padded résumé apparently went undetected when he was appointed head of FEMA in 2003. Brown claimed that the *Time* article distorted his record, but he did not provide proof to refute the story (Fonda and Healy, 2005; Brinkley, 2006, 246; Brown, 2006; Koven, 2008, 122).

Brown's work prior to joining FEMA was thought to be uneven at best. In the 1980s, he worked for an attorney in Oklahoma who described him as "not serious and somewhat shallow." Brown was one of the two attorneys (out of 37) who were terminated when the firm split up. Brown ran for Congress in 1988 against a Democratic incumbent and lost by a wide margin. From 1999 to 2001, Brown was the Judges and Stewards Commissioner for the International Arabian Horse Association (IAHA). Some members of the IAHA nicknamed him "The Czar" for his imperious attitude. After numerous lawsuits were filed against the IAHA by its own members (who were disciplined by Brown), Brown resigned from his position (Koven, 2008, 122).

The history of FEMA sheds some light into how someone such as Brown could be appointed its director. The organization was created in 1979 by President Jimmy Carter but was held in low regard by the incoming Reagan administration. Tulane Professor Douglas Brinkley notes that by 1981, the agency already smacked of patronage. According to Brinkley, appointing a person as director of FEMA was "akin to giving a donor or friend the ambassadorship to Luxembourg—a cushy, largely honorary position." FEMA was perceived as a joke. When Hurricane Hugo hit the Carolinas in 1989, South Carolina senator Fritz Hollings called FEMA employees "the sorriest bunch of jackasses I've ever known" (Brinkley, 2006, 247).

Brown's appointment was directly related to the fact that he was an old college friend of Joseph Allbaugh, a fellow Oklahoman and chief of staff under Texas governor (and later president) George W. Bush. Allbaugh also served as Bush's campaign manager during the 2000 presidential election. After Bush was elected, Allbaugh was appointed director of FEMA. While Allbaugh excelled at raising money and troubleshooting, he knew almost nothing about disaster relief. Allbaugh retired from FEMA, in 2002, after FEMA was absorbed into the new DHS. Allbaugh was replaced by his old friend, Michael Brown.

From a public relations perspective, Brown's performance in the Katrina spotlight was an unmitigated disaster. Faults with Brown's management are well documented. Among the more egregious of Brown's actions include the following:

- On August 29, 2005, 5 h after the hurricane hit land, Brown made his first request for Homeland Security rescue workers. He requested that rescue workers should not be deployed to the disaster area until they completed 2 days of training. This slowed down the response.
- Brown instructed fire and rescue departments outside of the affected areas to refrain from providing trucks or emergency workers without a direct appeal from state or local governments. The intent of this was to avoid coordination problems and the accusation of overstepping federal authority. This again slowed down the desperately needed response.
- Regarding how he might be perceived on television, Brown discussed whether he should roll up his shirt sleeves.
- On August 31, FEMA's key employee in New Orleans e-mailed Brown stating, "Sir, I know that you know the situation is past critical. ... Estimates are many will die within hours. ... We are out of food and running out of water at the dome, plans in works to address the critical need." Brown responded, "Thanks for the update. Anything specific I need to do or tweak?" This response suggested insensitivity, detachment, and a complete inability to perform the job that had been given to him.
- When Brown received the previously mentioned e-mail, his press secretary wrote that "it is very important that time is allowed for Mr. Brown to eat dinner." This e-mail is indicative of Brown's imperious nature reminiscent of when he was the commissioner for the IAHA.

- On September 1, 2005, Brown told Paula Zahn of CNN that he was unaware that New Orleans' officials had housed thousands of evacuees who ran out of food and water. Major news outlets had been reporting this for at least a day. Brown publicly displayed the fact that he may have known less about what was going on than the media and media watchers.
- On September 2, 2005, mayor of Chicago Richard M. Daley stated that he pledged firefighters, police officers, health department workers, and other resources on behalf of the city but was only asked to send one tank truck. This suggested that Brown was either insensitive to victims or unaware of the seriousness of the situation.
- An e-mail from a New Orleans' congressional representative offering medical equipment went unanswered for 4 days. This suggests both unresponsiveness to elected leaders and incompetence.
- On the morning of the hurricane, Brown asked the deputy director of FEMA, "Can I quit now?" A day later, he asked an acquaintance to "please rescue me." This displayed a jocular demeanor that was ill fitted for the situation.
- In the midst of the crisis, Brown wrote about his "problems finding a dog-sitter."
- In an e-mail to his deputy public affairs director, Brown joked that he was "a fashion god" and that his clothes came from Nordstrom. Such a narcissistic demeanor suggested Brown was not the person to assume responsibility for his job (Brown, 2006; Koven, 2008, 124).

On September 9, 2005, the head of the DHS Michael Chertoff relieved Brown of all on-site relief duties along the Gulf Coast. On September 12, 2005, Brown announced his resignation as director of FEMA. Chertoff, however, granted Brown two 30-day contract extensions, and he continued to receive his \$148,000 annual salary until November 2.

Some people viewed Brown as the scapegoat for the Bush administration, while others perceived Brown as representative of a patronage system run amok. Inappropriate use of patronage, however, was associated with the Bush administration on a number of other occasions. In July of 2008, a report prepared by the US Justice Department's Inspector General found that senior aides to former Attorney General Alberto Gonzales broke civil service laws by using politics to guide hiring decisions. The report singled out Monica Goodling, a young lawyer from the Republican National Committee, for her actions. In May 2007, at the height of an uproar over the firings of US Attorneys, Goodling admitted that she may have crossed the line at times in using politics in hiring decisions (Lichtblau, 2008).

The Department of Justice investigation revealed that Goodling and other Justice Department officials used personal interviews and Internet searches to screen out candidates who might be "too liberal" and identify candidates who were supportive of President Bush. The Department of Justice investigation indicated that one candidate was rejected for a job in part because she was thought to be a lesbian. A Republican lawyer received high marks on his job interview because of his conservative views about "god, guns, and gays." A highly regarded prosecutor was passed over for an important position because his wife was active in Democratic politics (Lichtblau, 2008).

The *New York Times* reported that the White House was also involved in decisions to dismiss federal prosecutors. Apparently, some White House officials consulted with the Justice Department in preparing a list of prosecutors who would be removed. A few weeks after concerns were relayed to Attorney General Alberto Gonzales, seven prosecutors were forced out. In one case, a United States attorney was removed to make room for a onetime adviser to Karl Rove, the senior White House advisor. Rove also passed on complaints about a US attorney who had failed

to indict Democrats in a voter fraud scandal. This attorney along with six others was dismissed on December 7, 2006 (Johnson and Lipton, 2007).

In light of these events, it should not be shocking that unqualified and/or marginally qualified individuals (such as FEMA Director Brown) were given important positions in the Bush administration. In spite of his difficulties, however, Director Brown seemed unrepentant. In testimony before a US House of Representatives investigative panel, Brown blamed the Louisiana governor, the mayor of New Orleans, “dysfunctional” state officials, the military, and DHS officials for the problems of Katrina. He admitted to making only two mistakes: not holding regular media briefings and not being able to persuade Governor Blanco and Mayor Nagin to “get over their differences.” Brown concluded that he was happy to be a scapegoat if it meant the FEMA he knew could be “reborn” and “get back to where it was” (Hsu, 2005).

Brown became the butt of jokes for popular comedians. Comedian Jon Stewart stated, “No word yet on Mr. Brown’s future plans, though sources say he does want to spend more time doing nothing for his family.” Jay Leno noted, “This is very exciting, you may have heard today President Bush announced a plan to put a man on Mars—the head of FEMA.” Damning references to Brown also came from elected leaders. The president of Jefferson Parish near New Orleans pleaded for Brown’s replacement stating, “Take whatever idiot they have at the top of whatever agency and give me a better idiot. Give me a caring idiot. Give me a sensitive idiot. Just don’t give me the same idiot” (Associated Press, 2005; Kurtzman, 2006).

20.4 Conclusions

The implications of the Katrina fiasco are relatively clear; there are dangers to patronage and limits to the level of incompetence that the American public will tolerate. The ethos of patronage, however, appeared to be alive and well during the Bush administration. Many of these appointments (but probably not all) did not go unnoticed. Michael Brown, Monica Goodling, Karl Rove, and Alberto Gonzales all resigned or were fired from their positions.

The separation of politics from administration has been a hallmark of public administration since the time of Woodrow Wilson. The response to Hurricane Katrina highlighted the continued tension between the ethos of patronage and that of merit. The media quickly exposed FEMA Director Brown as someone who was out of his depth and an embarrassment to those who supported him. President George W. Bush would come to regret the statement he uttered on December 30: “Brownie, you doing a heckuva job.” A nonprofit group that monitors language use named this statement as the most memorable phrase of George W. Bush for 2005. It later became a punch line for countless jokes about the administration’s handling of the hurricane (Spiegelman, 2006).

Hurricane Katrina seems to have reinforced a number of observations such as the following: (1) there is a legitimate role for government in American society, (2) competence in carrying out official responsibilities is better than incompetence, (3) excessive cronyism can cause political embarrassment, and (4) knowing how to do one’s job has value. The hurricane uncovered a lack of competence in government that probably cost lives.

In theory, more effective administration can be achieved. There is concern, however, that effective administration is constrained by the ethic of patronage. Patronage appointments, however, at a minimum can act as a dead weight on government effectiveness. Costs of political appointments may be bearable as long as appointees are not faced with responsibilities of any magnitude. Once faced with such responsibilities, the inadequacies of political selections can be quickly exposed.

These costs might literally have deadly consequences. A professional administrator trained in the science of administration is simply better prepared to serve the public than are patronage appointees. The damage to governance that emanates from appointments such as FEMA Director Brown is real, and action should be taken to mitigate the danger.

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Chapter 21

Ethics in Crisis Management

Carole L. Jurkiewicz

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When crises occur, the preeminent concerns are saving lives, damage assessment, communication systems, and emergency relief. Simultaneously, the media converge upon the affected area and begin to establish their own infrastructures. Concomitant to and directive of how these initiatives are instituted and progress is an ethical filter. Whether it be questions of resource distribution, triage, media coverage, funding, or political expression, each emerges from a perspective of what is right and what is wrong and what is excusable, rationalizable, obscurable, opportunistic, or untrackable; all factors dictate ethical behavior in crisis management. Some ethical elements of crisis response are planned in advance, such as media protocol on reporting and the degree to which they will immerse themselves in rescue operations and individuals who are on the ready to personally reap profits from the disaster, such as false nonprofits and sham relief organizations. These are premeditated, intentional ethical, or unethical choices. Other response initiatives flow organically from the established cultures in both the responder organizations and the community of the affected. Emergent from the culture, they reveal the ethical framework of the unit, but actions are taken without ethical review, with a general understanding of right and wrong.

While much can and has been written about unethical behavior committed with intent and premeditation, the focus here will be on how organizational and community ethics emerge in crises and how this information can be used to assess whether ethics interventions are needed once the crisis itself has passed. The key influencer on organizational and community ethics is ethical leadership. This element establishes the norms of how the crisis is managed and to a great extent

what is done or not done. Without time for reflection, external input, or careful consideration, leader behavior during the crisis is the ethical role model for what the citizens should do and rationalizes what they in effect actually do. The immediacy of the actions necessitated by crises removes the intellectual debate that may restrain such behaviors if more time was allowed for reflection. Thus, the actions reflect the values inherent in the community or organization existent at the time of the crisis and for which the leader holds direct ethical responsibility. The actions of the leader of New Orleans, Mayor Ray Nagin, following Hurricane Katrina are used here to illustrate this social-behavioral mechanism.

21.1 Importance of Ethical Leadership

Any discussion of a manifestation of an ethical framework through behavior evinced at the group level must necessarily begin with a review of the role of a public leader, and a centuries-old phrase ascribed to the Chinese encapsulates its importance: the fish rots from the head down. It is used to mean that an unethical leader is a causative factor that leads to unethical followers and, conversely, that if the top person exhibits a higher level of ethical behavior, followers will model their behavior accordingly. The leader establishes the culture of an organization, or a city/state/country, through their actions even more so than their words (Jurkiewicz, 2000, 2002, 2006) and is accountable for the culture they create. Foucault (1984) asserted that normalized values as articulated by those in authority lead to dominant and unquestioned institutional practices, which in turn define acceptable behavior and restrict individual autonomy. He asserts it as an involuntary, often unconscious, submission to the power of institutional authority, a view expanded upon by Bourdieu (1990) to describe how individuals create and maintain commonplace practices and adopt expected roles even when these practices are oppressive and marginalizing and are in contrast to one's previously held ethical beliefs. Kohlberg (1976, 1981, 1985) emphasized the point that leaders have a profound effect on the level of ethicality employed by their subordinates in deciding on which action is ethically right or wrong. Trevino (1990) asseverates that cultures such as that found in Louisiana and most particularly New Orleans and cultures that encourage, celebrate, and reward pushing the limits of legality to achieve personal gains exert a powerful influence on creating and sustaining unethical behavioral patterns. Ethical, or unethical, behavior is thus learned from those in positions of authority over us. This is a key element in the woefully ineffective and inefficient recovery efforts in New Orleans following Katrina. A cursory review of just a few of the thousands of reports of unethical behavior in the wake of Katrina, accompanied by charges of ethical violations against Mayor Nagin, provides a clear example of this top-down ethical relationship. To remind, the head of the fish can claim they have no knowledge of the rot occurring further down the body, but it is neither possible nor true as the head is the standard bearer. While both the state- and federal-level administrations share the responsibility in part for either contributing to the cultural ethic in the New Orleans area or failing to intervene both also have with their power the ability to rectify ethical violations. Of course, the federal level can be said to affect Mississippi as well as Louisiana, and the state level can be said to affect other Louisiana parishes beyond New Orleans, again the focus returns to local leadership.

Unethical behavior from citizens, businesses, and public employees in the wake of Katrina has been well documented. Numerous false claims for FEMA funds have been widely reported, although false claims for funds from the Red Cross have not been so broadly publicized (Salmon, 2005). Insurance companies have been and are being sued for alleged contract violations, unethical business practices, and fraud (CNN, 2005g). Additionally, police officers reportedly stole luxury

vehicles during the chaos following Katrina landfall (Gyan, 2006), were captured on video looting (CNN, 2005c), and were recorded stealing luxury items from storm-ravaged boutiques and department stores (CNN, 2005d,e,f). Documented reports of unwarranted killings by Blackwater operatives in the days following Katrina about which local law enforcements were aware and did nothing, in addition to Blackwater personnel commandeering citizens' property for their own use (Scahill, 2008), are further examples. One representative case of ethical malfeasance in the health care sector was a nursing home whose owners were charged with negligent homicide for abandoning elderly and infirm clients during the storm, 34 of whom drowned (CNN, 2005a). An example of egregious political behavior are reports from the Louisiana National Guard that Representative William Jefferson requested two National Guard heavy trucks and a helicopter, along with military support personnel, to escort him to his family home in New Orleans where he allegedly retrieved documents and a computer relevant to 16 criminal charges on which he has been indicted while others were waiting for emergency rescues from their rooftops, a trip during which personnel waited over an hour (Tapper, 2005). These are but a few illustrations of the scope and seriousness of the many ethical violations that ensued in post-Katrina New Orleans. The focus now shifts to the leader of the city.

21.2 Portrait of Unethicality in Crisis Management

New Orleans' Mayor Ray Nagin gained international renown for his role in Katrina and his behavior in its aftermath, and the ethically charged issues surrounding him and his administration are viewed by many as one of the roadblocks to recovery in New Orleans. He has been widely criticized for lack of planning despite clear scientific and weather reports, his actions during the hurricane (taking control of key top floors of a downtown hotel, evading calls for leadership and emergency decision-making) and incendiary comments and initiatives he enacted during the recovery period that followed (Russell, 2005). His lack of definitive leadership in calling for an evacuation of New Orleans following the National Hurricane Center's August 26, 2005, prediction that Katrina would reach Category 4 status has been attributed to his concerns for the city's liability for closing hotels and other businesses (Russell, 2005). Finally, announcing the evacuation on August 28, less than 24 h before landfall, was a direct cause of increased hardship for the 90,000 citizens (mostly impoverished and infirm) left in the city as 80% of it went under water (Parry, 2005). Looking to the federal government for relief, Nagin stated in his own news conference that, "I don't want to see anybody do anymore goddamn press conferences...until the resources are in this city...now get off your asses and let's do something, and let's fix the biggest goddamn crisis in the history of this country" (Robinette, 2005). Michael Chertoff, then Secretary of Homeland Security, responded with, "the way the emergency operations act under the law is, the responsibility and the power, the authority, to order an evacuation rests with the state and local officials. The federal government comes in and supports those officials" (Nagourney and Kornblut, 2005), illustrative of the battles that permeated various government levels, coordination of relief efforts. Former FEMA Chief Michael Brown stated his biggest failure was "not recognizing...that Louisiana was dysfunctional" (CNN, 2005b).

Nagin's conflicts with state and federal officials, as well as special interest groups, have also been widely reported. Nagin's order to seize firearms sparked immediate litigation by the National Rifle Association and the Second Amendment Foundation (NRA, 2008), with court ruling on contempt of court violations and issuing a permanent injunction against Nagin. Deeply distrustful and not wanting to relinquish control, when former FDIC head Powell was

originally appointed to oversee recovery efforts, he was met with suspicion and administrative power struggles, as Nagin warned Powell he was not the *federal mayor of New Orleans* (Roig-Franzia, 2005). He complained he was only allowed to spend \$15 million of the \$27 billion budget, although his initial investment of these funds into a casino district as a recovery tool was quickly abandoned, and post-Katrina analyses outlining what is needed to rebuild New Orleans remain absent from Nagin's reported initiatives. Favoritism in appointments to recovery committees, and political battles with the governor as well as key business people, continued to fuel the area's long-standing reputation for dysfunction and corruption (Roig-Franzia, 2005). Conflicts of this nature continued into the initial stages of recovery, with Nagin stating at a town hall meeting in October 2005, "I can see in your eyes, you want to know, 'How do I take advantage of this incredible opportunity? How do I make sure New Orleans is not overrun with Mexican workers,'" a comment widely criticized, most vocally by the US Hispanic Chamber of Commerce (Hispanic PR Wire, 2005). This was followed by Nagin's comment on the Tavis Smiley show (Stevens, 2006) that he hopes New Orleans emerges as a *Chocolate City*, referring to its future demographics, further inflaming ethnic tensions with claims that he knew the will of God (Sublette, 2006) and that the city "will be a majority African-American city. It's the way God wanted it to be" (CNN, 2006), disparaging *uptown* folks, his previously strong white, affluent base (Amrhein, 2005) and proclaiming that "God is mad at America. He sent us hurricane after hurricane....he is upset at black America...We're not taking care of ourselves" (Martel, 2006). The controversy surrounding his election with ethnic activists bussing in evacuees from other states to vote, giving Nagin a slim margin of victory in reelection, followed by his failed 100-day plan, a lawsuit by a contractor alleging Nagin was given gifts in exchange for preferential treatment, and his widely publicized view that record murders in New Orleans held positive consequences for New Orleans as it "keeps the New Orleans brand out there" (Bohrer, 2007) have been cited as some of the reasons why funding authorities refused his monetary requests and hampered recovery efforts and why controversy continues to surround him and finishes his last term as mayor. The Metropolitan Crime Commission has called upon the State Ethics Board to investigate Nagin's alleged acceptance of vacation trips paid for by a company awarded contracts by the city, the same company involved in a lawsuit of cost overruns to the city for a crime camera system (Bohrer, 2009). The annual quality of life poll for New Orleans (Johnson, 2009) reported approval ratings for Nagin at 29%, the lowest since the poll began, with Nagin tied for third place in a listing of the biggest problems facing the city. More recent surveys by the University of New Orleans survey show an even lower 24% approval rating (Bohrer, 2009). A website has been established (<http://www.nagins-last-day.com>) counting down the days to the end of his term in May 2010, which is viewed as a significant opportunity for advancing recovery efforts in New Orleans. Of course this success depends, in no small part, on the ethics and political leadership of the individual elected to replace him.

21.3 Ethical Culture

While the reputation of the state is overwhelmingly one of rife corruption, and deservedly so, Louisianians are by and large genuinely proud of that heritage. An oft repeated phrase here is that Louisiana is no more corrupt than any other state, and its citizens are simply more proud of the fact. To natives, it's a compliment that the state, which generally appears last among all the desirable measures of health and human progress and at the top of lists of dysfunction, can outwit all those policy makers and know-it-alls who think they can bend Louisiana to be like everyone or every place else. It may be that if the standards followed elsewhere were acknowledged as ones

Louisiana should emulate, then they would have to contend with a view that the way things are may not be the ideal after all. Pride in being unique, even if with a negative connotation, runs deep and wide here. If there is anything native Louisianians know for sure, it's that they are undisputedly the best when it comes to the things that matter most to them: family, heritage, food, faith, and fun.

Viewed as a parochial culture separate from the demands imposed by crises, Louisiana can appear to be a comfortable place to live and visit, as many tourists, convention goers, and revelers have known for centuries. What makes the state remarkably warm and inviting however is also that which, in the face of catastrophe, renders it effectually incapable of recovery. In the immediate aftermath of the hurricane when government at all levels seemed incapable of action, individuals took the initiative to use their own pirogues and motorboats and whatever other floatable device they had on hand to rescue stranded survivors; self-designated the Cajun armada, this provincialism was viewed as enviable and heroic as were the selfless acts of individuals and institutions across the state who opened their homes, hearts, and wallets to help those in need. It is hard to imagine any other state whose citizens could exhibit such genuine altruism and sincere desire to forsake personal safety and comfort to assist others. Yet when the immediate crisis of saving lives concluded and it came time for a professional public administration to step in and establish order and rebuild the infrastructure of a decimated society, the vacuum of professionalism and leadership in state and local administrations was glaring, accentuated by partisan and ill-functioning federal, state, and local administrations. Where that left, Louisianians were calling out for help that couldn't or wouldn't come, for the most part, placing their hopes on the rhetoric of politicians and disaster profiteers and longing for the good ol' days of Huey Long or Edwin Edwards, some even calling for an early release from prison of the former governor in time to save the republic. It was expected and accepted that he would skim some off the top of the pile for himself, but the people felt sure there would still be enough resources left for them and that was better than what they were getting. For those interested in understanding the system of ethics and moral standards that not only accept but facilitate and protect an administration and politic that by most any measure is unprofessional and inept, the question of why citizens don't demand fiscal, environmental, educational, and demonstrable competence begs for an explanation.

21.4 Manifestations of Louisiana's Ethical Culture

It would be neither fair nor accurate to characterize the entire state in the same manner. Northern Louisiana is much more socially, religiously, and culturally conservative than the areas directly affected by Katrina. As this discussion focuses on the aftermath of Katrina, the focus is necessarily on the southern part of state.

Cultural anthropologists, while not of one mind on the epistemological questions of measuring culture, agree that it is a body of learned behaviors common to a given society that shapes behavior and cognitive preferences (Bodley, 1994). Essentially, it is a system of shared meaning that distinguishes one group from another (Schein, 1985), with language being the most important; ways of organizing society such as kinship groups, organizational processes, and politics; and distinctive techniques and characteristic products. Strauss and Quinn (1998) classify these cultural properties as durability of the individual, motivation force, historical durability, thematicity, and sharedness. While cultural study can include surveys, demographic profiles, and population movement, culture is most commonly recorded through quasi-constructivist observation and reporting (Sewell, 1992; Spillman, 1995; Eliasoph, 1996).

In applying this model to Louisiana's ethical culture, it can be characterized by a unique patois of English, French, and Cajun and peppered by idioms that appear to serve both as native identifiers and as exclusionary cues to nonnatives. Humor is an important aspect of the Louisiana culture and illustrates the ethical culture relevant to this discussion. The majority of the humor involves an element of sexuality, which is predictable given the economic profile of the state (Jurkiewicz, 2007), and the jokes tend to feature people using wiles to (1) outsmart another to gain an advantage, (2) outsmart an educated authority to prove common sense trumps formal learning, or by (3) allowing the joke recipient to feel superior to those in the story; a predominant theme is to use language to get an advantage such as in the following examples.

A lawyer and a Cajun are sitting next to each other on a long flight. The lawyer asks if the Cajun would like to play a fun game. The Cajun is tired and just wants to take a nap, so he politely declines and tries to catch a few winks.

The lawyer persists that the game is a lot of fun. "I ask you a question, and if you don't know the answer, you pay me only \$5; you ask me one, and if I don't know the answer, I will pay you \$500."

This catches the Cajun's attention, and to keep the lawyer quiet, he agrees to play the game.

The lawyer asks the first question. "What's the distance from Earth to the moon?" The Cajun doesn't say a word, reaches in his pocket pulls out a five-dollar bill, and hands it to the lawyer.

Now, it's the Cajun's turn. He asks the lawyer, "What goes up a hill with three legs and comes down with four?"

The lawyer uses his laptop and searches all references. He uses the Airphone; he searches the Net and even the Library of Congress. He sends e-mails to all the smart friends he knows, all to no avail. After 1 hour of searching, he finally gives up. He wakes up the Cajun and hands him \$500. The Cajun pockets the \$500 and goes right back to sleep.

The lawyer is going nuts not knowing the answer. He wakes the Cajun up and asks, "Well, so what goes up a hill with three legs and comes down with four?"

The Cajun reaches in his pocket, hands the lawyer \$5, and goes back to sleep.

Boudreaux and Tuseau got married in Jeanerette. On their honeymoon trip, they were nearing New Orleans when Boudreaux put his hand on Tuseau's knee. Giggling, Tuseau said, "Boudreaux, ya can go a little farther now if ya want to." So Boudreaux drives to Mobile.

A Cajun was stopped by a game warden in Southern Louisiana recently with two ice chests of fish, leaving a bayou well known for its fishing.

The game warden asked the man, "Do you have a license to catch those fish?"

The Cajun replied, "Naw, ma fren, I ain't got none of dem, no. Dese are my pet fish." "Pet fish?!" the warden replied.

"Ya. Avery night I take dese here fish down to de bayou and let dem swim' round for a while. I whistle and dey jump rat back into dere ice chests and I take dem home."

“That’s a bunch of hooey! Fish can’t do that!” said the game warden.

The Cajun looked at the game warden for a moment and then said, “It’s de truth ma’ fren, I’ll show you. It really works.”

“Okay, I’ve GOT to see this!” The game warden was curious now.

The Cajun poured the fish in to the bayou and stood and waited. After several minutes, the game warden turned to him and said, “Well?”

“Well, what?” said the Cajun.

“When are you going to call them back?” The game warden prompted.

“Call who back?” the Cajun asked.

“The FISH.”

“What fish?” the Cajun asked.

Kinship groups, organizations, and political offices are highly protective of their traditions, are insular, and are fueled by patronage. Louisiana natives rarely relocate away from families except under extreme circumstances, which of course intensified the personal tragedies of families scattered to various US locales post-Katrina. Most native families know each others’ histories for multiple generations with many across the state sharing the same surnames. Frequently, the family reputation from centuries past is attributed to the decedents living today, whether warranted by observable circumstances or not; individuals cannot overcome their ancestral reputations as evidenced in such phrases as *just like a Thibodeaux* or a Robichaux or a LeJuene; newcomers are greeted with repeated queries regarding one’s ancestry and cool familial relations are met with disbelief followed by opprobrium. Extramarital affairs are common, and various crimes are easily forgiven with extended families encircling the wrongdoer and standing resolute regardless of the circumstances. Distinctive traditions and products abound, from state-observed holidays such as a week’s elaborate observance of Mardi Gras, methods of celebration such as Easter crawfish boils and early autumn Cochon de Lait, and foods and cuisines globally renowned for their ingredients, spice blends, and cooking techniques. Applying the measures of cultural anthropologists, Louisiana possesses a unique and clearly defined culture that exerts a strong and dynamic influence on behavior and cognitions (Rosenthal and Masarech, 2003), as well as ethical frameworks. To reiterate an earlier point, researchers have indicated that strong cultures that encourage, celebrate, and reward pushing the limits to achieve personal gains exert a powerful influence on creating and sustaining unethical behavioral patterns (Trevino, 1990).

21.5 Consequences of Unethical Leadership

One can build a persuasive argument to join the overwhelming collective voice lamenting the wasteful, unfocused, and inefficient recovery of New Orleans post-Katrina. Unlike Mississippi, Texas, and Florida who routinely suffer the effects of hurricanes, New Orleans has failed to thrive and most fingers point to the lack of ethical and effective leadership at the local level. While certainly not the totality of the problem, when focused solely on the issue of ethical leadership, the buck stops in exactly this place. The ethical culture of South Louisiana is what supported his election and it can be said he is representative of that culture. Perhaps that culture is determinant, and he is unable to rise above the tradition of corruption and selfishness that characterizes Louisiana politics, as discussed in the previous section. A leader, however, is called upon to rise to the responsibilities given them, to communicate a vision for a greater public good than what preceded that

individual's term in office. A leader does not use the cultural history of an area as an excuse for poor, even egregious, performance nor a *he did it so I can too* mentality nor the dirty hands argument. A fish rots from the head down, but it can also thrive in the same directional manner if the leader at the top sets the example for all those who follow.

Knowing the effect that leader ethicality has on the effectiveness of crisis management efforts, what can be done to improve this aspect of those in charge? Certainly electing ethical individuals from the start is the easiest route, but determining a candidate's ethicality when only a carefully edited version of the true individual is displayed during the campaign makes such judgments nearly impossible. Ongoing ethics training based on sound scholarly research is one approach that has demonstrated effectiveness, but one cannot force an individual to be ethical if they do not want to do so. For those who have the intent but lack the tools to fully assess and articulate their ethical frameworks, and thereby acting upon as a moral leader, two assessment tools come immediately to mind. The first is Foucault's (1986) key question set in leading an individual to systematize his or her ethical theory. The second is the Rubel Character Map (Rubel, 2010), a diagnostic tool to engage the leader on aspects of their character that require further development. Used in conjunction with one another, they offer insight and prescriptives toward enhancing leader ethicality.

The four questions that comprise this set by Foucault are intended to help an individual understand how ethical intent is motivated and influenced by the self-interests of other organizations and persons. With Foucault as with many others, reality is viewed as socially constructed, and thus, one's ethicality is subject to cultural forces such as organizational images, the media, religious beliefs, compelling ideologies, heroes, cultural figures, and parents (Simons, 1995). Becoming aware that one's ethicality is thus defined by others allows an individual to consider how she or he might resist adopting an ethical framework that is reactive in nature and defined by an external authority. Such a self-examination leads one to understanding and accepting responsibility for their own actions separate from the influences of others. These questions are listed in Table 21.1.

Essentially, by objectively addressing this question set, an individual can enhance the complexity of their ethical framework, much as suggested by Kohlberg's (1981) hierarchical model of moral development. From least to most complex, the model can be understood as illustrated in Table 21.2 (Crain, 1985).

The Rubel Character Map, published here for the first time, asserts a list of twenty-five virtues essential for leadership against which the individual is self- or other-measured on a scale from one to nine. A score on the lower end of the continuum demonstrates a deficiency, and at the other end, an excess; thus, each virtue can be an advantage or a detriment to ethical character when taken to an extreme. Individuals' virtues identified on the scale as being detrimental to leader effectiveness

Table 21.1 Foucault's Assessment of Ethicality

1. Ethical substance. Which part of myself or my behavior is influenced or concerned with moral conduct? What do I do because I want to be ethical?
2. Mode of subjection. How am I being told to act morally? Who is asking? To whose values am I being subjected?
3. Ethical work. How must I change myself or my actions in order to become ethical in this situation?
4. Ethical goal. Do I agree with this definition of morality? Do I consent to becoming this character in this situation? To what am I aspiring to when I behave ethically?

Table 21.2 Kohlberg's Hierarchy of Moral Development

<p>Stage 1: Heteronomous morality</p> <p>To avoid breaking rules backed by punishment, obedience of its own sake, and avoiding physical damage to persons and property.</p>
<p>Stage 2: Individualism, instrumental purpose, and exchange</p> <p>Following rules only when it is to someone's immediate interest; acting to meet one's own interests and needs and letting others do the same. Right is also what's fair, what's an equal exchange, a deal, and an agreement.</p>
<p>Stage 3: Mutual interpersonal expectations, relationships, and interpersonal conformity</p> <p>Living up to what is expected by people close to you or what people generally expect of people in your role as son, brother, friend, etc. <i>Being good</i> is important and means having good motives, showing concern about others. It also means keeping mutual relationships, such as trust, loyalty, respect, and gratitude.</p>
<p>Stage 4: Social system and conscience</p> <p>Fulfilling the actual duties to which you have agreed. Laws are to be upheld except in extreme cases where they conflict with other fixed social duties. Right is also contributing to society, the group, or institution.</p>
<p>Stage 5: Social contract or utility and individual rights</p> <p>Being aware that people hold a variety of values and opinions that most values and rules are relative to your group. These relative rules should usually be upheld, however, in the interest of impartiality and because they are the social contract. Some nonrelative values and rights like life and liberty, however, must be upheld in any society and regardless of majority opinion.</p>
<p>Stage 6: Universal ethical principles</p> <p>Following self-chosen ethical principles. Particular laws or social agreements are usually valid because they rest on such principles. When laws violate these principles, one acts in accordance with the principle. Principles are universal principles of justice: the equality of human rights and respect for the dignity of human beings as individual persons.</p>

suggest areas for needed improvement. Development in areas where an individual needs work is a protocol of action, habituation, evaluation, corrective measures, and reassessment. The virtues that comprise the Rubel Character Map are detailed in Table 21.3.

21.6 Post-Crisis Performance Review

Leaders are the indisputable role models for ethical behavior in their organizations and their electorate. While leaders generally emerge from the culture they are elected to serve, it is incumbent upon them and the responsibilities they hold to exemplify an ethical culture that elevates the community, rather than represents its lowest common denominator. The ethical impact of a leader under normal circumstances is evinced in the manner by which business is conducted, people interact with one another, education and cultural arts are valued, crime and environmental policy, as well as politics.

Table 21.3 Rubel Character Map: List of Virtues

Perseverance
Pride
Wisdom
Curiosity
Ingenuity
Spirituality
Perspective
Judgment
Open-mindedness
Critical thinking
Justice
Loyalty
Compassion
Courage/bravery
Emotional intelligence
Gratitude
Love
Self-control
Humility
Forgiveness/mercy
Honesty/integrity
Prudence
Humor
Optimism/hope
Patience

This impact is revealed both in the short and long terms. In a period of crisis, the ethicality of a leader is immediately apparent, his or her motives and intents communicated without the buffer of time to obfuscate, if indeed that is the usual *modus operandi*. Highly ethical leaders prosper during this period, demonstrating their focus on the public good, their integrity, and their effectiveness in rallying resources and organizing people to action. The unethical leader hides, vacillates, makes

excuses, blames others, makes statements that engender scorn, and ultimately fails to put the safety and future of citizens first. Both the ethical and the unethical leader can have the same budgetary acumen, the same number of years of service, and same education, but it is his or her ethical character that makes the difference, most acutely in times of crisis, in whether or not the community will prosper. While it would be ideal to have foreknowledge of a leader's ethical character, a post-crisis review using the instruments discussed here as well as data assessed from his or her words and actions will provide a clear profile on which the leader and the electorate can take action. As Martin Luther King (1963) axiomatically stated, "The ultimate measure of a man is not where he stands in moments of comfort and convenience, but where he stands at times of challenge and controversy."

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Chapter 22

Management of Hazardous Chemicals during Natural Disasters

Antoinette Christophe and Khashruzzaman Choudhury

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22.1 Introduction

Hazardous chemicals exist in our environment in both natural and other forms: as radioactive substance, organic chemicals, and heavy metals. These chemicals are harmful to human health and may even be life threatening. Treatment of these chemicals in the environment itself calls for caution. The dangers increase when we try to store, retrieve, and transport them. The handling becomes especially problematic during and after a natural disaster. This chapter addresses the basic issues involving handling of hazard chemicals during and after a natural disaster.

Hazardous chemicals located in the environment are sensitive to tissues in the human body and cause discomfort, loss of bodily functions, diseases, and sometimes death. Chemical agents in the air, water, food, and other materials bring about these exposures. The volume of chemicals inhaled or ingested determines the lethality of the pollutants. The route of exposure can be (1) inhalant or ingestant, transferring chemicals across the epithelial membranes of skin, respiratory tract, and gastrointestinal tract; (2) target pollutant transporting via the circulatory system to target tissue; and (3) uptake by target organs directly. The length of the chemical exposure episode is also an important factor. If there is overexposure in the short term, acute conditions may develop, which include burns, rashes, respiratory distress, convulsions, and possibly death. If chronic or repetitive exposures occur, conditions such as cancers, nervous system disorders, and damages to various organ systems may develop. Chemical retention may lead to cumulative uptake in target tissue and slow removal of the pollutant from the body. However, if the chemical agent is rapidly eliminated, its effects may be completely reversible, provided the person is removed from the exposure.

Hazardous chemicals affect not only living organisms but also properties. Many times, these conditions result in harmful physical effects, like fires, explosions, sudden release of pressure, and violent unstable reactions, all of which can pose a real threat to property. Numerous chemical wastes cause corrosion to materials because of their extreme pH or dissolved salts. Toxic chemicals that oxidize wastes can make substances combustible so as to burn uncontrollably. Highly reactive hazardous chemicals can explode, causing damages to materials and structures. Toxic pesticides can contaminate grain and other agricultural products and render them unfit for consumption, resulting in economic losses.

When hazardous chemicals enter the environment, their presence causes damages to the air, water, and soil media. Primary pollutants cause deterioration of the air quality and the formation of secondary pollutants may also occur. Primary air pollutants are usually in gaseous state as toxic organic vapors, corrosive acid gases, and toxic inorganic gases. Primary air pollutants are most dangerous to those in the immediate vicinity, like workers involved with site cleanup or people living adjacent to the site. Secondary pollution usually comes from the chemical oxidation of waste into corrosive substance or photochemical oxidation of organic matter, resulting in the release of aerosols into the atmosphere.

Hazardous chemical removal from air is an ongoing process via dissolution in water in the form of clouds or raindrops, which in many cases results in acid rain. For pollutants that are poorly water-soluble, the removal process may be through adsorption by aerosol particles. These airborne contaminants eventually cycle into the hydrosphere as released pollutants in streams, bodies of water, runoff from soil, or mobilized sediment.

Once hazardous chemicals are in the aquatic system, they are subject to various chemical and biochemical processes, such as acid–base, oxidation–reduction, precipitation–dissolution, and hydrolysis reactions or biodegradation. In addition, the presence of organic matter in water bodies tends to increase the solubility of hazardous organic chemicals, like leachate from landfills.

Sorption of nonionic organic matter by soil in landfills depends upon the organic content of the soil, the presence of hydrous metal oxides, and the content and types of clays present. Ion exchange processes hold heavy metals adsorbed by soils, interact with organic matter in the soil, and undergo an oxidation–reduction process, which then leads to a chemical pollutant’s mobilization or immobilization. In addition, if methylating bacteria is present in the soil at this time, the metals can volatilize into organometallic compounds. Other factors that affect heavy metal mobility and reduction in soils are the soil’s pH, temperature, cation-exchange capacity, mineral content, and the types and combinations of organic matter present. Other sources of leachates are hazardous chemical sumps and lagoons, leaking septic tanks, leaking gasoline storage tanks, and underground waste disposal wells. All these scenarios produce situations where there is an interchange of contaminated water between surface and groundwater, usually at the discharge and recharge points.

Water bodies (rivers, impoundments, and groundwater aquifers) are highly dynamic systems. The fate of hazardous chemicals in water depends on the substance’s solubility, density, biodegradability, and chemical reactivity. The hydrologic systems are constantly experiencing inputs and losses of materials, both natural and anthropogenic in nature. In addition, these hazardous gases, liquids, and solids interact chemically with each other and with living organisms. Ultimately, the hazardous chemicals or their by-products dispersed and transported in water, in some cases, undergo bioaccumulation through the food chain involving aquatic organisms.

22.2 Hazardous Chemicals and Their Harmful Effects

The chemical groups discussed here are a part of the Environmental Protection Agency (EPA) Section 313 Emergency Planning and Community Right-To-Know Act (EPCRA), also known as the Toxics Release Inventory (TRI). The 30 hazardous chemical categories listed, each with specified health effects, are a real threat to the environment and human health.

Antimony compounds are silver-white metals found in the Earth’s crust. Once antimony is mined, it oxidizes to antimony oxide or changes to a brittle semihard metal. The oxidation process may continue until it oxidizes to a trioxide that is very slightly soluble in water. When antimony is exposed to the skin, a rash made of pustules may surround the sweat and sebaceous glands. Other potential problems are ocular conjunctivitis (eye exposure), gastrointestinal problems (oral exposure), and spontaneous abortion (in pregnant women working in an antimony-enriched environment). Antimony compounds are harmful in concentrations greater than 1 part per million (ppm).

Arsenic is found in soil in its inorganic form and may exist as a colorless gas called arsine. This gray-colored metal readily combines with oxygen, chlorine, and sulfur. The most common arsenic exposure comes from ingesting contaminated food; inhaling arsenic in large amounts over a short period of time causes acute exposure and may result in nausea, diarrhea, abdominal pain, and nervous system disorders. Chronic inhalation exposure, small doses over an extended period, may result in skin and mucous membrane irritation. Chronic, oral exposures cause gastrointestinal problems, anemia, skin lesions, hyperpigmentation, liver and bladder damage, and cancer. Inhalation of arsenic has been linked to the occurrence of lung cancer. EPA classifies arsenic as a Group A human carcinogen.

Barium compounds are characterized as alkaline earth metals, silver white in color and soft to the touch. These compounds immediately oxidize in moist air or react with water. However, elemental barium does not exist in nature; it usually exists as a divalent cation (i.e., barium sulfate or barium carbonate). When barium is ingested, it causes vomiting, diarrhea, abdominal

pain, hypertension, cardiac arrhythmias, and skeletal muscle paralysis. EPA listed limit is 1.0 ppm (Choudhury and Richard, 2001).

Pure beryllium is a hard gray metal, which does not occur naturally. Beryllium exists as a chemical component of certain types of rocks, coal and oil, soil, and volcanic dust. Pure beryllium is insoluble in water; however, some form may be soluble in water. Exposure to beryllium usually occurs when workers inhale the compound during mining or processes in the workplace; exposure also results from burning coal, fuel oil, and tobacco smoke (US Environmental Protection Agency, 2000). Acute inhalation can cause inflammation of the lungs or acute pneumonitis, which is reversible. Chronic inhalation causes berylliosis, the formation of noncancerous lesions on the lungs. Epidemiology studies indicate a causal relationship between beryllium exposure and increased risk of developing lung cancer. There are no reported harmful effects of swallowing beryllium, due to the fact that very little beryllium can move from the stomach and intestines into the bloodstream (US Environmental Protection Agency, 2000).

Pure cadmium exists as a soft silver-white metal; however, most of the time, it combines with other elements (i.e., cadmium chloride or cadmium oxide). Cadmium is stable and can enter the body through contaminated air, food, or water. Cadmium is usually emitted into the air when fossil fuels (coal or oil) are burned or when municipal waste is incinerated. Cadmium, especially cadmium oxide, is a probable carcinogen according to EPA. Cadmium exposure causes prostate and kidney cancer in humans and can cause damage to the reproductive and respiratory systems. Cadmium compounds cause lung and testicle cancer in tested animals. Long-term exposures to cadmium can cause fatigue and loss of smell. Short-term high exposures to this compound cause rapid lung damage, shortness of breath, chest pain, and buildup of fluid in the lungs. In severe cases, cadmium exposure can result in permanent lung damage or death.

Chlorophenols are needlelike and flakey in appearance. Thirteen out of 19 chlorophenol compounds are di-, tri-, and tetra- formations. The number of chlorine atoms and structure's atomic configuration affects the compound's physical and chemical properties. Heat or combustion of chlorophenols forms toxic and corrosive gases. Chlorophenols react violently with strong oxidants (Australian Government Department of Environment and History, 2005). Respiratory or dermal exposure to chlorophenols results in acne, liver injury, and various acquired disorders (blood, skin, and hair). An acute exposure causes severe irritation and burning to the skin, eyes, mucous membranes, and upper respiratory tract. It may also cause tremors, convulsions, difficulty breathing, buildup of fluid in the lungs, pneumonia, nausea, vomiting, diarrhea, abdominal pain, drop in blood pressure, collapse, and coma. Chlorophenols are recognized carcinogens (Australian Government Department of Environment and History, 2005).

The oxidation state and the composition of chromium compounds determine their physical and chemical properties. Most of the Chromium (VI) compounds are soluble in water, but other oxidation states are only slightly soluble or insoluble in water. The effect of the two different oxidation states on human health is quite different. Chromium (III), in very small amounts, is essential for our health, while chromium (VI) is highly toxic to humans. Breathing chromium VI can damage and irritate the nose, throat, lungs, stomach, and intestines and may cause asthma or some other acquired allergic reaction. Other symptoms of chromium (VI) include ulcer formation, convulsions, and kidney and liver damage. Chronic exposures to chromium (VI) cause adverse effects to the respiratory system and immune system and may cause cancer. Dermal exposure to this oxidation state of chromium produces skin ulcers, redness, and swelling.

Cobalt in its pure form is an odorless silvery metal, insoluble in water, but will readily dissolve in acid. However, some cobalt compounds are soluble in water. Cobalt metal can be beneficial

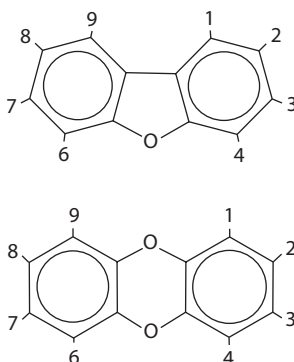
and harmful to humans, depending on its physical state. Cobalt burns readily when exposed to heat and will give off hazardous fumes. On the other hand, cobalt is a part of vitamin B12 and a health treatment for anemia. Exposure to cobalt can cause respiratory irritation, coughing asthma, pulmonary edema, pneumonia, skin problems, kidney damage, lung damage, and heart failure and can be disabling or fatal.

Copper is a reddish-brown, odorless metal. It is resistant to corrosion, is an excellent conductor of heat and electricity, and is insoluble in water. Copper compounds exist as copper (I) or copper (II), which have very different properties. The display of properties depends on the compound's total composition and the amount and type of copper present. Small quantities of copper, 1–2 mg, are required as a dietary intake to stay healthy. Acute chemical exposure to copper causes vomiting, diarrhea, stomach cramps, nausea, anemia, liver and kidney damage, or death. Very young children are sensitive to copper and chronic exposures, at high concentration, via food will cause liver damage or death. A small fraction to the population in the United States have problems absorbing copper (Menkes' disease) or excreting copper (Wilson's disease).

Cyanide is a colorless or pale blue liquid or gas that has a characteristic bitter almond odor at 1–5 ppm. Cyanide salts are white solids with bitter almond smell. A very small amount of cyanide in B12 (cyanocobalamin) is a necessary dietary intake. Cyanide exposures usually occur in the workplace, to individuals who work in operations or processes at facilities where cyanide is produced. Cyanide can enter the body by ingestion of contaminated food or by inhaling fumes. Inhalation of cyanide is very toxic and fatal to humans. However, brief exposure to low levels of cyanide may only cause shortness of breath, convulsions, or loss of consciousness. While acute exposure for a very short period causes eye, nose, and throat irritations; headaches; pounding heart; and damaged central nervous system (CNS), respiratory system, and cardiovascular system and quickly leads to death; long-term exposure to low levels of cyanide can cause deafness, vision problems, and loss of muscle coordination. It may also affect the thyroid gland.

Diisocyanates are low molecular weight aromatic and aliphatic compounds that are colorless to pale yellow liquids that have a pungent odor, or they may exist as crystalline solids. Diisocyanates react with amines, alcohols, and organic acids, resulting in heavy heat production or what is referred to as an exothermic reaction. When these compounds come in contact with water, a reaction occurs, generating large quantities of carbon dioxide (Bil et al., 2002). Diisocyanate compound usage occurs widely in manufacturing or production processes where foams, fibers, paint coatings, and varnishes are produced. Also, diisocyanates are frequently used in the automobile industry and for building insulation materials. Annual isocyanate production is about 3 billion lb, with 280,000 US workers potentially exposed (NIOSH, 1996). The highest releases in the United States occur in Calcasieu parish, Louisiana, where 640,001 lb was released to land (Scorecard, 2006). Major routes of exposure for diisocyanates are inhalation of vapor or dermal contact. These exposures usually occur during the processing of polyurethane foam, melting or burning of polyurethane foam (during fire fighting), or the handling of liquid isocyanates. Diisocyanates exposures cause irritation to the mucous membranes of the eyes, gastrointestinal tract, and respiratory tract. Respiratory irritation may progress to chemical bronchitis with severe bronchospasm; workers become sensitized and asthmatic and experience severe asthma attacks or death on repeat exposure (below the NIOSH REL). Hypersensitivity pneumonitis (HP) occurs sporadically, with flu-like symptoms, fever, muscle aches, headaches, dry cough, chest tightness, and difficulty breathing. Symptoms increase as HP becomes chronic, with fatigue and weight loss also observed.

Dioxins are halogenated organic compounds. The most common types of dioxins are polychlorinated dibenzofurans (PCDFs) or polychlorinated dibenzodioxins (PCDDs). The basic structure of the two most common dioxins is two benzene rings joined by a single-oxygen bridge (PCDF) or a double-oxygen bridge (PCDD), as seen in the diagram that follows:



Chlorine atoms can attach to any of the eight positions on either molecule, with toxicity depends on the number and location of the chlorine atoms. Molecules that have chlorines in the 2, 3, 7, and 8 position are toxic. Out of 210 PCDF/PCDD compounds, only 17 (7 PCDDs and 10 PCDFs) have chlorine in these positions. Dioxins have no commercial values; they form during combustion processes (i.e., incineration of waste, burning of yard trash, forest fires, and paper and herbicide processing). People experience exposures to dioxins through low-level food contamination. However, dioxins build up in the tissue of humans (bioaccumulation) over time, and at a dangerous level, these compounds can cause cancer, reproductive problem (endometriosis), damaged immune systems, heart disease, diabetes, or birth defects. Exposures to dioxins below the lethal dose cause chloracne (severe, persistent acne). The mode of action for dioxin is similar to hormones, like estrogen. Dioxins enter the cell and binds with a protein called the Ah receptor. The dioxin–Ah receptor combination binds with DNA and alters genes expression. The alteration in gene expression causes changes in specific proteins and enzyme levels in cells, which leads to change in tissues and the human body.

Ethylenebisdithiocarbamate (EBDC) is a fungicide. Various commercial names are mancozeb, maneb, and metiram. EBDC is practically insoluble in most organic solvents. However, mancozeb is rapidly absorbed into the body from the gastrointestinal tract and then disseminates to various targeted organs, and within 96 h, it is excreted. Mancozeb is only hazardous when the body metabolizes it and produces the metabolites ethylenethiourea (ETU) and carbon disulfide. The main target organ affected is the thyroid gland, which may be due to the metabolite ETU. Mancozeb research data are inconclusive, but it suggests mancozeb is nonmutagenic or weakly mutagenic. There are no data on mancozeb carcinogenic effects.

Glycol ethers are colorless, odorless (to pleasantly mild) volatile organic compounds (VOCs) that exist in a liquid form. They are used as solvents and ingredients in cleaning products, liquid soaps, and cosmetics. Overexposure to glycol ethers can cause anemia, intoxication, and eye, nose, and skin irritations. An acute high level of glycol ether exposure to humans will cause narcosis, pulmonary edema, and severe liver and kidney damage. Chronic glycol ether exposures may result in neurological and blood disorders, fatigue, nausea, tremor, and anemia. There are no data on human reproductive, developmental, and carcinogenic health effects due to exposures. Animal studies indicate reproductive and developmental effects, birth defects, and possible damages to male's sperm and testicles, which may result from glycol-ether-type exposures.

Lead is a naturally occurring bluish-gray metal that is found in small quantities in the earth's crust. It is very toxic at low concentrations. Pure lead is insoluble in water, but its compounds (lead acetate, lead chloride, lead oxide, etc.) range from insoluble to water-soluble. Lead is used to manufacture batteries and produce metal products, paints, and ceramic glazes. An individual can become exposed to lead by breathing lead-contaminated air, dust, and dirt or by ingesting lead-based paint chips. Acute lead exposures cause brain damage, kidney damage, and gastrointestinal distress. Chronic lead exposures affect the blood, blood pressure, kidneys, and CNS; reduce sperm count; cause spontaneous abortions and low birth weight babies; and inhibit the ability of humans to metabolize vitamin D. Children are very sensitive to lead poisoning, and when exposed, they display slowed cognitive development and reduced growth.

Manganese occurs naturally in the environment as a silver-colored metal that is soluble in water. As a metal, it can form compounds with oxygen, sulfur, and chlorine. As a solid compound, it does not evaporate, but its particles can disperse in the air. Manganese is nutritionally essential for normal physiologic function in humans. Chronic exposures to high levels of manganese cause problems with the CNS and affect the visual reaction time, hand steadiness, and eye-hand coordination. In addition, chronic manganese exposure causes *manganism syndrome*. Exposed individuals experience weak and lethargic feelings, tremors, a masklike face, psychological disturbances, and impotency or loss of libido in men.

Elemental mercury is a silver-white metal liquid with a vapor pressure of 0.002 mmHg at 25°C. In a liquid state, it gives off toxic vapors at very low unnoticeable level to humans. Mercury exists in three oxidation states, elemental (Hg), mercurous (Hg⁺), and mercuric (Hg⁺⁺), and three forms, elemental mercury, inorganic compounds (primarily mercuric chloride), and organic compounds (primarily methyl mercury). All forms of mercury are toxic, but each displays different health effects. For elemental mercury, acute and chronic exposures affect the CNS and cause tremors; symptoms differ based on the level and length of exposure. For example, acute elemental mercury exposures yield mood changes and slowed sensory and motor nerve functions. Chronic exposures increase excitability, irritability, and excessive shyness. For inorganic mercury, acute oral exposure will cause nausea, vomiting, severe abdominal pain, and kidney damage. Animal studies demonstrate that mercuric chloride causes tumor formation (forestomach, thyroid, and renal). For methyl mercury, acute exposures to high levels of methyl mercury result in CNS effects including blindness, deafness, decreased level of consciousness, and death. Chronic exposures cause CNS effects including paresthesia, blurred vision, malaise, difficulty speaking, and constriction of the visual field. Babies born to women who ingest high levels of methyl mercury, during pregnancy, show signs of mental retardation, ataxia, constriction of the visual field, blindness, and cerebral palsy.

Nickel is a silver-white, hard, ferromagnetic metal, which is a good conductor of electricity and heat. Resulting health effects depend on the route and degree of exposure and the properties of the nickel compound that the individual has been exposed. Nickel causes allergic reactions, like dermatitis and asthma. Exposures that occur in older refining processes may result in an increased risk of cancer of the paranasal sinuses and lungs. However, modern industrial plants are designed to remove the risk of these types of exposures.

Nicotine is a hygroscopic, oily liquid that is miscible with water. Its chemical name is (S)-3-(1-methyl-2-pyrrolidinyl)pyridine. In small amounts, nicotine acts as a stimulant, increasing a person's activity, alertness, and memory. Repeated use can develop dependency on nicotine, with the user experiencing loss of appetite and feeling relaxed, with an increasing heart rate and blood pressure. Large doses of nicotine cause vomiting and nausea; 40–60 mg may be lethal to an adult human. Nicotine is more toxic than cocaine (lethal dose 1000 mg).

The nitrate ion is a polyatomic anion (NO_3^-) whose negative ion charge allows it to combine with a positively charged ion, resulting in a nitrate salt. Also, nitrates can combine with various organic and inorganic compounds to form other stable nitrate compounds. Most nitrates are soluble in water, and once in the body, nitrates convert to nitrites. The greatest use of nitrates is as a fertilizer, but they can also be an oxidizing agent (Burcat, 1999). When nitrates are mixed with hydrocarbons or carbohydrates, flammable or even explosive mixtures can be formed, for example, black gunpowder, TNT dynamite, and nitromethane (propellants/specialty fuels). Exposure to nitrates can cause adverse health effects to the heart and blood vessels and may cause blood system toxicity. Cardiovascular (blood vessel) toxicant exposures often lead to a variety of diseases, such as hypertension, hardening of the arteries, abnormal heartbeat, and decrease in the flow of blood to the heart. One adverse effect after exposure of the blood system to toxicant is the reduced ability of red blood cells to carry oxygen. The low level of oxygen in red blood cells interferes with important immunological function of the white blood cells and can induce cancer (Burcat, 1999).

Polybrominated biphenyls (PBBs) are colorless to off-white brominated flame retardants and plastic additives that are added to home electrical appliances, textiles, and plastic foams. Most information concerning PBB exposure comes from studies done on people in Michigan who consumed PBB-contaminated animal products. Residents complained of nausea, abdominal pain, loss of appetite, joint pain, and lethargy. In addition, animal studies on PBBs show that these compounds can cause weight loss; skin disorders; liver, kidney, thyroid, nervous, and immune system effects; and cancer. As a result of the findings from various animal tests and studies, the US Department of Health and Human Services and the International Agency for Research on Cancer (IARC) suggest that PBBs are possibly carcinogens.

Polychlorinated alkanes (PCAs) are manufactured by chlorination of liquid n-alkanes. The largest application of PCAs is as plasticizer, enhancer of flame retardant, and extreme pressure lubricant. PCAs are released in the environment by improper handling and disposing of metal-working fluids or PCA polymers and leaching of PCAs from paints and coatings. PCAs are bioaccumulated, the lower the chlorine content of the alkane, the faster the uptake and elimination of the pollutant in the body.

Polycyclic aromatic (organic) compounds, also called polyaromatic hydrocarbons (PAHs), are composed of carbon and hydrogen with a structure of fused rings of two or more (similar to benzene). There are one hundred or more different PAHs that occurs in complex mixtures (ATSDR, 1995). PAHs form as a result of incomplete burning of coal, oil, gas, wood, garbage, tobacco, and charbroiled meat. PAHs are used in manufacturing processes to formulate medicines, dyes, plastics, and pesticides. Also, they are present in the asphalt of roads, crude oils, coal, coal tar pitch, creosote, and roofing tar. This indicates that PAHs exist throughout our environment, in the air, water, and soil. In the air, PAHs can attach to dust particles and in the soil they remain as solids. PAHs do not dissolve easily in water or burn easily, but they evaporate readily into the air. Exposures occur when breathing fumes or upon skin contact with PAHs for long periods, in which case cancer may develop. The reason PAHs are carcinogenic is its chemical structure, a flat hydrophobic-shaped ring. This shape (structural configuration) makes it very hard to excrete PAHs from the body and easy to insert them into the DNA structures. Once inserted in the DNA, they interfere with the proper functioning of the DNA, which can lead to cancer (ATSDR, 1995).

Selenium compounds occur naturally and are found widely distributed in the earth's crust. Selenium usually combined with other elements in the environment (silver, copper, lead, nickel,

sulfide minerals). Hydrogen selenide is highly toxic at room temperature, and humans who inhale it develop irritated mucous membranes, pulmonary edema, severe bronchitis, and bronchial pneumonia. Inhalation of elemental selenium dust irritates the mucous membranes of the nose and throat and can result in coughing, nosebleeds, bronchial spasms, and chemical pneumonia. Oral ingestion causes indigestion, nausea, cardiovascular effect, and neurological effects (headaches, dizziness, eye irritation) (USEPA, 1993).

Silver occurs naturally in the environment in its pure and ore forms. It is extremely photosensitive and stable in air and water. One exception to this stable form of silver is when it is exposed to sulfur compounds, it will readily tarnish. Metallic silver is insoluble in water, but many silver salts such as silver nitrate (AgNO_3) are soluble. In the environment, silver occurs primarily in the form of the sulfide (Ag_2S) or is associated with other metals like lead, copper, iron, and gold, which are all insoluble. Most human exposure to silver is by inhalation. Silver salts absorb from the lungs and gastrointestinal tract; silver dust is retained in the lungs. Silver irritates the gastrointestinal tract and causes lung and throat irritation, stomach pain, and lesions in the kidney and lungs. Once the silver is absorbed, it is retained in the body. Chronic exposures lead to deposit buildup and stained tissues (argyria). Discoloration of the skin, nasal sputum, and gums are the most serious health effect of silver.

Strychnine is a white, odorless bitter crystalline powder and a very strong poison. A small amount of strychnine can produce a severe effect in people. Strychnine comes from a *Strychnos nux-vomica* plant found in southern Asia and Australia. Years ago, strychnine was taken as a pill to treat human ailments. However, today, strychnine use is mainly as a pesticide to kill rats or is occasionally used to mix with *street* drugs (LSD, heroin, and cocaine). Fifteen to sixty minutes after consuming strychnine, poisonous symptoms appear. A low to moderate dose of strychnine will cause people to become agitated, fearful, easily startled, and restless. After a low to moderate exposure, a person's arms and legs become rigid, jaws tighten, and they will feel uncontrollable arching of the neck and back (with painful muscle spasms) and possibly experience kidney and liver damage. Fifteen to thirty minutes after a high dose of strychnine, an individual may experience respiratory failure and become brain dead, which could lead to death. People that survive the toxic effects of strychnine poisoning will experience long-term health effects, like brain damage or kidney failure. People severely affected by strychnine poisoning are not likely to survive.

Thallium is a very soft metal that is very toxic. The toxicity comes from its ability to replace crucial alkali metal cations in the human body (Na^+ , K^+), which interrupts cellular processes. Thallium poisoning causes loss of hair, damage to the peripheral nerves, and cancer. Exposure should not exceed 0.1 mg/m^3 of skin in 8 h time-weighted average (40 h workweek). Thallium was an effective murder weapon before the antidote Prussian blue was discovered.

Vanadium is a soft, grayish-white metal that is it very useful in nuclear applications (has a low fission neutron cross section). The common oxidation states of vanadium are +2, +3, +4, and +5. The higher the oxidation state, the more toxic vanadium is, which makes vanadium pentoxide (+5-oxidation state) the most dangerous form of vanadium. The Occupational Safety and Health Administration (OSHA) guideline requires an exposure limit of $0.05 \text{ mg/m}^3/8 \text{ h day}$ for vanadium pentoxide fumes in the workplace. The National Institute for Occupational Safety and Health (NIOSH) advises that 35 mg/m^3 of vanadium be considered an immediate danger to human health and life because at this level, permanent health problems or death occurs.

Warfarin is a rodenticide and an anticoagulant, which is practically insoluble in water, soluble to slightly soluble in solvents (i.e., acetone, benzene, toluene, xylene, and cyclohexane), and

moderately soluble in some alcohols (methanol, ethanol, and isopropanol). Warfarin is very toxic by inhalation and ingestion and moderately toxic via dermal absorption. A dose of 200 mg/m³ is instantly highly toxic to human life. Warfarin causes organ damage by inhibiting the coagulation of blood, in the lungs hemorrhaging can result. Warfarin also causes hematuria, back pain, hematomas in arms and legs, bleeding lips, mucous membrane hemorrhage, abdominal pain, vomiting, and fecal blood.

Elemental zinc is a bluish-white metal, which in its dust form is very flammable upon exposure to heat or flames and may ignite spontaneously in dry air. Zinc is beneficial to humans as insoluble in water, soluble in acid, alkalis, and acetic acid. Zinc slowly reacts with sulfuric or hydrochloric acid, oxidizing agents, and metal ions and can form zincates with alkali hydroxides. Zinc is an essential trace element that plays a role in normal growth, taste, and sperm development. The routes of human exposure to zinc are inhalation, ingestion, and dermal contact. Acute inhalation exposure to zinc during welding and smelting, in the workplace, results in *metal fume fever*, which has symptoms of headache, chills, fever, and muscle aches. Zinc chloride can cause ulceration of the skin and damage the mucous membrane of the respiratory tract, which may lead to pneumonitis. The US EPA and the IARC have inadequate evidence that zinc is a potential carcinogen.

22.3 Natural Disasters and Hazardous Chemicals

Historically, sudden and extraordinary physical disturbances, like volcanic eruption, earthquakes, hurricanes, and tsunamis, were placed in the supernatural realm and considered *acts of God*. However, with present-day spread of more secular and nonreligious ideologies, these events are thought of as *natural disasters*. In recent decades, due to unsustainable practices of man, it is difficult to attribute all the responsibility to God or nature. Society has responded to the challenge by organizing separate responses and planning for specific disasters. Planning is divided among different organizations and agencies, which tend to respond and view threats and impacts differently. There are separate disaster plans for chemical hazards, hurricanes, nuclear plants, and floods; nevertheless, there is no legislation to address handling of hazardous chemicals in cases of any one combination of several or all of these disasters and the debris that is generated.

Nonetheless, many hazardous wastes, when mixed with other waste or material, can produce effects, which are harmful to human health and the environment, such as (1) heat or pressure; (2) fire or explosion; (3) violent reaction; (4) toxic dusts, mists, fumes, or gases; or (5) flammable fumes or gases. The material safety data sheet (MSDS), a hazardous communication tool, provides details on all-important aspects of chemical use, handling, and storage. However, in cases of natural disasters, the MSDS may not be available for consultation or the identification of the chemicals is in question.

Some of the possible natural hazards that can occur are hurricanes, volcanic eruption, earthquake, and landslide. Humans are usually placed in a vulnerable position, which results from a lack of appropriate emergency management. This humanist response then leads to financial, structural, and human losses. How much loss is incurred depends on the capacity of the population to support or resist the disaster. In addition, the community's resilience and strong leadership play a significant part in their longevity. One way to look at natural disasters is *hazards plus vulnerability*. In other words, a natural hazard will never result in a natural disaster in areas without vulnerability. For example, a category five hurricane and storm surge in an area uninhabited would have a

small chance of becoming a natural disaster. So this would mean events are not simply hazardous or disastrous without human involvement.

Natural disasters in the United States date back as far as 1811, when the worst earthquake measuring 8.0 or higher on the Richter scale occurred. This earthquake resulted in the formation of new lakes, changed the course of the Mississippi River, and caused the disappearance of the town, New Madrid, Missouri, and all the hazardous chemicals that exist there, they all went underwater. These natural disasters have plagued the United States for many years, from the Johnstown Flood of Pennsylvania (1889) to the Atlantic Hurricane Season and Evansville Tornado of 2005 and many more recorded in between (see Table 22.1). In each case, there is massive structural and property damage and loss of life reported; however, very little is reported on the fate of all the hazardous chemicals that remain present, undergoing chemical reaction and human exposure and imparting detrimental effects on biodiversity and the ecosystem. In New Orleans, August 2005, Hurricane Katrina barreled down on the city, breaching levees and causing massive flooding. In the mist of the aftermath, the EPA in coordination with Louisiana Department of Environmental Quality (LADEQ) collected samples for chemical testing. The sample collection and testing for various pollutants, such as VOC, SVOC, total metals, pesticides, and total petroleum hydrocarbons was performed in a timely fashion. Nevertheless, the question remains, how was contaminated debris, water, soil, and property treated, stored, retrieved, transported, and disposed of in cases of natural disasters? Are there procedures in place for these catastrophic events?

22.4 General Emergency Planning for Storage, Retrieval, and Transportation of Hazardous Chemicals

The Department of Transportation (DOT) established the Hazardous Materials Transportation Program in 1974 to identify and manage various threats surrounding the transportation of hazardous materials. The program covers different forms of transportation, a wide range of hazardous materials (chemical, radioactive, and infectious), various manufacturers, shippers, and carriers. In cases of accidental hazardous releases, the program provides for sample collection, analysis, and identification of the unintentional material release. During the normal course of operation, DOT must balance safety and cost, resulting from regulations, special permits, and approvals.

Stable chemicals have the potential to become hazardous under the right conditions. This is why it is necessary to store chemicals and other hazardous materials properly, to prevent spills and undesirable reactions and minimize human and environmental exposures. EPA regulation is limited in this area; the Occupational, Safety and Health Administration (OSHA) regulates most of chemical storage and handlings. The regulations under which these activities occur are (1) storage and handling of flammable liquids (29 CFR 1910.106), storage of compressed gases (29 CFR 1910), (2) communicating chemical hazards to employees under the Laboratory Standard (29 CFR 1910.1450), and (3) the Hazard Communication Standard (29 CFR 1910.1200).

In the process of storing and handling hazardous chemicals, it is extremely important to minimize human exposures, avoid underestimating associated risks, and use proper control measures to eliminate hazardous risks. To accomplish these necessary hazardous chemical management issues, it is imperative that the risk associated with each chemical is assessed, understood, and communicated. In addition, the proper engineering controls, personal protective equipment (PPE), and proper training in accordance with regulatory requirements must occur in its entirety

Table 22.1 Major Natural Disasters in the United States

<i>Date</i>	<i>Location</i>	<i>Comment</i>
1811–1812	New Madrid, Missouri (<i>worst earthquake</i>)	Some people consider the San Francisco (California) quake of 1906 to be the nation's worst earthquake. In terms of lives lost and destruction of property, the 1906 quake wins the title. However, the New Madrid quakes of 1811 and 1812 were of greater magnitude and caused more widespread damage. By assessing the scope of damage, it is estimated that the three earthquakes that occurred at this time measured 8.0 or higher on the Richter scale, and stories related to the quake were felt across the entire country. Since this area of the country was less populated at the time, there were far fewer deaths and structural damage. However, the damage can still be seen today by comparing maps and photos before and after the quake. Large areas of ground sunk, new lakes were formed, and the course of the Mississippi River was changed causing the town of New Madrid to disappear below its waters.
October 8, 1871	Peshtigo, Wisconsin worst fire	This forest fire is believed to have started when a small brush fire set by railroad workers got out of hand, but the actual cause is still unknown. Over 1500 people lost their lives. The other damage statistics include 3.8 million acres burned, 9 towns destroyed, and an estimated \$169 million dollars in damages.
1888	New England blizzard	Paralyzed New England for a week.
1889	Johnstown Flood of Pennsylvania	The third greatest natural disaster in US history in terms of lives lost, leaving 2200 dead.
1896	St. Louis–East St. Louis tornado	Costliest and third deadliest tornado in US history tracks through urban St. Louis, Missouri, and East St. Louis, Illinois, killing at least 255 and incurring an estimated \$2.9 billion in damages (1997 USD).
1900	Galveston hurricane	A 20-ft storm surge swept over Galveston Island and killed an estimated 8000 people, the deadliest natural disaster in US history; estimated damages <\$1 billion.
1906	San Francisco earthquake	The official casualty count of 700 at the time was recently revised in 2005 to 3000+; estimated damages \$6 billion.
March 1, 1910	Wellington, Washington (<i>worst avalanche</i>)	During the winter of 1910, two trains were trapped in Stevens Pass in the Cascade Range. One passenger train and one mail train became snowbound when the plows couldn't clear the large amounts of snow from the tracks. As night fell, a rumble was heard high up on the ridge above the trains. Within minutes, an avalanche descended on the two trains, sweeping them off the tracks and into the Tyre River Canyon 150 ft below. The number of people killed, 96, would've been much higher if some of the passengers had stayed in the cars instead of trying to walk out of the mountains.

Table 22.1 (continued) Major Natural Disasters in the United States

<i>Date</i>	<i>Location</i>	<i>Comment</i>
1918–1919	Nationwide (<i>worst epidemic</i>)	Worst epidemic—during this 1 year, 28% of the American population was infected by Spanish influenza and 675,000 people died.
1919	Atlantic Gulf hurricane	Six hundred people were killed, with estimated damages amounting to <\$1 billion.
1925	Tri-State tornado	Killed 695 in Missouri, Illinois, and Indiana.
1927	Mississippi floods	Two hundred people were killed, with estimated damages of \$2 billion.
1928	Great Okeechobee flood and Hurricane San Felipe	The fourth deadliest natural disaster in US history. At least 1836 people were killed; estimates are as high as 2750, although most of the bodies were never found. There was estimated damages totaling <\$1 billion.
1930s	Dust Bowl (<i>worst drought</i>)	When drought swept the Great Plains and plunged thousands into poverty as farmers abandoned their land to seek better lives elsewhere.
1935	Florida Keys hurricanes	Also known as the Labor Day Hurricane, killed more than 400 in 1935.
1938	New England hurricanes	Six hundred fatalities and \$4 billion in damage from New York City to Boston.
1944	Northeast hurricane	Three hundred people killed, with estimated damages totaling <\$1 billion.
1950	Storm of the Century	Brought snow and hurricane-force winds to 22 states and claimed 383 lives.
1955	Hurricane Diane	One hundred and eighty-four people killed, with estimated damages totaling \$5 billion.
1957	Hurricane Audrey	Three hundred ninety people killed, with estimated damages totaling <\$1 billion.
1965	Hurricane Betsy	Seventy-five people were killed, with estimated damages amounting to \$7 billion.
1969	Hurricane Camille	Claimed estimated 256–335 lives in Mississippi, Alabama, and Virginia, with estimated damages totaling \$6 billion.
1971	Sylmar earthquake	Killed 65 in the Greater Los Angeles area.

(continued)

Table 22.1 (continued) Major Natural Disasters in the United States

<i>Date</i>	<i>Location</i>	<i>Comment</i>
1972	Hurricane Agnes	One hundred and twenty people killed, with estimated damages totaling \$8 billion.
1974	Tornado Outbreak/ Super Outbreak	One hundred forty-eight tornadoes swept through locations in 13 US states and 1 Canadian province from the Great Lakes to Alabama and Mississippi, killing 315 people.
1977	Blizzard	Paralyzed Buffalo and surrounding areas for 2 weeks.
April 18, 1980	Mt. St. Helens, Washington <i>(worst volcano)</i>	When the major eruption occurred, most of the top of the mountain was blown away. In 6 min, 150 miles ² of forest was completely leveled. The snow at the peak quickly melted, causing the largest debris landslide recorded in historic times. Within days, the ash cloud had encircled the earth. Locally, ash covered the ground to a depth of 25 ft and ash fallout could be found as far away as the east coast. Most of the human deaths, 57 in all, were scientists who were close by studying the volcano, although there were a few residents who had refused to leave their homes. Other damage included the death of 2,000 deer, elk, and bear and 12 million salmon and the destruction of enough trees to build 300,000 homes.
(1982/1983 and 1997/1998)		Caused storms that battered the West Coast and set rainfall records in the Southeast.
March 24, 1989	Prince William Sound, Alaska <i>(worst oil spill)</i>	Due to the negligence of the captain of the Exxon Valdez, the tanker hit an undersea reef and spilled over 11 million gal of oil into the water. An estimated \$2.1 billion was spent to clean up 1300 miles of Alaskan coastline. Of course not all of the oil could be removed, and the spill is still impacting the environment today. No human lives were lost, but wildlife suffered greatly. Deaths were estimated at 250,000 seabirds; 2,800 sea otters; 300 harbor seals; 250 bald eagles; 22 killer whales; and billions of salmon and herring.
1989	Hurricane Hugo	Seven billion dollars (1989 dollars) in the United States, with another \$3 billion in damage in the Caribbean. Eighty-six people lost their lives.
1992	Hurricane Andrew	Caused an estimated 23–61 deaths and a range of \$25–\$33 billion in damage in Florida and Louisiana.
1993	Winter Superstorm/ Great Blizzard of 1993	Battered the eastern seaboard and claimed 79 lives (some sources reported up to 270 lives lost). Estimated damages totaled \$4 billion.

Table 22.1 (continued) Major Natural Disasters in the United States

<i>Date</i>	<i>Location</i>	<i>Comment</i>
1994	Northridge earthquake	Caused 57 deaths and \$23 billion in damage in the Greater Los Angeles area.
1999	Oklahoma–Kansas tornado outbreak	Oklahoma tornado outbreak, with 42 dead.
2004	Atlantic hurricane season	Hurricane Charley, Hurricane Frances, Hurricane Ivan, and Hurricane Jeanne all struck Florida causing widespread damage, destruction, and power damages. Tropical Storm Bonnie also hit Florida during the 2004 season, making a total of five storms to hit Florida. A total of 167 people were killed, with estimated damages totaling \$46 billion.
2005	Atlantic hurricane season	Includes major hurricanes that struck the United States, such as Hurricane Dennis, Hurricane Katrina, Hurricane Rita, and Hurricane Wilma. These storms have cost the United States billions of dollars, hitting Texas, Louisiana, Florida, Mississippi, and Alabama. Hurricane Katrina: Probably the most costly natural disaster in US history; caused massive damage in Louisiana (including near-total inundation of New Orleans) and Mississippi. The loss of life due to Hurricane Katrina was 1330. The estimated damages due to Hurricane Katrina totaled \$96 billion.
November 2005	Evansville tornado	Killed 22 in southern Indiana.
September 2008	Hurricane Gustav	Caused at least \$6.6 billion in damages; 3 million people fled and 153 deaths were attributed to the hurricane.
2009	California wildfires	More than 336,020 acres were damaged from July 7 to October 27 and resulted in two fatalities.
2010 blizzards	Mid-Atlantic states	Mid-Atlantic states received up to 30 in. of snow and 50 million people's lives disrupted with power failures; even states such as Mississippi, Louisiana, and Texas experienced a day of snowfall.

and document and update the records of the chemical hazard training periodically. The chemical containers and gas cylinders must be properly labeled (i.e., acid, base, organic solvent, compressed gas, toxic chemical) and stored accordingly. A centralized chemical storage area is recommended in most cases, with chemical segregated according to chemical classes and compatibility. If the chemical is reactive, physical separation from other hazardous materials is crucial, because highly

reactive chemicals are volatile and explosive in nature. Store compressed gases upright, chained to a secure surface, away from heat sources and with the cylinder cap in place when the cylinder is not in use.

To facilitate a hazard communication program, MSDSs are necessary and availability to personnel is essential. For environmental health and safety, a chemical inventory should be prepared and maintained frequently. Maintenance of this inventory is important to comply with OSHA requirements (Lab Standards) and EPA requirements under the EPCRA. The inventories should include chemical names, storage locations, quantities, and hazard information. Requirements and regulations regarding the proper storage and handling of hazardous materials can be complex, but with chemical hygiene and a hazard communication plan in place, safe operations can be clearly articulated.

22.5 Handling Hazardous Chemicals before, during, and after Natural Disasters

Hazardous chemical shipments by rail, truck, and ship occur in the United States every day without the citizens knowing the potential danger that surrounds them. No agency, federal, or state requires that surrounding communities be forewarned about the presence of these chemicals. Shipments of hydrogen cyanide, highly flammable propane, chlorine, and many other toxicants are unknowingly apart of our daily transit. Even the first responders, trained for accidents involving hazardous chemicals, do not know what dangerous chemicals are in their city at any given time. When an emergency involving chemical spills occurs, the first responders locate the shipment's manifest. The only problem with referencing the shipment's manifest is it only identifies what is included in the shipment. The manifest document fails to instruct the responder what to do if the tanker ruptures or if various chemicals in the shipment mix.

Natural disasters strike with varying degrees of severity, and in the aftermaths, situations worsen, due to the frantic rush to save lives and stabilize conditions. During these natural disasters, the main concern is preventing loss of life by massive evacuations and supplying those affected with much needed resources. Private industries and business prepare their companies and facilities to prevent economic losses, via loss of product, raw materials, and structural damages. There is a great need for government intervention during and immediately after a natural disaster.

The federal government cannot intervene in the state government's affairs unless the US Constitution states clearly that it has the authority to do so. The Robert T. Stafford Disaster Relief Emergency Assistance Act allows the federal government to supplement states and local resources in major disasters. However, the governor has to satisfy the required prerequisite by responding with appropriate actions under the state law and executing the state emergency plan. He or she has to comply with a list of the types and amounts of emergency assistance needed and the state and local resources used (Nat. Guard and Airmen, Police and DOTD, Dept. of Social Services, Dept. of Health and Hospitals, Shelter Task Force, Red Cross, and Dept. of Wildlife and Fisheries). If the President of the United States decides to declare a community as a natural disaster area, the Federal Emergency Management Agency (FEMA), US Army Corps of Engineers (USACE), and the US EPA can provide federal assistance. The Stafford Act authorizes debris removal in the public interest; FEMA operates under Section 206.224 of Title 44 of the *Code of Federal Regulations* (CFR) and starts debris removal in a broad sense (remove, handle, recycle, and dispose). Under the CFR, FEMA is concerned with not only the protection of life,

health, and safety but also its interest expenses to ensure economic recovery of the affected area. Collection and stockpiling of trash and debris take place to clear streets and highways and to prepare for construction and rebuilding.

The emergency management agencies and waste management agencies all play a role in disaster debris cleanup; nevertheless, they focus little attention to potential hazardous chemical releases until after the natural disaster event has ended. Manifest for shipments may be lost, misplaced, or destroyed due to inclement conditions, such as storms, wind, flooding, fire, and the absence of essential personal. The most basic problem in industrial hygiene when dealing with hazardous waste, under these conditions, is the unknown composition of the materials being handled. The consequences of this lack of knowledge, for first responders and the surrounding community, are that the following choices are difficult to make: (1) PPE for worker protection, (2) air-monitoring for first responders and downwind communities, and (3) medical surveillance strategies for site workers and the potentially exposed communities.

Historically, disaster debris was buried or burned in the affected community; however, due to the magnitude and complexities of more recent disasters, this is not acceptable. Burning of unknown chemical substances absorbed on debris can result in various chemical reaction, chemical releases, and irreversible acute chemical exposures and possibly death. It may also cause increase contamination of drinking water sources (surface and groundwater). An alternative to burning debris is to landfill or incinerate with pollutant control devices in place. The problem is these options are not sufficient to handle the overwhelming amount of debris generated from natural disasters; it would cause a hardship for the municipalities, deplete landfill space, and create future hazardous landfill runoff.

22.6 Current Rules and Regulations Guiding the Handling of Hazardous Chemicals in Disasters

The government in many nations has passed legislation to deal with hazardous substances and waste. The United States is no exception, including a vast network of such legislation to protect life and resource, making them environmental sustainable for future generations.

The Clean Air Act (CAA), passed in 1970, is a comprehensive federal law that regulates air emission (stationary and mobile) sources. This law empowers the US EPA to put in place the National Ambient Air Quality Standards (NAAQS), which aims to protect the public's health and environment. The agency's goal was to have established NAAQS in each state by 1975 and to require the states to set up state implementation plans (SIPs) for the industrial sources (USEPA, 1994). The CAA was amended in 1977 to set new goals (dates) for areas that failed to attain the NAAQS by 1975. It was also amended in 1990 to address insufficiency in CAA, such problems as acid rain, ground-level ozone, stratospheric ozone depletion, and air toxics (USEPA, 1994). See Table 22.2 for details of the following amendments to CCA and other regulatory agency frameworks:

- Regulated toxic, explosive, or flammable substances (Section 112(r) of CCA).
- Criteria air pollutants (Section 108 of CCA).
- Hazardous air pollutants (HAPs) (Section 112 of CCA).
- The Occupational Safety and Health Administration (OSHA) also establishes permissible exposure limits (PELs) for air contaminants in the workplace.
- The US DOT maintains a list of inhalation hazard chemical.

Table 22.2 Federal Regulatory Programs (Established by Different Federal Environmental Laws)

<i>Chemical Name(s) CAS Registry Number (or EDF Substance ID)</i>	<i>Type of Pollutant</i>	<i>Title of Regulation and Regulation's Salient Features</i>
Occupational Safety and Health Administration. OSHA Limits for air contaminants http://www.osha-slc.gov/SLIC/pel/index.html	Air contaminants (Occupational Safety and Health Act)	The Occupational Safety and Health Administration (OSHA) establishes the federal regulatory framework for the control of workplace safety. OSHA's goal is to make sure employers provide their workers a place of employment free from recognized hazards to safety and health, including exposure to toxic chemicals. OSHA establishes PELs to regulate workplace exposure to air contaminants. The universe of substances covered by OSHA PELs has largely been determined by whether a substance has a threshold limit value (TLV), a voluntary exposure standard developed by the American Conference of Governmental Industrial Hygienists (ACGIH).
EPA, Office of Solid Waste and Emergency Response. List of lists: consolidated list of chemicals subject to the EPCRA and Section 112(r) of the CAA: CAA 112(r) Regulated Chemicals For Accidental Release Prevention http://www.epa.gov/ceppo/pubs/title3.pdf	Regulated toxic, explosive, or flammable substances (CAA)	The federal CAA establishes the regulatory framework for the control of air pollutants. Section 112(r) established a list of substances, which, if present in a process in a quantity in excess of a threshold, require that the facility establish a risk management program to prevent chemical accidents and to prepare a risk management plan and submit the plan to the state and to the local emergency planning organization.
EPA, Office of Air Quality Planning and Standards. NAAQS http://www.epa.gov/airs/criteria.html Carbon monoxide 630-08-0 Lead 7439-92-1 Lead compounds LCT000 Nitrogen dioxide 10102-44-0 Ozone 10028-15-6 PM 10 EDF-077 PM 2.5 EDF-213 Sulfur dioxide 7446-09-5	Criteria air pollutants (CAA)	The federal CAA establishes the regulatory framework for the control of air pollutants. Section 108 authorizes the US EPA to establish NAAQS for criteria air pollutants to protect public health and the environment. Criteria air pollutants must meet the following criteria: 1. Emissions cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare. 2. Presence in the ambient air results from numerous or diverse mobile or stationary sources.

<p>EPA, Office of Solid Waste and Emergency Response. List of lists: consolidated list of chemicals subject to the EPCRA and Section 112(r) of the CAA: CEPCRA Section 302 Extremely Hazardous Substances http://www.epa.gov/ceppo/pubs/title3.pdf</p>	<p>EHSs (Superfund)</p>	<p>The SARA of 1986 was enacted by congress to help local communities protect public health, safety, and the environment from chemical hazards. Section 302 defines a list of EHSs. The presence of EHSs in amounts in excess of a <i>threshold planning quantity</i> requires that certain emergency planning activities be conducted. The initial list in Section 302 of EHSs is based on the list of substances published in November 1985 by the US EPA in Appendix A of the <i>Chemical Emergency Preparedness Program Interim Guidance</i>. Substances are listed based on concerns about acute toxicity, reactivity, volatility, dispersibility, combustibility, or flammability.</p>
<p>EPA, Office of Air Quality, Planning, and Standards. Section 112 Hazardous Air Pollutants List http://www.epa.gov/ttn/atw/188polls.html EPA, Office of Air Quality, Planning, and Standards. Modifications to the 112(b)1 Hazardous Air Pollutants http://www.epa.gov/ttn/atw/atwmod.html</p>	<p>HAPs (CAA)</p>	<p>The US Congress amended the federal CAA in 1990 to address a large number of air pollutants that are known to cause or may reasonably be anticipated to cause adverse effects to human health or adverse environmental effects. One hundred eighty-eight specific pollutants and chemical groups were initially identified as HAPs, and the list has been modified over time. Section 112 of the CAA governs the federal control program for HAPs. <i>National emissions standards for hazardous air pollutants</i> (NESHAPs) are issued to limit the release of specified HAPs from specific industrial sectors. These standards are <i>technology-based</i>, meaning that they represent the best available control technology an industrial sector could afford. The level of emission controls required by NESHAPs is not based on health risk considerations: allowable releases and resulting concentrations have not been determined to be safe for the general public. The CAA does not establish air quality standards for HAPs that define legally acceptable concentrations of these pollutants in ambient air.</p>
<p>Electronic CFRs. 40 CFR, Chapter I, Part 261. Appendix H to Part 261—Hazardous Constituents http://www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_40/40cfr261_00.html</p>	<p>Hazardous constituents (RCRA)</p>	<p>The Hazardous Constituents list (Appendix H) of the RCRA is used to identify the universe of chemicals of concern under RCRA, the primary environmental law governing the proper disposal of hazardous wastes. The Hazardous Constituents list includes substances that meet the following criteria: (1) inclusion in the CWA list of priority pollutants, (2) chemicals considered hazardous to transport by the DOT, (3) chemicals identified as carcinogens by the US EPA's Carcinogen Assessment Group, (4) chemicals with high acute toxicity, as identified by the NIOSH's Registry of Toxic Effects of Chemical Substances list.</p>

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Table 22.2 (continued) Federal Regulatory Programs (Established by Different Federal Environmental Laws)

Chemical Name(s) CAS Registry Number (or EDF Substance ID)	Type of Pollutant	Title of Regulation and Regulation's Salient Features
EPA, Office of Solid Waste and Emergency Response. List of lists: consolidated list of chemicals subject to the EPCRA and Section 112(r) of the CAA: CERCLA Hazardous Substances http://www.epa.gov/ceppo/pubs/title3.pdf	Hazardous substances (Superfund)	The CERCLA created the Superfund Program to clean up uncontrolled or abandoned hazardous waste sites and to respond to accidents, spills, and other emergency releases of pollutants and contaminants. Section 101 defines a list of hazardous chemicals for which the US EPA must establish regulations. Releases of CERCLA hazardous substances in amounts greater than their <i>reportable quantity</i> must be reported to the National Response Center and to state and local government officials. Hazardous substances identified in CERCLA include all chemicals on the following regulatory lists: 1. CAA list of HAPs 2. CWA list of hazardous substances and priority pollutants 3. Solid Waste Disposal Act list of hazardous wastes 4. TSCA list of imminent hazards
Electronic CFRs. 49 CFR, Chapter I, Part 172. Hazardous Materials Table http://www.access.gpo.gov/nara/cfr/waisidx_00/49cfr172_00.html	Inhalation hazard chemicals (DOT)	The US DOT maintains a list of inhalation hazards for regulatory purposes. Chemicals must be either gases or volatile liquids and must meet certain toxicity thresholds to be placed on the DOT list.
EPA, Office of Water. Current Drinking Water Standards http://www.epa.gov/safewater/mcl.html 2002 Edition of the Drinking Water Standards and Health Advisories http://www.epa.gov/ost/drinking/standards/dwstandards.pdf	MCLs (SDWA)	The SDWA was enacted to protect the quality of drinking water in the United States. The SDWA requires the US EPA to establish primary drinking water regulations for contaminants in public water systems that may have adverse effects on people's health. Such regulations typically include a media quality standard that defines legally allowable concentrations of toxic chemicals, called MCLs. MCLs are established to be as close to a level that is without known or anticipated adverse health effects as is technically or economically feasible. All contaminants that may have any adverse health effects and may occur in public water systems are covered by SDWA, but both congress and the US EPA have found it necessary to establish priorities for developing drinking water regulations, given the large number of potential contaminants. Following amendments to SDWA passed in 1997, MCLs are established for prioritized candidates on a fixed time schedule.

<p>EPA, Pesticide Product Information System http://www.epa.gov/opppmsd1/PPISdata/</p>	<p>Registered pesticides (FIFRA)</p>	<p>The FIFRA controls the distribution, sale, and use of pesticides. FIFRA requires all pesticide manufacturers to register their pesticides with the US EPA before they are allowed to be marketed.</p>
<p>EPA, Office of Environmental Information. Emergency Planning and Community Right-to-Know Section 313 List of Toxic Chemicals. EPA260-B-01-001. March, 2001. http://www.epa.gov/triinter/chemical/chemlist2001.pdf EPA, TRI program. TRI chemicals. http://www.epa.gov/triinter/chemical/EPA, TRI program. TRI chemical list changes. http://www.epa.gov/triinter/chemical/chemlistchanges02.pdf</p>	<p>TRI chemicals</p>	<p>The federal EPCRA of 1986 established the TRI. This program requires manufacturing companies in certain industrial sectors (SIC codes 20–39) to publicly report environmental releases and transfers of chemicals on a list established by Section 313. The US EPA expanded the TRI to include seven additional industries beyond manufacturing: metal mining, coal mining, electrical utilities, commercial hazardous waste treatment, petroleum bulk terminals, chemical wholesalers, and solvent recovery services. EPCRA is also known as SARA Title III, because the right-to-know program was created as part of the SARA of 1986. The original list of approximately 300 substances subject to TRI reporting requirements was derived from chemical lists used by New Jersey and Maryland. The TRI list has been modified and expanded. EPA removed some low-risk substances and added more pollutants. 1998 was the last reporting year for phosphoric acid. In 2000, 25 chemicals were added to the list, including 17 dioxin and dioxin-like compounds and other PBT chemicals. Chemicals are listed if they are known to cause or can reasonably be anticipated to cause significant adverse acute effects on health at concentrations likely beyond facility boundaries; cancer, teratogenic effects, reproductive effects, neurological effects, heritable genetic mutations, or other chronic effects on health; or significant damage to the environment.</p>

(continued)

Table 22.2 (continued) Federal Regulatory Programs (Established by Different Federal Environmental Laws)

Chemical Name(s) CAS Registry Number (or EDF Substance ID)	Type of Pollutant	Title of Regulation and Regulation's Salient Features
<p>EPA, Office of Solid Waste and Emergency Response. Waste Minimization Priority Chemicals and Chemical Fact Sheets. http://www.epa.gov/epaoswer/hazwaste/minimize/chemlist.htm</p> <p>EPA, PBT Chemical Program. Priority PBT Profiles http://www.epa.gov/opptintr/pbt/cheminfo.htm</p> <p>EPA, TRI program. TRI PBT chemical list http://www.epa.gov/tri/chemical/pbt_chem_list.htm</p> <p>EPA, PBT Profiler http://www.epa.gov/oppt/pbtprofiler/</p>	<p>PBT chemicals (US EPA)</p>	<p>The US EPA maintains a list of PBT chemicals to identify chemicals and chemical categories, which may be found in hazardous wastes regulated under the RCRA. This list was created to help implement EPA's national RCRA waste minimization policy. It is being used to promote voluntary waste minimization efforts to reduce the generation of PBT chemicals found in RCRA hazardous waste by at least half by the year 2005. This list of 30 waste minimization priority chemicals (WMPCs) replaces the list of 53 chemicals EPA identified in its 1998 Federal Register Notice of Availability: <i>Draft RCRA Waste Minimization Persistent, Bioaccumulative and Toxic (PBT) Chemical List</i>. More information on how EPA identified the chemicals in the current list.</p> <p>EPA has also developed other lists of PBT pollutants for use in specific programs. As part of its multimedia strategy for priority PBT pollutants, EPA has identified 12 pollutants for emission reductions because they are priorities under the US-Canada binational toxics strategy. This initial set of priority PBT pollutants includes: aldrin/dieldrin, benzo(a)pyrene, chlordane, DDT and its metabolites, hexachlorobenzene, alkyl-lead, mercury and its compounds, mirex, octachlorostyrene, PCBs, dioxins and furans, and toxaphene.</p> <p>In an effort to obtain better information on PBT chemicals, EPA has implemented regulatory changes to its TRI program to track PBTs that are released to the environment in very small amounts.</p> <p>EPA has also developed an evaluation tool called the PBT Profiler, which predicts PBT potential of chemicals. This assessment tool estimates the environmental persistence (P), bioconcentration potential (B), and aquatic toxicity (T) of discrete chemicals based on their molecular structure. The model compares results with the PBT criteria established for premanufacture notices (PMNs) submitted under Section 5 of TSCA and the final PBT rule for reporting chemicals under TRI.</p>

<p>EPA. Final Water Quality Guidance for the Great Lakes System. 60 Federal Register: 15365 (March 23, 1995). Table 6 EPA. Great Lakes Initiative. http://www.epa.gov/waterscience/GLI/index.html</p>	<p>Bioaccumulative chemicals of concern (BCCs) (US EPA)</p>	<p>The US EPA's <i>Final Water Quality Guidance for the Great Lakes System</i> identifies specific chemicals that will be subject to stringent regulatory controls. These BCCs include any chemical that has the potential to cause adverse effects after release to surface waters due to bioaccumulation in aquatic organisms (the bioaccumulation factor must be greater than 1000, after considering metabolism and other physicochemical properties).</p>
<p>EPA. UN PIC and US PIC-Nominated Pesticides List http://www.epa.gov/oppfead1/international/us-unlist.htm Chemical Name CAS Registry Number (or EDF Substance ID)</p>	<p>Banned or severely restricted pesticides (US EPA)</p>	<p>The US EPA maintains the list of banned or severely restricted pesticides as part of its participation in a voluntary international program known as the PIC procedure. A <i>banned</i> pesticide is defined as a pesticide for which all registered uses have been prohibited by final government action or for which all requests for registration or equivalent action for all uses have, for health or environmental reasons, not been granted. A <i>severely restricted</i> pesticide is defined as a pesticide for which virtually all registered uses have been prohibited by final government regulatory action but for which certain specific registered use or uses remain authorized.</p>

(continued)

Table 22.2 (continued) Federal Regulatory Programs (Established by Different Federal Environmental Laws)

Chemical Name(s) CAS Registry Number (or EDF Substance ID)	Type of Pollutant	Title of Regulation and Regulation's Salient Features
<p>US EPA and Environment Canada. Canada–US Strategy for the Virtual Elimination of Persistent Toxic Substances in the Great Lakes http://www.epa.gov/glnpo/p2/bns.html#Level I</p> <p>EPA, Great Lakes National Program Office. DRAFT Report on Level 2 Substances in the Binational Toxics Strategy: A US Perspective http://www.epa.gov/glnpo/bns/levelii/leviisubsus.html</p>	<p>Great Lakes binational toxics strategy substances (United States and Canada)</p>	<p>The Great Lakes binational toxics strategy was developed by the US EPA and Environment Canada to implement the Revised Great Lakes Water Quality Agreement of 1978. The strategy classifies toxic substances into two levels of concern for priority action. <i>Level I</i> substances are the most immediate priority and are targeted for virtual elimination. <i>Level II</i> substances have been identified by one or both countries as having the potential to significantly affect the Great Lakes ecosystem through their use and/or release. However, <i>joint challenge goals</i> for the reduction of <i>Level II</i> substances have not yet been set. The strategy uses multiple screening criteria to identify substances that are present in the water, sediment, or aquatic biota of the Great Lakes system and that are exerting, singly or in synergistic or additive combinations, a toxic effect on aquatic, animal, or human life. The criteria consider the substances' persistence in the environment, potential for bioaccumulation, and toxicity. <i>Level I</i> substances were selected on the basis of their previous nomination to lists relevant to the pollution of the Great Lakes Basin ecosystem, including (1) substances noted in the US EPA's BCCs from <i>Final Water Quality Guidance for the Great Lakes System, 1995</i>; (2) substances identified in <i>Canada–Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA)</i>, 1994; (3) substances defined as critical pollutants by the International Joint Commission (IJC), 1987; and (4) substances designated "Lakewide Critical Pollutants" in Lakewide Management Plans (LaMIPs). <i>Level II</i> substances have been identified by one or both countries as having the potential to cause a significant impact on the Great Lakes ecosystem. The two nations have agreed to share information regarding the persistence, bioaccumulation potential, and toxicity of <i>Level II</i> substances. Stakeholders will be encouraged to undertake pollution prevention activities to reduce levels in the environment of those substances nominated jointly by both governments.</p>

The Federal Water Pollution Control Act Amendment of 1972 grew out of the awareness and concern for the control of water pollutants. The Act was amended in 1977 and became a law known as the Clean Water Act (CWA), giving EPA the authority to implement pollution control programs that (1) set wastewater standards for industry, (2) set water quality standards for all surface water contaminants, (3) make it unlawful to discharge from a point source into navigable waters without a permit (issued by EPA), and (4) construct sewage treatment plants and addressed nonpoint source pollution.

Since the inception of the CWA, part of the Act has been modified so that two nations, the United States and Canada, can agree to reduce certain toxic pollutants in the Great Lakes. The modified law establishes water criteria for the Great Lakes and addresses 29 toxic pollutants. See Table 22.2 for details on the following:

- Bioaccumulative chemical of concern
- Great Lakes binational toxics strategy substances

In 1974, the Safe Drinking Water Act (SDWA) was instituted to protect the quality of water that is potentially designated as drinking water sources (surface or groundwater) in the United States. The EPA set the safe standards for purity, required all operators of public water systems to comply with health-related standards (primary), and encouraged them to attain secondary standards, which are public nuisance. The EPA relinquished power to state governments to monitor and enforce SDWA drinking water standards.

The Toxic Substances Control Act (TSCA) of 1976 was implemented to give EPA the ability to track industrial chemicals produced and imported in the United States. Many of the chemicals tracked by EPA have unknown or dangerous characteristic, and this reason requires testing for those that pose an environmental or human health risk. The TRI under the federal EPCRA of 1986 requires manufacturers in certain industrial sectors (SIC 20-39) to publicly report their environmental releases and transfers of chemicals listed under Section 313 (see Table 22.2).

Resource, Conservation, and Recovery Act (RCRA) of 1976 (amended and strengthened by the Hazardous and Solid Wastes Amendments [HSWA] of 1984) is used to identify the hazardous chemicals of concern. The RCRA legislation requires EPA to protect human health and the environment from improper management and disposal of hazardous wastes by issuing and enforcing regulations pertaining to such wastes. The RCRA requires that hazardous wastes and their characteristics be listed and controlled from the time of origin until their proper disposal or destruction, *cradle to grave*. Other RCRA-related information such as persistent, bioaccumulative, and toxic (PBT) chemical list can be seen in Table 22.2.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 created a Superfund Program to clean up uncontrolled or abandoned hazardous waste sites and to respond to accidents, spills, and other emergency releases of pollutants and contaminants in the United States. This would assist in eliminating or controlling hazardous materials that have a potential to endanger people or the surrounding environment. CERCLA was extended for 5 years by the passage of the Superfund Amendments and Reauthorization Act (SARA) of 1986 (Section 302) to help local communities to protect public health and safety and the environment from extremely hazardous substances (EHSs). This legislation had a greater increased scope than that of CERCLA and \$8.5 billion in funding.

The EPA has a Pesticide Product Information System, which controls the distribution, sale, and use of pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

Under this Act, all pesticide manufacturers must register their pesticides with EPA before they are allowed to place them on the market. If for any reason the EPA finds a pesticides to be a health or environmental risk, that pesticide is banned or severely restricted as part of a voluntary international program known as the Prior Informed Consent (PIC) procedure.

22.7 Critical Examination of Existing Rules and Regulations

The United States takes a generic approach, equally applicable to all stages of disaster mitigation, response, and recovery. The rules and regulations established to address the handling of hazardous fail to provide for the removal of chemically contaminate debris, stored chemicals, and chemical waste. As a rule, the Army Corps of Engineers (ACE), the US Coast Guard, and other designated agency simply haul trash to an out-of-the-way section of the city, which is not monitored or covered by any existing laws. Once the hazardous chemicals and debris are placed in a landfill, it can then be regulated under TRI, RCRA, SARA, or CERCLA.

22.8 Katrina Experience: Handling Hazardous Chemicals

The agencies responsible for assessing the levels of contaminates present in New Orleans after Hurricane Katrina were the US EPA, working in conjunction with the LADEQ.

Air data collection started September 12, 2005, reflecting the presence of volatile priority pollutants (benzene, toluene, xylene), which are commonly found in gasoline and industrial solvents. Long-term exposure to these chemicals could have posed a negative health effect. The elevated levels of benzene and xylene were located near a Murphy Oil spill. Murphy Oil implemented a cleanup response, and on October 2, 2005, a confirmation sample was analyzed and revealed low levels of volatile pollutants that were well below the Agency Toxic Substance and Disease Registry's (ATSDR) health standards. On October 5, 2005, high levels of benzene were detected in two locations near an industrial area, along LA State Highway 18 in St. Charles Parish.

On September 3, 2005, multiply floodwater sample collections for chemical and biological testing were taken from various points in the New Orleans area. Biological test detected total coliforms and *Escherichia coli* at high levels (above EPA's recommendation), indicative of sewage and wastewater contamination and the potential for the presence of other biological pathogens.

The floodwaters sampled (September 3, 2005–September 19, 2005) were analyzed for over 100 priority pollutants and compared to EPA's drinking water maximum contaminant levels (MCLs) and ATSDR minimum risk levels (MRLs) for health guidance values. Lead, arsenic, barium, thallium, chromium, benzene, selenium, and cadmium were exceeding EPA limits. Hexavalent chromium, manganese, p-cresol, toluene, phenol, 2,4-D (an herbicide), nickel, aluminum, copper, vanadium, zinc, and benzidine were detected in the floodwater. The EPA and ATSDR/CDC stated that chemicals exceeded drinking water standards, but as long as the floodwater was not accidentally ingested and proper protective equipment is worn (i.e., gloves and safety glasses) during the time of response activity, the threat is low and it did not present a health hazard.

Sediment samples were collected once the hurricane water recedes for residual deposits from nearby water bodies, soil from yards, road and construction debris, and other unknown materials. The sediment samples were submitted for biological and chemical testing. *E. coli* bacteria were detected in sediment samples, but there is no standard for determining human health risks from *E. coli* in soil sediment. The test only indicates the presence of fecal bacteria and the potential for virulent pathogens. Determination was that exposure to the sediment (soil) should be limited or avoided as much as possible.

The EPA and LADEQ collected sediment samples for chemical testing. The samples were tested for volatile organic compounds (VOC), semivolatile organic carbons (SVOC), total metals, pesticides, and total petroleum hydrocarbons. Samples collected (between September 9, 2005, and September 19, 2005) revealed some SVOCs, such as diesel and fuel oil. The levels of these SVOCs were elevated; however, with the lack of the ability to volatilize, due to lower vapor pressure and soil–solvent complex formation, these chemicals may remain in the soil for some unknown amount of time. Health advisories state that bare or broken skin exposed to sediment containing SVOCs can result in a dermatitis or skin irritation problem. VOCs were at very low levels and readily dissipated into the air due to high vapor pressure and the lack of soil–solvent complex formation (short duration in soil). These PAHs can produce adverse health effects.

Sample collections between September 25, 2005, and September 30, 2005, revealed a continued elevated concentration of petroleum. VOCs, SVOCs, PAHs, pesticides, various heavy metals (antimony, arsenic, chromium, hexavalent and trivalent chromium, aluminum), and mercury were found at levels below what ATSDR/CDC considers being immediately hazardous to human health. Heavy metal concentration exceeded EPA and ATSDR/CDC limits, and it was concluded that emergency responders wearing the proper protective equipment (i.e., gloves and safety glasses) are not expected to experience adverse health effects.

22.9 Graphical Statistical Models and Findings

We constructed the two graphs (Figures 22.1 and 22.2) by taking a random sampling of the EnviroMap coordinates (latitude/longitude) and plotting them graphically. The first graph depicts heavy metal contamination; the second graph shows levels of organic compound contamination. The coordinates selected predominately represent Orleans parish; however, Plaquemine, St. Bernard, and Jefferson parishes are included (see Table 22.3).

Much sediment is deposited in floodplains or flood areas where streams overflow their banks. The selected site in and around the New Orleans area contained bacteria, pesticides, several organic compounds, and various heavy metals. The two bacteria found were coliform and *E. coli*. Coliform is not a pathogen, but its presence is indicative of sewage and possibility more serious pathogens like *E. coli* and *Salmonella*. The two pesticides detected are actually organochlorine insecticides; they are DDT and dieldrin.

The heavy metals identified at most site sample were lead, arsenic, and mercury. Lead was highest in concentration, followed by arsenic, then mercury. Each of these metals has toxicities and/or carcinogenicity uniquely their own. Specific concerns with lead vary with the age and circumstances of the host, and the major risk is toxicity to the nervous system. The most susceptible New Orleans populations are children, particularly toddlers and infants in the neonatal period. For adults with excess occupational or accidental lead exposure, the concerns are peripheral

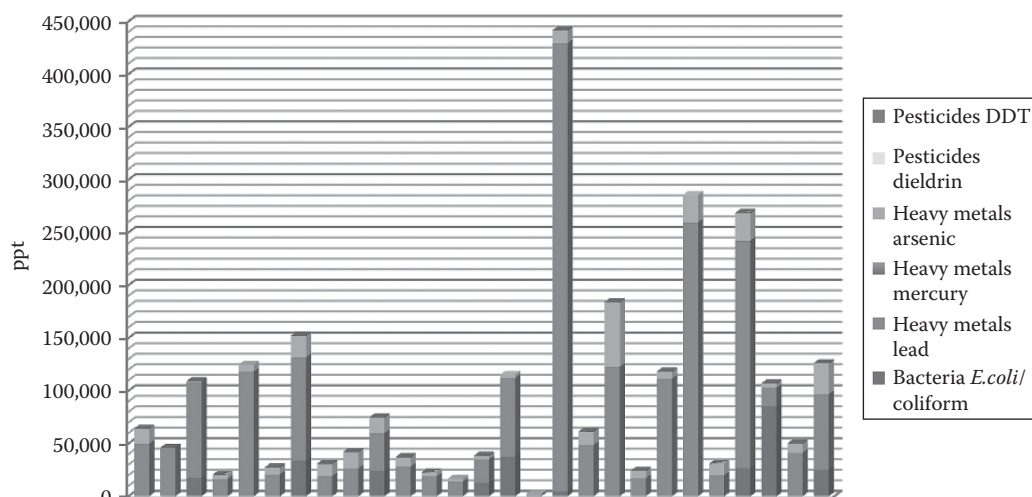


Figure 22.1 Bacteria and heavy metal contamination from Hurricane Katrina in the New Orleans area, Sept. to Oct 2005. (Data from U.S. Environmental Protection Agency, *Dealing with debris and damaged buildings: Response to 2005 hurricanes, 2005.*)

neuropathy and/or chronic nephropathy. Methyl mercury is the only form of mercury that can be absorbed through the skin; this toxicant is very harmful to fetuses of exposed mothers and can be consumed by eating mercury-contaminated fish.

The random samples selected on EnviroMap for chemical contamination reveal in the graph that hydrocarbons (petroleum unspecified), diesel range organic compound, and various aromatic compounds appear to be predominating. The toxicity of hydrocarbons generally is indirectly proportional to the agent's viscosity, with products having high viscosity (150–250), such as heavy oils have only limited toxicity. Products with viscosity in the range of 30–35 or lower present an extreme aspiration risk. Petroleum naphtha derivatives, gasoline, kerosene, and mineral seal oil (or signal oil) produce severe and often prolonged chemical pneumonitis.

Carbon disulfide (CS_2) was also detected in many of the sites, some with high concentrations. Adverse effects resulting from prolonged human exposure to high levels of CS_2 are organic brain damage, peripheral nervous system decrements, neurobehavioral dysfunction, ocular and auditory effects, and atherosclerosis. It is also a contributing factor in coronary heart disease.

Governor Blanco issued a letter to President Bush on August 27, 2005, urging Federal State of Emergency for the State of Louisiana under the Stafford Act. The governor had satisfied the required prerequisite by responding with appropriate actions under the state law and executing the state emergency plan. She further complied with a list of the types and amounts of emergency assistance needed and the state and local resources used (Nat. Guard and Airmen, Police and DOTD, Dept. of Social Services, Dept. of Health and Hospitals, Shelter Task Force, Red Cross, and Dept. of Wildlife and Fisheries). Blanco made a second plea to the President, on August 28, 2005, to expedite the major disaster declaration to free up additional federal relief for Louisiana on *Good Morning America*. The governor continues her plea to the President over the phone, on August 29, for help. The President made the major disaster declaration on August 29, 2005, the day Hurricane Katrina made landfall. The next morning, the 17th Street levee breaches, followed by

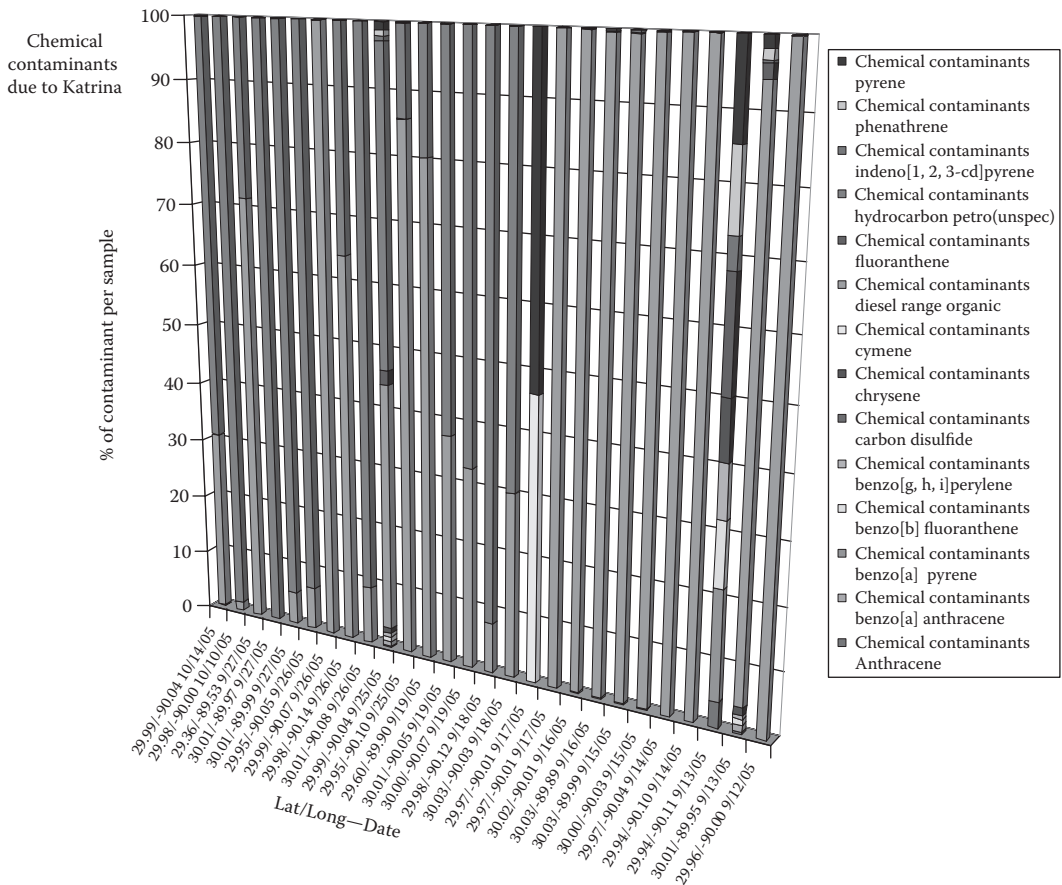


Figure 22.2 Organic compound contamination in the New Orleans area. (Data from U.S. Environmental Protection Agency, Dealing with debris and damaged buildings: Response to 2005 hurricanes, 2005.)

two more levee breaches, and results in 80% city of New Orleans being underwater. The President's declaration allowed two types of federal disaster assistance, general (Section 402a) and essential (Section 403). However, President Bush, the federal government, and much needed supplies did not arrive until Friday, September 2, 2005. The President meets with Governor Blanco, Mayor Nagin, and other Louisiana congressional delegates on Air Force One; as the meeting concludes, President Bush invites Governor Blanco to join him in a private office along with members of his White House staff. In the meeting, the governor is still requesting more federal troops; however, President Bush offers a reorganization proposal instead. This is the first time the President explains to Governor Blanco that the federal troops were being withheld due to the inadequate dual command structure. Moreover, it was on Air Force One that the governor learns of the new reorganization proposal. Meanwhile, toxic sewage sets saturating the infrastructures of New Orleans. What results is chemical hazardous waste stockpiled on the streets of the city until the top-down/bottom-up dilemma was being replaced by what appears to be a synthesis process between the federal and state governments.

Table 22.3 Coordinates Selected for Study

<i>Date</i>	<i>Location</i>	<i>Parish</i>	<i>Coordinates Latitude/Longitude</i>
September 12, 2005	St. Bernard Hwy at East of Fresconevelle	St. Bernard	29.96/–90.00
September 13, 2005	11000 Almonaster Blvd at Amid landfill entrance	Orleans	30.01/–89.95
September 13, 2005	Clara and Calhoun	Orleans	29.94/–90.11
September 14, 2005	3330 General Taylor St.	Orleans	29.94/–90.10
September 14, 2005	N. Claiborne and Feliciana	Orleans	29.97/–90.04
September 15, 2005	Desire St. and Ebony Mart Parking	Orleans	30.00/–90.03
September 15, 2005	7100 Westhaven Rd.	Orleans	30.03/–89.99
September 16, 2005	Industrial Pky and Industrial Drive	Orleans	30.03/–89.89
September 16, 2005	Near Dwyer and Lamb, east side I10	Orleans	30.02/–90.01
September 17, 2005	Prieur and Tupelo	Orleans	29.97/–90.01
September 17, 2005	Caffin and Miro	Orleans	29.97/–90.01
September 18, 2005	Downman Rd and Wales	Orleans	30.03/–90.03
September 18, 2005	Intersection Ethel and Fairway	Orleans	29.98/–90.12
September 19, 2005	4009 Gibson	Orleans	30.00/–90.07
September 19, 2005	corner of Carnot and Music	Orleans	30.01/–90.05
September 19, 2005	East side of Hwy 23, heading north	Plaquemine	29.60/–89.90
September 25, 2005	South Galvez and 4th St.	Orleans	29.95/–90.10
September 25, 2005	AG Street Landfill	Orleans	29.99/–90.04
September 26, 2005	Crescent Street east of St. Bernard, south side	Orleans	30.01/–90.08
September 26, 2005	Along west side of park	Jefferson	29.98/–90.14
September 26, 2005	Bruxelles and Republic	Orleans	29.99/–90.07
September 26, 2005	Elysian Field and Frenchman	Orleans	29.95/–90.05
September 27, 2005	US 90	Orleans	30.01/–89.99
September 27, 2005	Old Gentilly and Darby	Orleans	30.01/–89.97
September 27, 2005	Buras Firehouse at SR23	Plaquemine	29.36/–89.53
October 10, 2005	Tupelo and Florida	Orleans	29.98/–90.00
October 14, 2005	T0335-051014-01	Orleans	29.99/–90.04

Hurricane Katrina is the largest natural disaster experienced by the United States, encompassing vast areas, including Louisiana, Mississippi, and portions of Alabama and producing an estimated 55 million yd³ of debris in New Orleans and an additional 20 million yd³ in Mississippi. The degree of devastation to homes, businesses, industries (chemical and oil refineries), public utilities, and vegetation was unparalleled. Post-Katrina, there was an immediate need to clear debris (hazardous and nonhazardous) and control the releases of hazardous substances, which pose human health and safety risks. The ACE supervised contractor hired to clear, remove, and dispose of debris and to clear ground and water routes. Debris was separated, prior to disposal, as hazardous and nonhazardous materials. This task was complicated in cases when hazardous and nonhazardous materials commingled, for example, building material coated with lead-based paint.

The goals of the legislation and the legislators were to provide protection and safety to the citizen of New Orleans and their properties. However, lack of communication between the top-down and bottom-up actors inhibited adequate responses to the most devastating natural disaster in the history of our country. To attempt to ensure that this does not happen again, the legislation on all governmental levels needs to be revisited and possibly updated to provide for necessary protection from hazardous chemical exposures in cases of natural disaster.

22.10 Three Suggested Frameworks

A framework can be considered as the processes and technologies used to solve a complex issue. It is the skeleton upon which various objects are integrated for a given solution. Listed in the following are the existing framework and two proposed frameworks, which when implemented will assist in correcting flawed governmental institutional designs:

22.10.1 Framework #1

(See Appendices 22.A and B for homeland security and the state's organizational chart.)

The original mission of the Department of Homeland Security (DHS), which oversees the FEMA, was mainly to protect the country from terrorist threats. However, since May 25, 2006, the focus has been broadened to protect the country from threatening incidence or events. This need for DHS to redefine its mission may be in response to the lack of normal behavior on the part of FEMA during and after Hurricane Katrina.

The advantages of this framework are that it is established and do not require any cost of modification and staffing. With this framework, it is business as usual, which can be a disadvantage for natural disaster response in general and the management of hazardous chemicals specifically. The problem of communication between the federal, state, and local governments persist, and the next major natural disaster becomes unprecedented. For example, Bob Bea, University of California professor and National Science Foundation (NSF) investigator into the levee failures, stated that the task force's explanation of the 17th Street Canal breach was lacking (Marshall, 2006). Bea points out that a study was performed in 1986, which indicated that the separation (failure mechanism) could indeed occur. The report was done by the Vicksburg, Mississippi, research station for the New Orleans District. The ACE has acknowledged that the report, *E-99 Sheet Pile Wall Field Load Test Report*, does exist, yet the urgency of this information was not communicated via the appropriate level of government to circumvent what has become the US largest natural disaster.

The federal government cannot intervene in the state government's affairs unless the US Constitution states clearly that it has the authority to do so. The Robert T. Stafford Disaster Relief Emergency Assistance Act allows the federal government to supplement states and local resources in major disasters. DHS and FEMA mission may have changed; nevertheless, they cannot respond to a natural disaster until the governor of the affected state makes a request to the President to invoke a state of emergency. Due to institutional rigidities and bureaucracy, this may become a long, drawn-out process, resulting in the management of hazardous chemicals and conditions being delayed and the risk to human health and life increasing with time.

22.10.2 Framework #2

(See Appendix 22.C for the proposed organizational chart.)

This proposed framework is very similar to the existing framework; except here the governor of the state creates a staff of experts, State Emergency Management Division (SEMD), to work firsthand with the federal government during and after natural disasters. The federal and state governments are allowed to coordinate efforts without having to wait for the state of emergency to be granted by the President of the United States. The newly created task force will report directly to the governor, with timely updates of the status of the recovery effort.

The creation of a state agency of this nature will renew the excitement and determination to address natural disasters and the management of hazardous chemical expediently. Nevertheless, there are consequences: (1) The share expense, between the federal and state, for disaster will become more of a state cost. (2) People in the existing institutional structure will resist change from the *status quo*. (3) Claims will be made that the governor has acquired too much power. (4) State officials may declare a venture of this magnitude will be too expensive for the state to fund. A solution for the latter assertion is for the federal government to continue to bare the expense for 1–10 years.

22.10.3 Framework #3

(See Appendix 22.D for the proposed organizational chart.)

The third framework involves the creation of a state and local division within the Emergency Preparedness Agency, composed of environmental and organic chemists and environmental engineers, to facilitate the coordination of a community task force. This group would operate independently but cooperate with the ACE. This division would head a program that educated the communities on preparations to deal with waste created by natural disaster. They would constantly reinforce the consequence of complacency while teaching the communities how to reduce the burden on their municipal facilities and landfill. The division would provide each home with an airtight container for the storage of all hazardous household chemical, to be used to store all chemicals (prelisted) prior to evacuation; enforce random checks of homes in cases of evacuation; and implement fines and penalties for noncompliance of citizen. These measures taken will assist in sending the message that not to cooperate means turning your home, community, and legacy into a Superfund site and a source of disease and cancer.

The plan is to have the chemist and engineer on site immediately after the natural disaster to oversee the collection, recycling, and disposal of debris. These professionals will ensure hazardous, comingled hazardous–nonhazardous, and solid waste municipal will be properly separated and route to its appropriate destination. The division will also create preselected sites for staging,

collection, storage, sorting, recycling, landfilling, and incineration. The team of scientist will test or supervise testing of all collected debris for identification of hazardous chemicals, in order to determine the fate of specific waste. They will also determine the condition of areas and probability of rehabilitation of properties.

This framework would create a state and local division within the Emergency Preparedness Agency, composed of microbiologist and toxicologist to study short-term and long-term health effects resulting from the natural disaster event and potential exposure of humans, ecosystems, and the environment. This information will be provided to the team of chemist and engineers.

The division leadership will create a committee of political analysts to analyze the Robert T. Stafford Act to determine if it needs to be modified to accommodate the increase in unprecedented natural disasters. This would potentially give the federal government more power to assist state governments in cases of distress resulting from high-magnitude natural disaster. To assist the state and federal governments in the recovery operation, the division will require all facilities to modify all infrastructure that contains hazardous chemical to comply with a standard, set by this division, to reduce chances of leakage, rupture, or explosions and build an airtight enclosed safe storage area for all chemical drums and other small container, to house in cases of natural disaster and planned evacuations. Facilities would be fined or face being forced to discontinue operation for noncompliance.

22.10.4 Suggested Framework: Comparison

The first framework represents the existing state governmental institution, in which the federal government is immobilized until their assistance is requested by the governor of the affected state(s). In some instances, there is a communication problem, in which the leaders at the top are failing to communicate effectively with their counterpart in the local offices. This system has been in place for many years and continues to operate ineffectively.

The *modified* state government organizational structure places major control in the hands of the governor. The task force works with FEMA but reports directly to the governor. The task force is a part of the state government and operates on a bottom-up implementation platform. However, by working in conjunction with FEMA (top-downers), the process becomes a synthesis implementation plan, improving communication between the top-down actors (feds) and the bottom-up actors (state), which will facilitate better management of hazardous chemicals during and after natural disasters.

The *modified* local Emergency Preparedness Agency framework creates a task force composed of chemist and engineers, which operate as street-level bureaucrats. This group's only concern is to serve and protect the citizens of the community (i.e., New Orleans). In this proposed framework, the management and control of hazardous chemical are housed within the state and local governments and can be implemented before the *state of emergency* is declared by the President. With this bottom-up implementation, design, assessment, removal, chemical identification, and disposal of hazardous chemicals are expedited. This should reduce the need for the stockpiling of hazardous chemical debris in local communities after a major disaster.

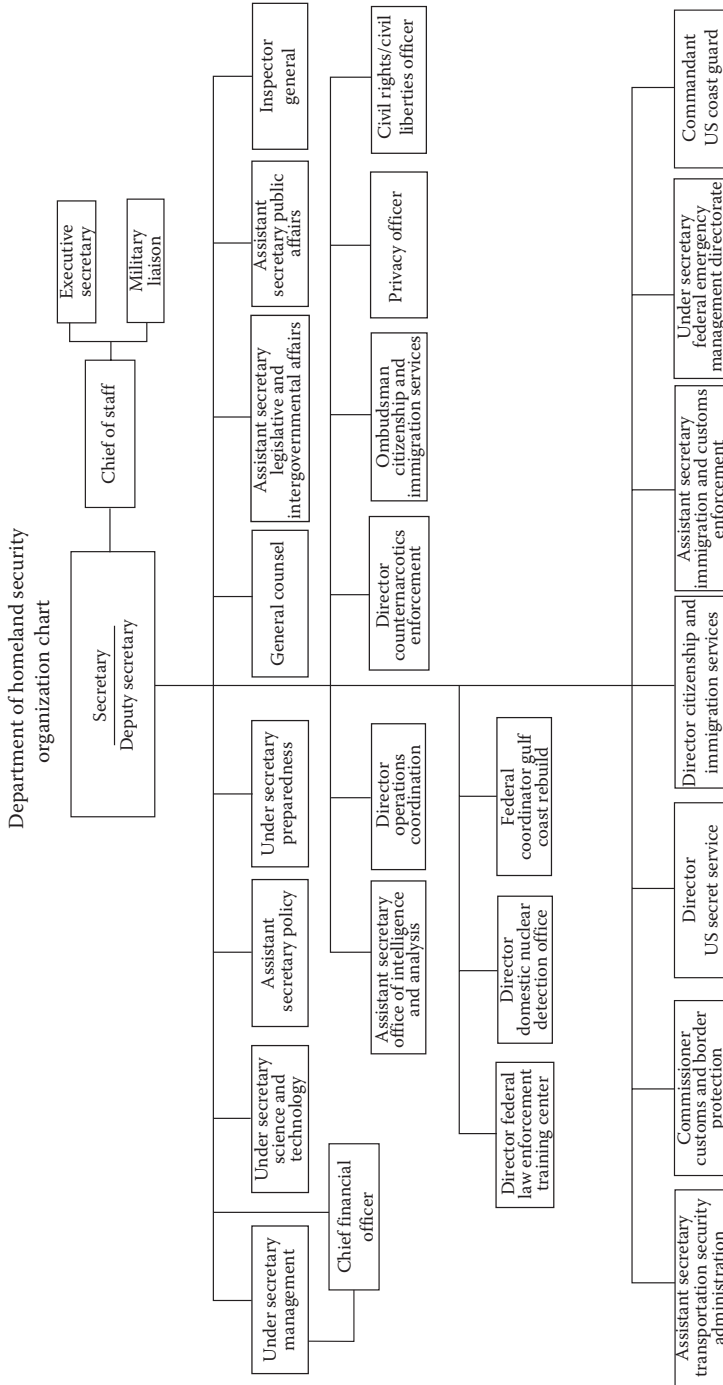
Each framework engages a process to solve the complex issue of management of hazardous chemicals during and after natural disaster. Despite the strength and weaknesses in each framework, it appears that the trade-off is between cost, level of management of hazardous chemicals, and human health risk (see Table 22.4). The American citizens and the political leaders must decide which is most important, saving money or saving lives.

Table 22.4 Three Suggested Frameworks: Comparison

<i>Framework</i>	<i>Main Propositions</i>	<i>Important Strengths</i>	<i>Weaknesses</i>
1	Existing state governmental institutional design. "Business as usual"	<ol style="list-style-type: none"> 1. No additional cost incurred 2. Consensus among political players 	<ol style="list-style-type: none"> 1. Poor communication between the three levels of government. 2. Poor management of hazardous chemicals during and after natural disasters. 3. Increasing hazardous chemical exposure during and after natural disasters.
2	Modified state governmental institutional design	<ol style="list-style-type: none"> 1. Each state as greater control of management of hazardous chemicals in cases of natural disasters 2. Decrease in the frequencies of hazardous chemical exposures 	<ol style="list-style-type: none"> 1. Increase cost and financial burden on state government. 2. Political player and other stakeholders will resist change. 3. Claims will be made that the governor has too much power.
3	Modified division within the State Office of Emergency Preparedness	<ol style="list-style-type: none"> 1. Is a bottom-up approach that enables local community in preparations to deal correctly with hazardous chemicals after natural disasters 2. Faster analysis and identification of toxicant 3. Significantly reduces chances of hazardous chemical exposures 	<ol style="list-style-type: none"> 1. An enormous cost to the government. 2. Need for staffing and training newly hired personal at a fast paste.

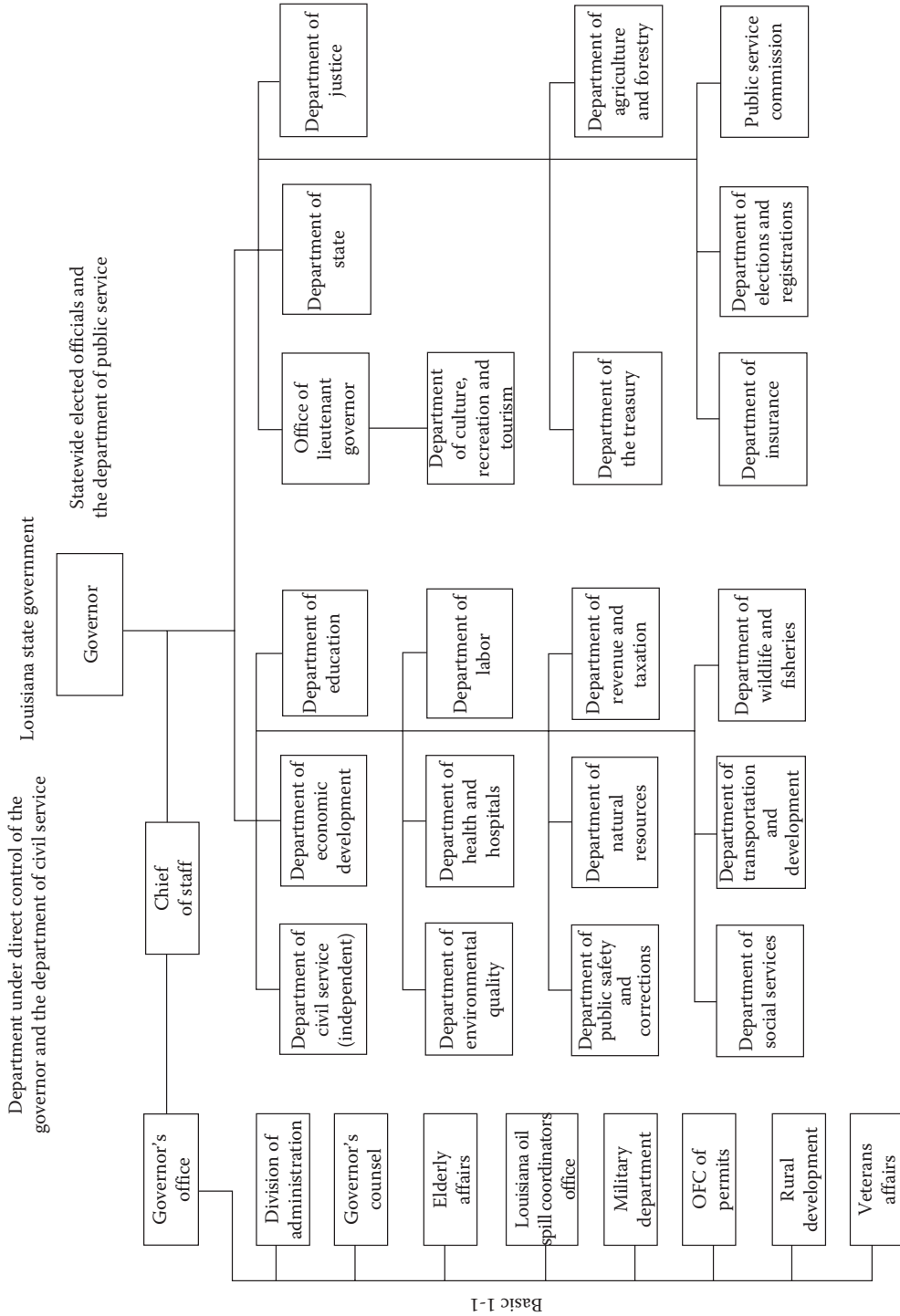
Source: Louisiana State Office of Emergency Preparedness (modified).

22.A Appendix A*



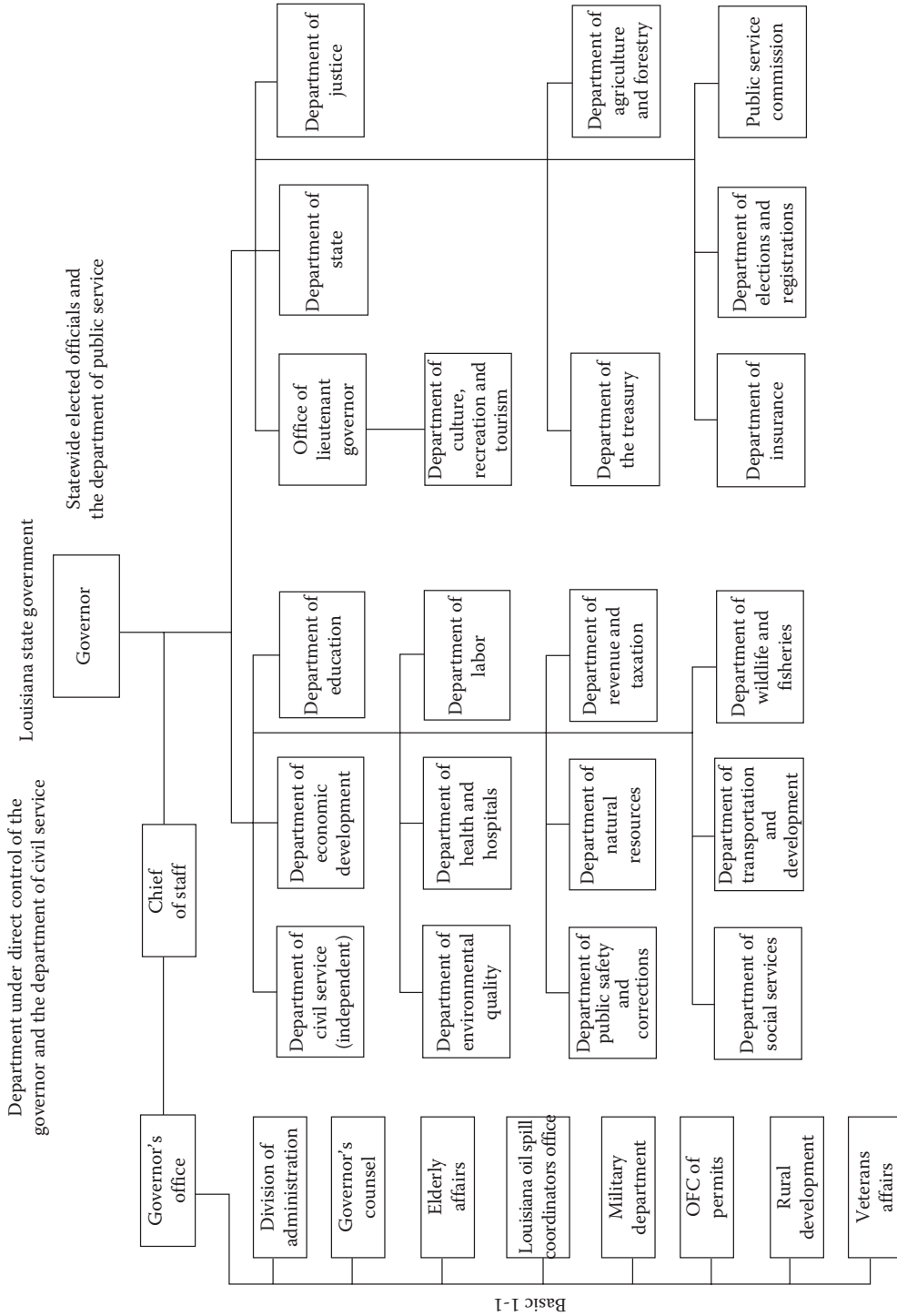
* From The Office of Homeland Security.

22.B Appendix B*



* From Louisiana State Office of the Governor.

22.C Appendix C*

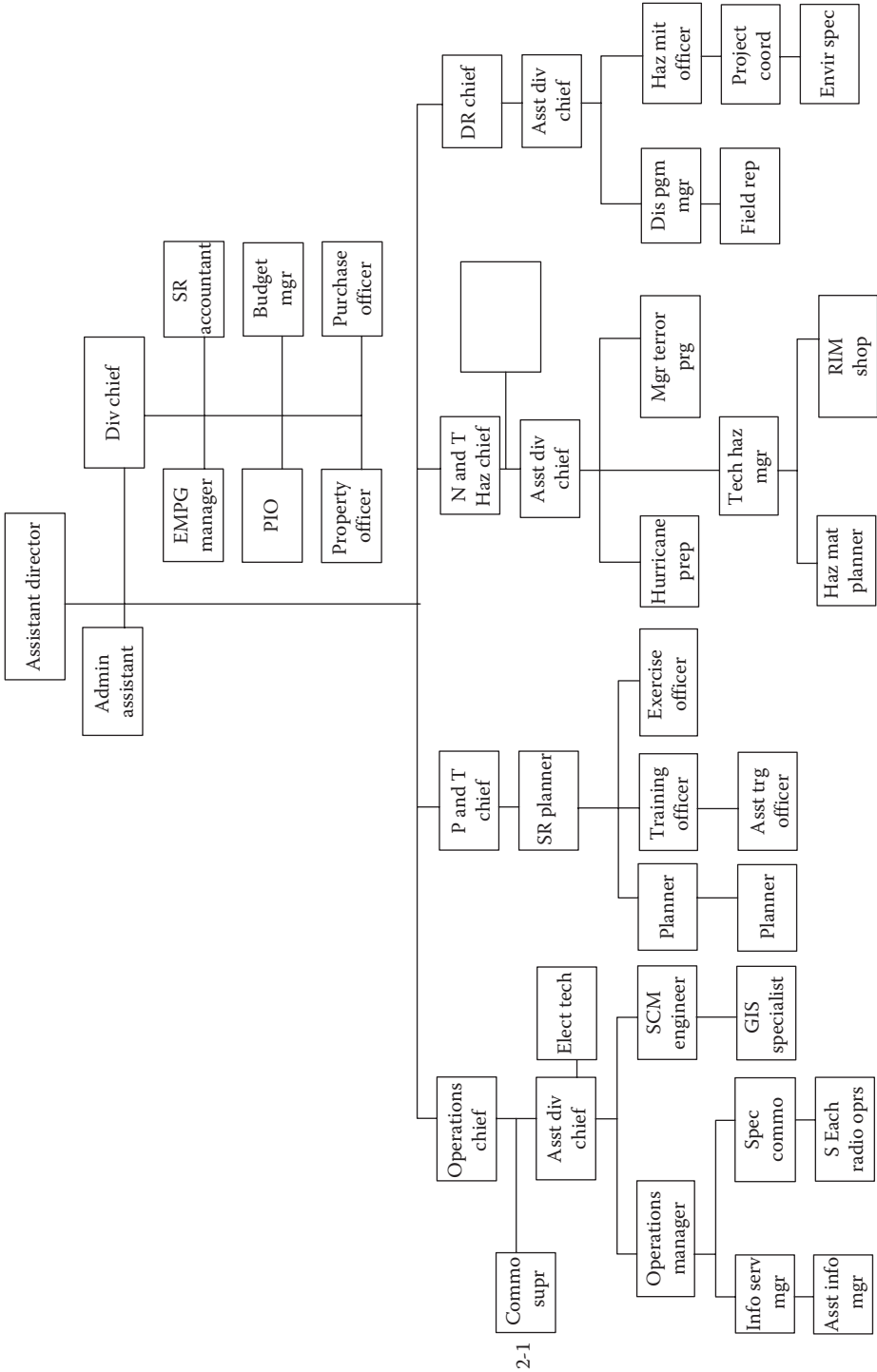


Basic 1-1

* From Louisiana State Office of the Governor (modified).

22.D Appendix D*

Attachment 2
Loop organizational chart
Revised - 04/19/2001



* From State/FEMA Natural Disaster Task Force; Natural Disaster Hazardous Chemicals Task Force.

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Chapter 23

How a Navigation Channel Contributed to Most of the Flooding of New Orleans during Hurricane Katrina

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23.1 Introduction

Hurricane Katrina made landfall in southeast Louisiana as a fast-moving Category 3 hurricane at 6:10 am on Monday, August 29, 2005. Of the populated areas that constitute Greater New Orleans (GNO), 80% of Orleans Parish, 99% of St. Bernard Parish, and approximately 40% of Jefferson Parish were flooded, in some cases for weeks. This flooding cost the lives of more than 1500 residents. Over 100,000 families were rendered homeless, the great majority of whom had heeded evacuation orders, making this disaster the worst since the 1927 Mississippi River flood in terms of homes destroyed. Many observers have noted similarities between the patterns of surge-induced flooding that occurred during Katrina and the previous storm of record, Hurricane Betsy in 1965 (van Heerden, 2007). The GNO hurricane protection system (HPS) was, in fact, intended to prevent a repeat of the Betsy disaster, but this system failed during Katrina with a 20-fold increase in loss of life (van Heerden, 2007).

Early in 2006, attorneys filed a suit in federal court (<http://katrinadocs.com/>) against the US Army Corps of Engineers (USACE) (US Government) for damages they felt were caused by the Mississippi River Gulf Outlet (MRGO) channel and its associated funnel (van Heerden and Bryan, 2006). The attorneys contracted with Louisiana scientists, engineers from University of California–Berkeley, and with wave and hydrodynamic modelers from Delft University of Technology (TU Delft) in the Netherlands. This new research effort was undertaken to develop a greater understanding of the MRGO levee failure mechanisms and a detailed interpretation of the conveyance contribution of the MRGO to flooding. Additionally, the study compared the Katrina levee failures and associated flooding to a hypothetical scenario in which there was no MRGO channel and associated wetland loss.

It is hoped that knowledge gleaned from the Hurricane Katrina catastrophe and the recent closure of the MRGO will minimize its funnel effect and lead to development of a new HPS that will prevent future hurricane flooding.

23.2 St. Bernard Polder and MRGO

The focus is on surge and waves generated in the Lake Borgne funnel (Figures 23.1 and 23.2). The geography of the funnel includes the preexisting Gulf Intracoastal Waterway (GIWW) canal along the northern margin, the enlarged portion of the GIWW referred to as MRGO Reach 1 that serves as an outlet to the Inner Harbor Navigation Channel (IHNC), the MRGO Reach 2 channel along the south margin, and levee embankments paralleling all of the artificial channels on the inland side. The funnel also contains natural features including the southern half of Lake Borgne, which is divided into two embayments or lobes, and thousands of acres of wetlands both on the inboard and outboard sides of the hurricane protection structures. Three drained and developed polders surround the Lake Borgne funnel, including New Orleans East to the north, the Orleans Metro area to the west, and the combined Lower 9th Ward and

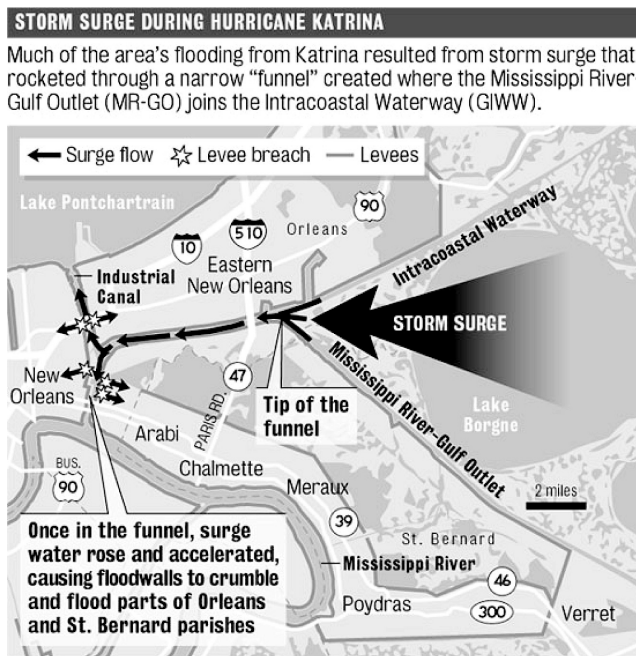


Figure 23.1 Graphic created by the New Orleans *Times-Picayune* newspaper to explain the role of the MRGO funnel in the flooding of New Orleans during Hurricane Katrina.

St. Bernard Parish neighborhoods to the south. All of these developed polders received floodwaters from the Lake Borgne funnel, specifically through or across channels constructed or enlarged as a part of the MRGO navigation project (Figure 23.2).

23.3 The Funnel

The funnel is dominated by Lake Borgne, a very large shallow bay similar to Lake Pontchartrain that is elongated along a southwest to northeast axis, providing more than 40 miles of open water in this direction—a very long *fetch* over which hurricane winds can build surge and waves (Figure 23.1). It also contains a large swatch of tidal marsh, nearly 32,000 acres (Day and Shafer, 2008; Fitzgerald et al., 2008) called the Central Wetlands Unit, located between the main federal levees along the south bank of the MRGO and a lower state-built levee known as the 40 Arpent levee. Two gated structures were constructed as part of the hurricane protection project through the federal levees where Bayou Bienvenue crosses on the west end and at Bayou Dupre farther to the east, to allow water exchange with the MRGO and for small vessels to pass between the wetlands and the ship channel during normal tides (Figure 23.2).

The developed and drained portion of the St. Bernard polder lies south of the 40 Arpent levee, sheltered behind 2.4–3.0 miles of former freshwater bald cypress (*Taxodium distichum*)–water tupelo (*Nyssa aquatica*) swamp that has become intermediate to salt marshes and open water ponds since the construction of the MRGO (Day and Shafer, 2008). Pump stations located along

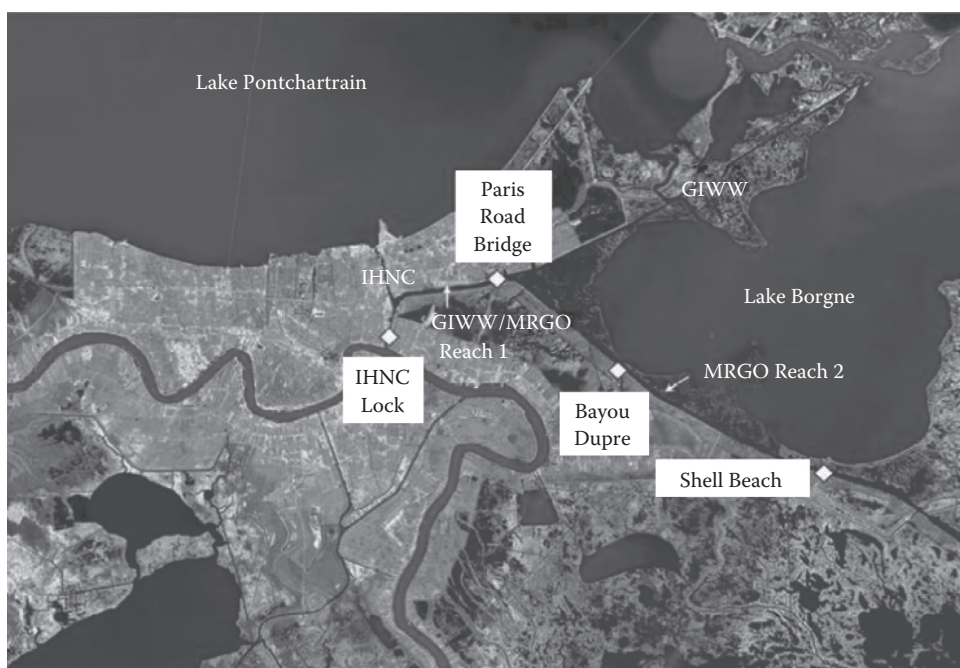


Figure 23.2 Relationship of MRGO Reaches 1 and 2 and the GIWW to the Lake Borgne funnel, showing undeveloped marsh contained within the flood protection system on the east side of New Orleans East and north of the developed area of St. Bernard Parish.

the 40 Arpent levee discharge storm drainage into these wetlands, and this limited freshwater introduction has preserved a few stands of the once more extensive swamp forest that covered this area prior to construction of the MRGO (Day and Shafer, 2008; Kemp, 2008). St. Bernard has some of the highest land on the east bank of New Orleans, following as it does the natural levee of the Mississippi River and some of its abandoned distributaries (Figure 23.2). Despite being relatively high by local standards, the St. Bernard polder experienced the most violent, spatially expansive, and deepest flooding in the entire metro area during the Katrina event (Figure 23.3). Except for a limited contribution from rainfall, all flooding of the St. Bernard polder was caused by water that passed through or across one or more reaches of the MRGO. This water entered the developed area as a result of catastrophic floodwall failures along the IHNC on the western margin, by overtopping of levees on MRGO Reach 1, and by flow through breaches in the federally built levees along the MRGO Reach 2. The interior 40 Arpent levee was protected by over two miles of the Central Wetlands Unit and was relatively undamaged, but it averaged only 6.5 ft high and was completely overtopped when floodwaters from the MRGO filled the Central Wetlands Unit beyond this level.

23.4 Mississippi River Gulf Outlet

The MRGO is a free-flowing, man-made navigation channel connecting the Gulf of Mexico to the interior of the city of New Orleans. The MRGO project was approved by the US Congress

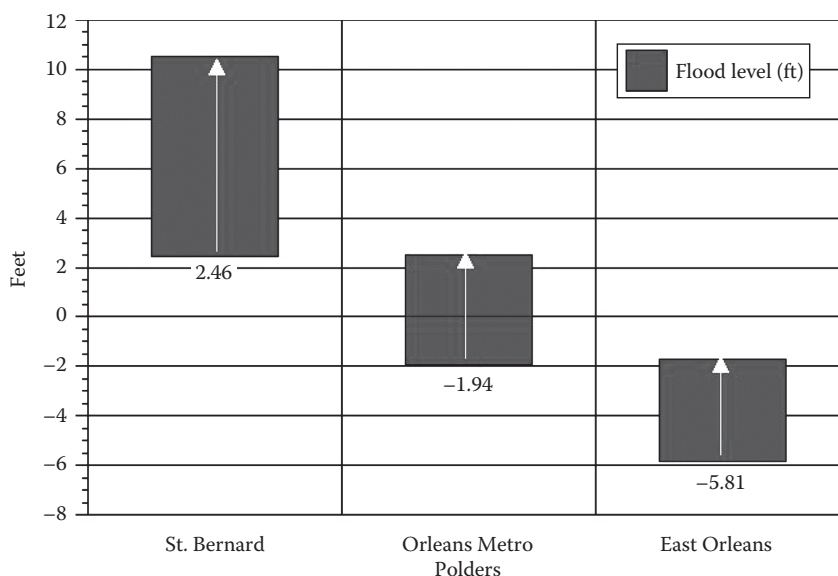


Figure 23.3 Comparison of mean maximum floodwater elevation with average elevation of flooded land in three New Orleans polders (van Heerden et al, 2007).

under the Rivers and Harbor Act of 1956 (PL 84-455). The USACE New Orleans District (NOD) began construction of this project in 1958 and completed it in 1968 at a cost of approximately \$92 million. In the process, they dredged more earth than was moved during construction of the Panama Canal and destroyed thousands of acres of swamps and marshes (Kemp, 2008; Shafer et al., 2009). Subsequent operations and maintenance costs have totaled in excess of \$500 million (Gunn, 1977; IPET, 2006).

The MRGO was authorized as a 76-mile ship channel with a 36 ft controlling depth, 500 ft wide at the bottom and 650 ft wide at the top, that would cut through the marshes of lower St. Bernard Parish and with a somewhat larger cross section (Figure 23.1) across the shallow waters of Breton Sound (USACE, 1999). The MRGO was promoted by New Orleans port interests as a federally funded economic development project that would stimulate a boom in industrial and port development for New Orleans and St. Bernard Parish. The anticipated economic renaissance, like the ship traffic that peaked in 1978 and diminished afterward, never materialized (IPET, 2007). By 2005, the channel had opened to up to 3000 ft in some locations and had been dredged annually. Saltwater intrusion associated with the construction of the channel had killed thousands of acres of surge reducing freshwater marshes and cypress swamp.

In 1957, before the MRGO moved into the construction phase, the Police Jury (county government) of St. Bernard Parish was concerned enough to establish a *Tidewater Channel Advisory Committee* to review plans then being developed for the MRGO. The chairman presented a report to the full Police Jury recommending that St. Bernard Parish opposes the project, stating that enhanced tidal action caused by the channel “will have adverse effects on the entire marsh area with consequent crosive (*sic*) action and the intrusion of high saline content water into areas normally fresh or only slightly brackish” (St. Bernard Tidal Channel Advisory Committee, 1957). This report goes on to state presciently:

During times of hurricane conditions, the existence of the channel will be an enormous danger to the heavily populated areas of the Parish due to the rapidity of the rising waters reaching the protected areas in full force through the avenue of this proposed channel. This danger is one that cannot be discounted. No matter how small a flood may be, or how small the area to which it is confined, to the families that have water in their houses, it is a major catastrophe.

(St. Bernard Tidal Channel Advisory Committee, 1957, p. 3)

How prophetic these words in 1957.

23.5 Computer Models Used to Reconstruct Surge and Waves

Like all of the other technical teams that have studied Katrina hydrodynamics, reliance on computer models to reconstruct the surge and wave dynamics that were in play during the passage of this storm was essential.

23.6 ADCIRC Storm Surge Model

ADCIRC is a 2D, depth-averaged, finite-element hydrodynamic model that is forced by a planetary boundary layer (PBL) hurricane wind model (Westerink et al., 2004). The model predicts water surface elevation and currents generated by wind and pressure. Our ADCIRC version S08 consists of over 300,000 computational nodes in a domain that includes the western half of the Atlantic Ocean, the Caribbean Sea, and the Gulf of Mexico. More than 80% of these nodes are concentrated within Louisiana's wetlands and estuaries to reproduce the complex geometry of natural and man-made channels and levees that affect surge transmission, amplification, and attenuation (van Heerden and Bryan, 2006). The S08 version of ADCIRC was used primarily to provide boundary conditions for the FINEL hydrodynamic model (Figure 23.4).

23.7 FINEL Hydrodynamic Model

The numerical model FINEL generates detailed information about water motion in the area of study and is similar to ADCIRC in many ways in that it is also a 2D, depth-averaged, hydrodynamic model running on an unstructured grid using the finite-element method (de Wit et al., 2008). The FINEL numerical model was developed by Svašek Hydraulics and the fluid mechanics section of the civil engineering faculty of the TU Delft in the Netherlands. The model has been used for hydrodynamic simulations all over the world. The FINEL model was set up with far more detail in the bathymetry and topography than has been available to date in any ADCIRC version in part to better study the effects of bottom friction differences between open water and various wetland types (de Wit et al., 2008; Kemp, 2008). Bays and channels tend to provide less resistance to flow than do marshes and particularly swamp wetlands. FINEL provides the flexibility necessary to examine incrementally the effects of adding, removing, or modifying channels, wetlands, and flood protection elements within the landscape to gain a greater understanding of how each contributed to surge dynamics (Figure 23.4). It should be noted that because of time constraints,

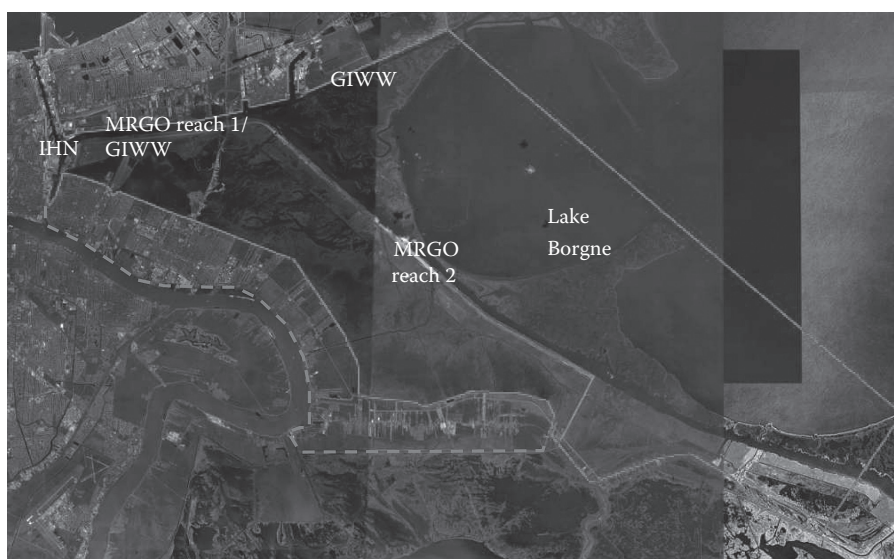


Figure 23.4 FINEL model computational domain outlined in solid grey line. Urban area bounded on west with dashed line.

the FINEL model domain does not include the New Orleans East and Orleans Metro polders and therefore does not directly simulate overtopping into these regions (de Wit et al., 2008). While it faithfully replicates surveyed overbank, floodwall, and levee elevations as they existed prior to Katrina along the north bank of GIWW/MRGO Reach 1 and the IHNC, it also does not consider the effects of breaches that occurred during that storm in the southern portion of the IHNC between the MRGO junction and the lock (Figure 23.1). This means that it is expected to overpredict surge elevations actually observed in the southern part of the IHNC and, consequently, overtopping into the Lower 9th Ward and Central Wetlands Unit just to the north. These limitations have been addressed to some degree by added analyses of overtopping potential, using a 1D weir model for the polders not explicitly included in the model domain (de Wit et al., 2008).

23.8 SWAN Wave Model

The SWAN wave model (Version 40.51AB) is used more than any other around the world to simulate waves, particularly in coastal and estuarine settings. It is known as a third-generation wave model and represents the current state of the art for wave simulation. Svašek Hydraulics and TU Delft were involved in its development and were particularly qualified to simulate the wave climate along MRGO Reach 2 during Katrina (Gautier et al., 2008). SWAN uses a grid to compute how waves generate, dissipate, and propagate under the influence of wind, bathymetry, vegetation type, water levels, currents, and incoming waves (Figure 23.5). This is a finite-difference model built, unlike ADCIRC or FINEL, of equal-sized rectilinear cells that achieves greater resolution through the use of nested grids, in which larger grids provide boundary conditions for smaller ones. It is very similar to the WAM model that was used by the Interagency Performance Evaluation Taskforce (IPET, 2006) to generate offshore wave conditions. It was not necessary to rerun the WAM wave simulator because the WAM output from offshore that was generated by

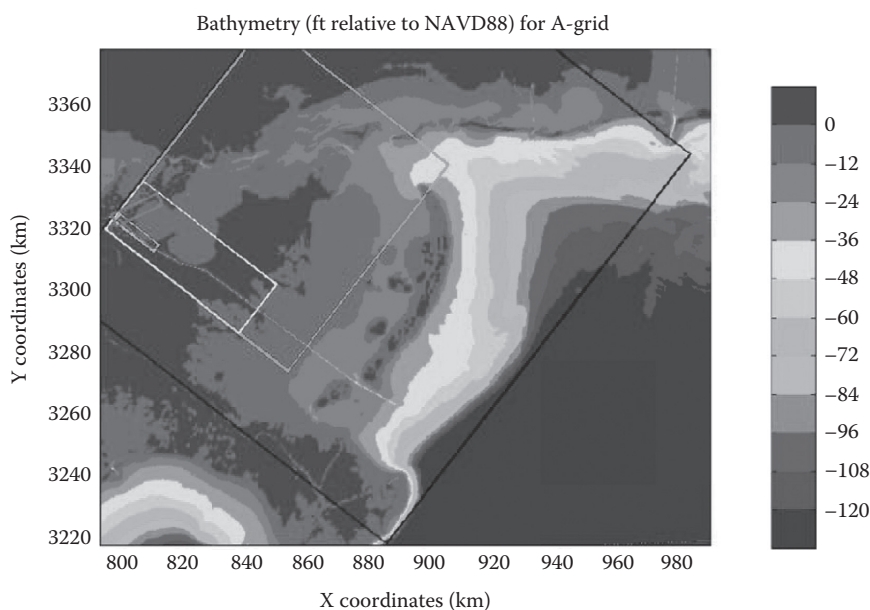


Figure 23.5 SWAN nested grids A–G positioned over bathymetry and topography. Boundary conditions for largest grid supplied by WAM output.

the USACE IPET could be used to set boundary conditions for the largest of the nested grids of the SWAN wave model (Figure 23.5).

We applied SWAN to study the Katrina storm scenarios with and without the MRGO project and with and without the marshes and swamps that it destroyed (Gautier et al., 2008). As is true for the steady and unsteady flows that contribute to surge, vegetation type profoundly affects the rate of wave energy dissipation that ultimately determines the size and character of the waves that attack man-made structures like levees. The SWAN model is ideally suitable to investigate such interactions, including the unique attributes of a wetland swamp canopy to separate the winds that build waves from the water surface, leading to a more rapid loss of wave height and energy than can be attributed to bottom friction effects (Gautier et al., 2008).

23.9 Analytical Sequence

Two different scenarios were modeled. Scenario 1—*MRGO As-Is* modeled the actual Katrina storm conditions as accurately as possible (Table 23.1). However, to assess the impacts of the MRGO channel, how it exacerbated surge conveyance, and the wind-wave field facing the Reach 2 levees, a hypothetical Scenario 2C—a *no MRGO* setting with 1958 wetlands intact—also was modeled. This scenario can be considered a *neutral* MRGO setting.

The MRGO Reach 2 channel was modeled in two configurations (Table 23.1). The greatly expanded channel 2000–3000 ft wide and more than 40 ft deep that existed in front of the Reach 2 levees before Katrina—and persists today despite all the talk of remediation—occurs only in Scenario 1, the Katrina-As-Is Scenario. This MRGO channel reach is completely absent in Scenario 2C. The MRGO Reach 1 channel was also modeled in two configurations (Table 23.1). The 1000 ft wide channel that provided the outlet from the funnel to the IHNC during Katrina

Table 23.1 Katrina Simulation Scenarios for Characterization of MRGO Reach 1 and Reach 2 Surge, Current, and Wave Characteristics

Scenario	MRGO Reach 2 Channel	MRGO/GIWW Reach 1 Channel	Reach 2 Levees	Reach 1 Levees	40 Arpent Levee	Vegetation
1	Existing 8/2005	Existing 8/2005	Existing 8/2005	Existing 8/2005	Existing 8/2005	Existing 8/2005
2C Neutral MRGO	None	Pre-MRGO	Existing 8/2005	Existing 8/2005	Existing 8/2005	Pre-MRGO 1958

occurs only in Scenario 1, the Katrina-As-Is Scenario. This MRGO channel reach is reduced to the pre-MRGO dimensions of the antecedent GIWW barge channel in Scenario 2C, about 10% of its current cross section.

The *neutral MRGO* analyses are based on the rationale that the USACE had a congressionally directed responsibility to manage the MRGO navigation project so that it caused no added, unmitigated impact on the ability of the hurricane protection project to also fulfill its mission—also congressionally mandated—to protect the city of New Orleans and St. Bernard Parish from hurricane-induced flooding.

A merger of ADCIRC output and high water mark data was used to provide boundary conditions for FINEL, as we sought a higher level of accuracy than could be obtained from any of the ADCIRC versions now in use (Gautier et al., 2008; Kemp, 2008). ADCIRC hydrographs were produced at key locations, including three that were necessary to provide boundary conditions for FINEL (de Wit et al., 2008). The surge hydrographs at these boundary points were adjusted by the smallest amount necessary to match high water mark measurements without causing numerical instability. FINEL was then calibrated to provide benchmark surge hydrographs at specific readout locations (Figure 23.6).

For subsequent scenarios, ADCIRC was run first with the same modifications proposed for the more detailed FINEL run. Resulting hydrographs were compared to the Katrina base case ADCIRC hydrographs, and those at the FINEL boundaries were adjusted for elevation and time to incorporate ADCIRC changes predicted at the boundaries. FINEL was used to generate a surge surface at hourly intervals beginning at 04:00 on the morning of August 29, 2005. SWAN was then run over the surge surface generated by FINEL to provide hourly snapshots of wave characteristics.

23.10 Vegetation

The effect of even low-lying marsh vegetation to retard and attenuate storm surge also has been known for as long as the MRGO has existed and was, in fact, one criterion for the original Chalmette levee design (USACE, 1963, 1967). One of the major adverse impacts of the MRGO project was to change marshes to open water and swamp to marshes (Fitzgerald et al., 2008; Shaffer et al., 2009). Accordingly, it has been very important to incorporate the effects of these MRGO-induced changes on surge and wave dynamics experienced during Hurricane Katrina and then to assess whether the presence or absence of swamp and marsh affected the

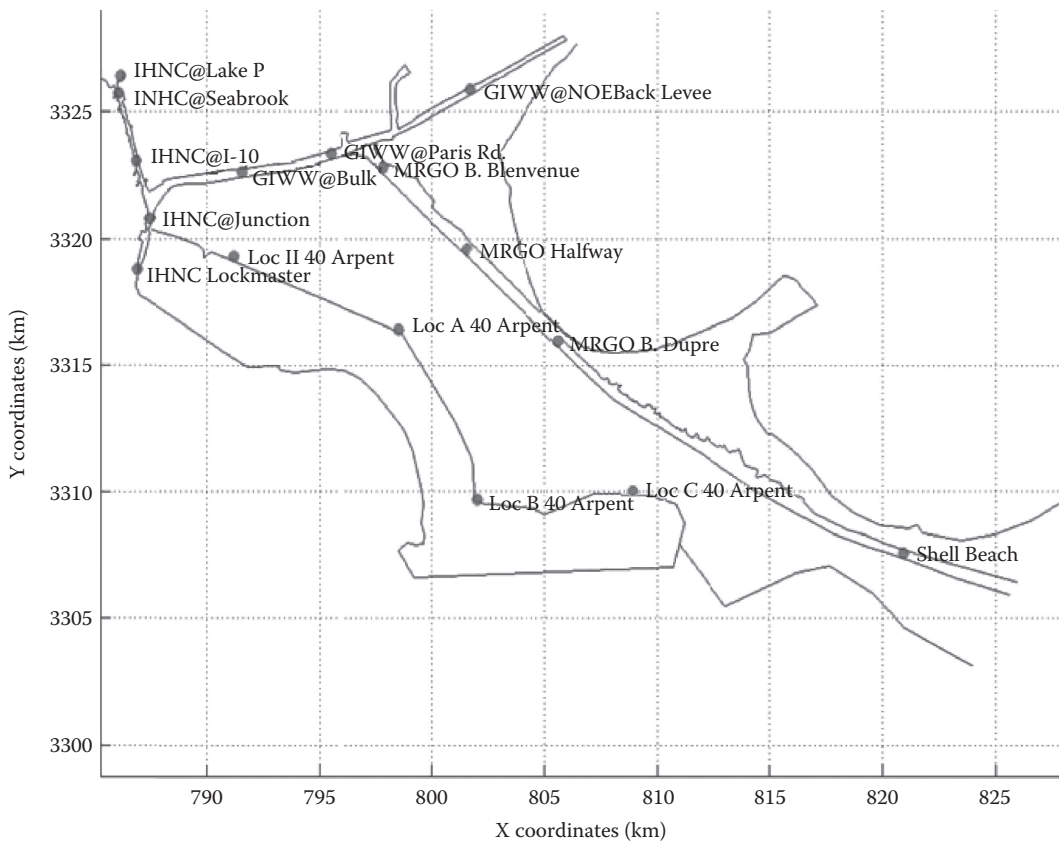


Figure 23.6 Locations for FINEL time series output of water level, current direction, and velocity.

timing and severity of flooding of populated areas. We modeled vegetation in two ways, namely, in the existing pre-Katrina configuration (Scenario 1) and in the 1958 pre-MRGO condition (Scenario 2C).

23.11 MRGO Funnel and Its Effect on Surge

The surge during Katrina dropped after the peak at roughly the same time everywhere as the storm completed its transit past New Orleans heading for the Mississippi coast. The pattern of surge rise was more complicated than its fall. For any approaching storm, wind speeds are higher closer to the eye, but also the pattern of land and water features that the surge encounters differs from one place to another. Surge will build in large water bodies like Lake Borgne and Lake Pontchartrain and be transmitted inland preferentially through channels, rather than over land. It will pile up on elevated features like levees, particularly if they are oriented close to perpendicular to the direction of the winds driving the surge. Wave action generally increases with surge height (Figure 23.7), as both are forced by the same properties of the wind, namely, speed and direction (Gautier et al., 2008). Wave period also increased as the storm progressed (Figure 23.8). So surge and wave action

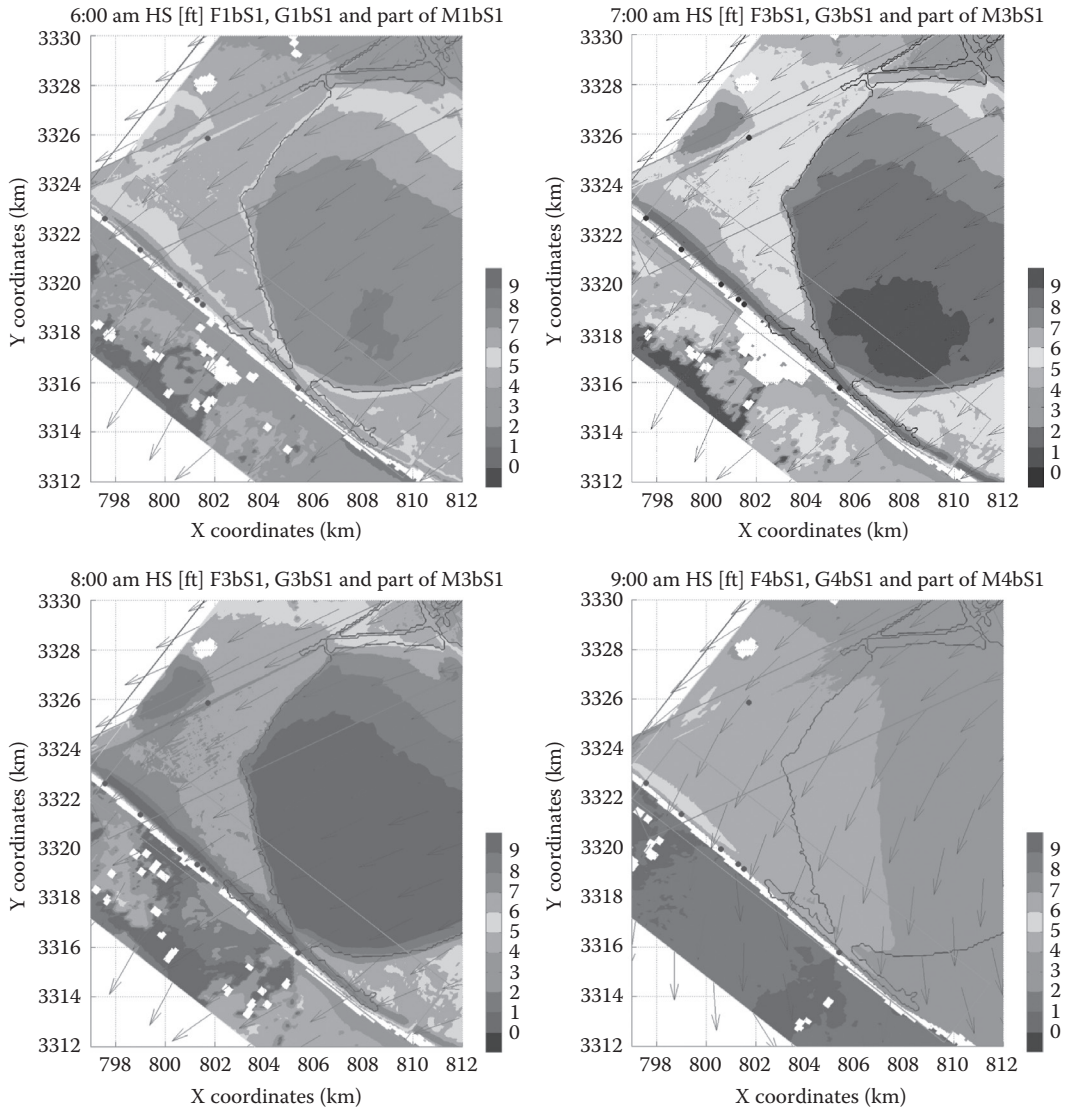


Figure 23.7 Evolution of significant wave heights (ft) in eastern lobe of Lake Borgne predicted by SWAN from 06:00 (top left), 07:00 (top right), 08:00 (bottom left), and 09:00 (bottom right) corresponding to surge elevations on the MRGO Reach 2 levees of 13, 15, 18, and 14 ft, respectively. (From Gautier, C. et al., Wave modeling New Orleans—Mississippi River Gulf outlet, Hurricane Katrina August 2005. Expert report. In re Katrina Canal Breaches Litigation, Civil Action No. 05-4182, US District Court for the Eastern District of Louisiana, Section “k”(2), Pertaining to Robinson (06-2268) Judge Duval. (<http://katrinadocs.com/report.cfm?r=50>), 2008.)

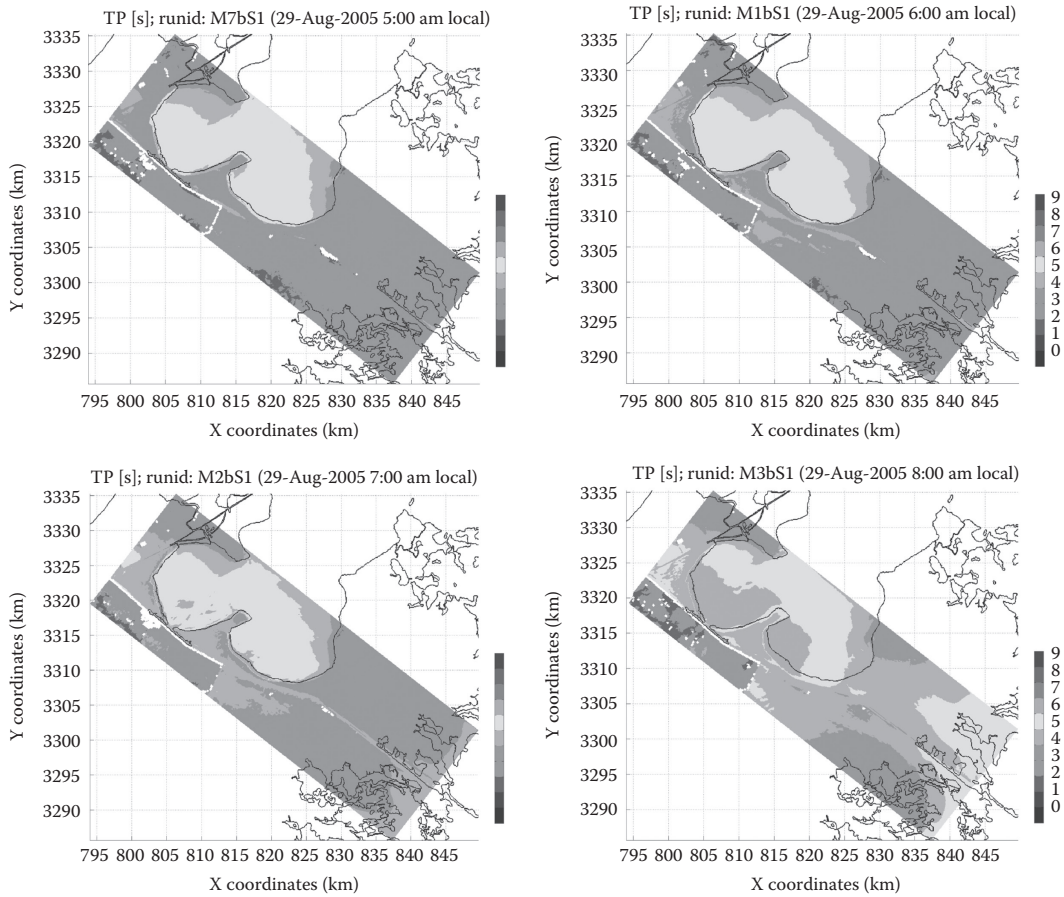


Figure 23.8 SWAN-generated snapshots showing the distribution of peak wave period in southern Lake Borgne during Katrina. The 08:00 CDT panel in the bottom left shows a peak wave period in southern Lake Borgne of between 6 and 7 s. (From Gautier, C. et al., Wave modeling New Orleans—Mississippi River Gulf outlet, Hurricane Katrina August 2005. Expert report. In *re Katrina Canal Breaches Litigation, Civil Action No. 05-4182, US District Court for the Eastern District of Louisiana, Section “k”(2), Pertaining to Robinson (06-2268)’ Judge Duval.* (<http://katrinadocs.com/report.cfm?r=50>), 2008.)

built up at varying rates in different places during the passage of Katrina but diminished rapidly as soon as the storm left the area.

The severity of flood damage in protected areas is related to when flooding begins in the surge sequence, more if earlier and less if later, which also is a function of when overtopping or breaching of the levee structures takes place in the surge sequence. Surge and wave energy (proportional to significant wave height, H_s) build up at varying rates and to varying levels at different places depending on details of the geometry of the landscape impacted. Accordingly, it is appropriate to consider whether the construction of the MRGO, which dictated the selection of the subsequent alignments of the levee flood protection structures built later, played any role in hastening the onset of surge or waves that could have damaged flood protection elements sooner rather than later, if the geometry created by the combination of channels and paralleling

man-made protective structures acted together to drive up surge through creation of what local residents have called the *funnel* (Figure 23.1).

23.12 FINEL Analysis of Funnel Effects

First, we take an in-depth look at Hurricane Katrina-driven flow patterns in the funnel as it was during the storm. Then, we compare this to the condition with the no MRGO scenario (Scenario 2C).

Scenario 1 or Katrina-As-Is. The progression of surge for Katrina-As-Is Scenario 1 in the funnel is shown hourly from 04:00 through the peak at around 08:00 and as it is dropping at 09:00 (Figures 23.9 and 23.10). The surge maximum occurs on the MRGO Reach 2 levees south of the east lobe of Lake Borgne as has been true for all ADCIRC simulations by the LSU Hurricane Center (van Heerden, 2007) and IPET (2006). But FINEL predicts that this maximum is transmitted through MRGO Reach 1 with little decrease to the south end of the IHNC (Figure 23.10). Overtopping of flood protection structures occurs where the surge is highest south of Lake Borgne, and where levee and floodwall crowns are lowest, along MRGO Reach 1 and at the southern end of the IHNC. But because the structures do not breach in the model, the Central Wetlands Unit storage area is not filled by the end of the sequence (Figure 23.10). Under the modeled conditions for the flood protection structures, flooding of developed areas of the St. Bernard polder through overtopping of the 6.5 ft 40 Arpent levee would not have occurred except at the western margin into the Lower 9th Ward. There, overtopping would have lasted less than 3 h and would have been less than 2 h on the MRGO levees south of Lake Borgne.

What is most apparent in the velocity plots is that the larger dimensions of the channels constructed or enlarged as part of the MRGO navigation project are carrying a disproportional share of flow. The channel from about Bayou Bienvenue all the way into the IHNC looks like a major river in the velocity maps (Figure 23.11). It can be seen that velocities in MRGO Reach 1 are only slightly higher than in Reach 2 between the Bayou Bienvenue control structure and the turn at the junction with the GIWW. This suggests that the vast majority of flow entering Reach 1 is coming from Reach 2 (Figure 23.11) and that this flow is being efficiently conveyed by the Reach 1 channel all the way into the IHNC.

23.12.1 Neutral MRGO Scenario 2C

In this scenario, surge along the shore of Lake Borgne is simulated to be representative of the conditions before the construction of the MRGO, conditions that essentially would have persisted to the present if there had been no channel (Shaffer et al., 2009). Surge hydrographs were prepared at the same output locations as shown for the earlier scenarios but also at additional points along the 40 Arpent levee (Figure 23.6). The replacement of the MRGO channel by marsh had a minor effect on the surge hydrographs at locations along the MRGO levee alignment toward the east side of the funnel (Figures 23.12 and 23.13), but a progressive lowering of the peak surge and a time lag becomes more prominent at locations farther west (Figures 23.12 and 23.13). This is particularly true for the locations inside the GIWW and IHNC west of Paris Road, so that at the lock on the south side of the IHNC, the surge is about 3.0 ft lower than for the Katrina-As-Is condition. Because the length of these structures extend for several miles, even a minor increase in the overtopping rate per linear foot results in much larger volumes of water overtopping the structure.

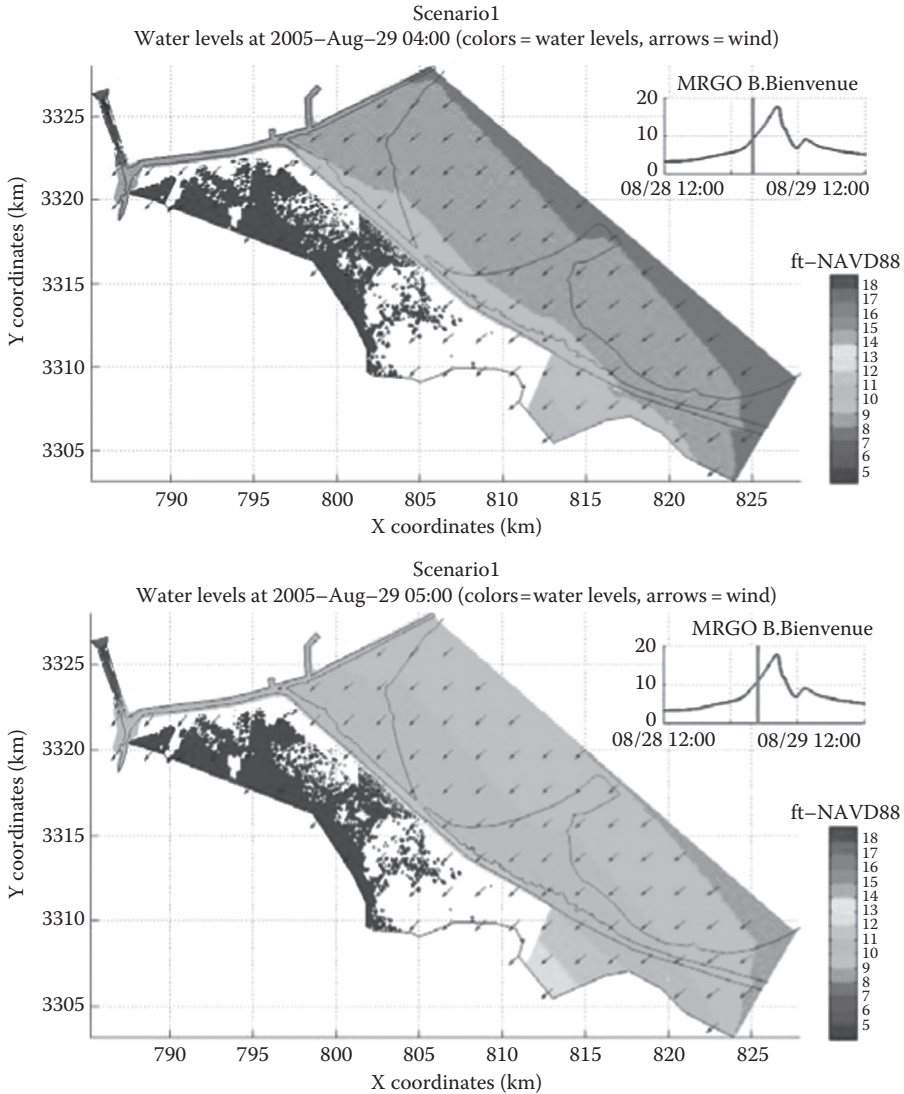


Figure 23.9 FINEL surge simulation for Katrina-As-Is Scenario 1 at 04:00 (top), 05:00 (middle), and 06:00 (bottom). Surge on scale (ft). Inset indicates surge progression on B. Bienvenue hydrograph. Arrows show wind direction. No overtopping of intact MRGO levees into Central Wetlands Unit. (From de Wit, L. et al., Flow modeling New Orleans—Mississippi River Gulf outlet, Hurricane Katrina August 2005. Expert report In re Katrina Canal Breaches Litigation, Civil Action No. 05-4182, US District Court for the Eastern District of Louisiana, Section “k”(2), Pertaining to Robinson (06-2268)’ Judge Duval. <http://katrinadocs.com/report.cfm?r=49>, 2008.)

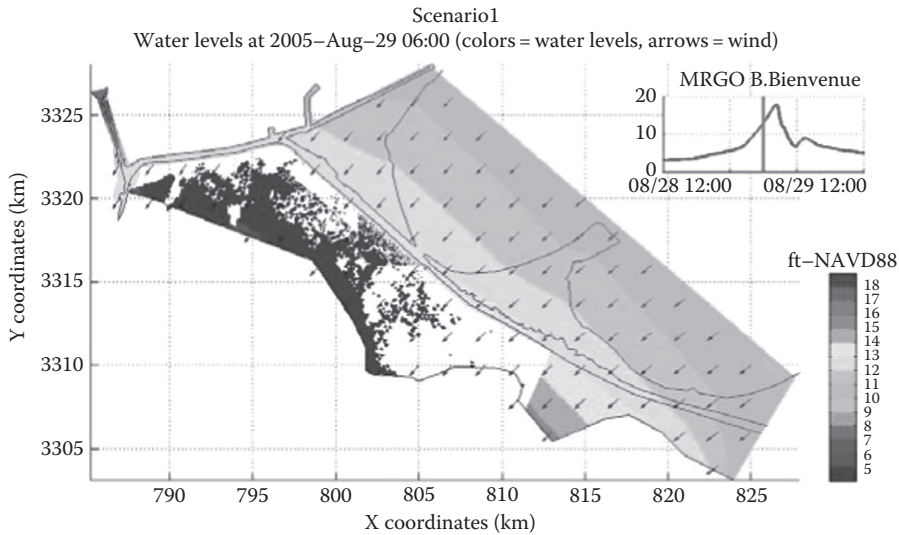


Figure 23.9 (continued) FINEL surge simulation for Katrina-As-Is Scenario 1 at 04:00 (top), 05:00 (middle), and 06:00 (bottom). Surge on scale (ft). Inset indicates surge progression on B. Bienvenue hydrograph. Arrows show wind direction. No overtopping of intact MRGO levees into Central Wetlands Unit. (From de Wit, L. et al., *Flow modeling New Orleans—Mississippi River Gulf outlet, Hurricane Katrina August 2005. Expert report In re Katrina Canal Breaches Litigation, Civil Action No. 05-4182, US District Court for the Eastern District of Louisiana, Section “k”(2), Pertaining to Robinson (06-2268)’ Judge Duval.* <http://katrinadocs.com/report.cfm?r=49>, 2008.)

23.12.2 MRGO Channel Reach Discharge Analysis

To further understand surge behavior in a funnel situation (de Wit et al., 2008), discharge estimates were developed at cross sections laid across the MRGO Reach 1 and Reach 2 channels (Figure 23.14). The cross-sectional area for each of these traverses with an assumed +16 ft (NAVD88) water elevation is given in Table 23.2, and the discharges for each cross section and each scenario are provided at hourly intervals in Table 23.3. The Scenario 2C cross section of Reach 1 is roughly half that of the Katrina-As-Is section because about half of the total cross-sectional area of Reach 1 for Scenario 1 is above the overbank when the water level is at +16 ft (Table 23.2). These discharges are very large, ranging for MRGO Reach 1 in the Katrina-As-Is Scenario from 173,000 to 430,000 cfs over the course of 5 h (Table 23.3). The Reach 1 channel entrains water in addition to that contributed by Reach 2 from the GIWW channel and from across the remaining wetlands. This added water becomes more significant at the 08:00 surge peak. At peak surge, the volume contributed from outside of Reach 2 rises from about 25% to 40% and continues to increase to 70% at 09:00 as the discharge in Reach 2 drops precipitously when the wind shifts.

As might be expected, discharge through the Reach 1 section is greatly diminished when the ship channel is removed as is the case in Scenario 2C. Flow then is largely overland even if it is constrained by levees or berms, as under Scenario 2C. Peak discharge for this scenario in Reach 1 is only slightly more than a third of the Katrina-As-Is discharge (Table 23.3). The Reach 2 discharge across the unbroken marsh at the Bayou Bienvenue cross section is less than 20% of its value when the fully enlarged channel section is available. The direction of flow reverses to the east at this

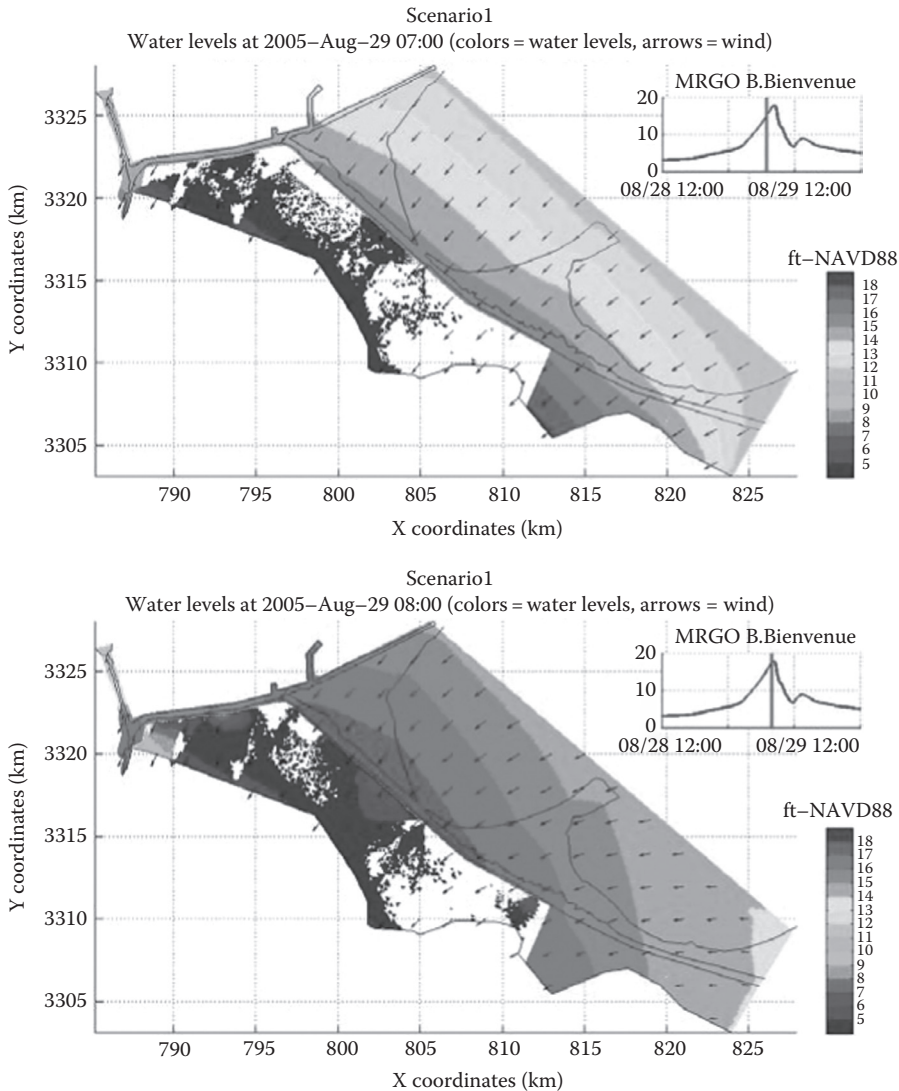


Figure 23.10 FINEL surge simulation for Katrina-As-Is Scenario 1 at 07:00 (top), 08:00 (middle), and 09:00 (bottom). Overtopping of intact MRGO levee into Central Wetlands Unit begins close to peak surge at 08:00 is most significant at MRGO–IHNC junction and in the vicinity of Bayou Dupre. (From de Wit, L. et al., Flow modeling New Orleans—Mississippi River Gulf outlet, Hurricane Katrina August 2005. Expert report In re Katrina Canal Breaches Litigation, Civil Action No. 05-4182, US District Court for the Eastern District of Louisiana, Section “k”(2), Pertaining to Robinson (06-2268)’ Judge Duval. <http://katrinadocs.com/report.cfm?r=49>, 2008.)

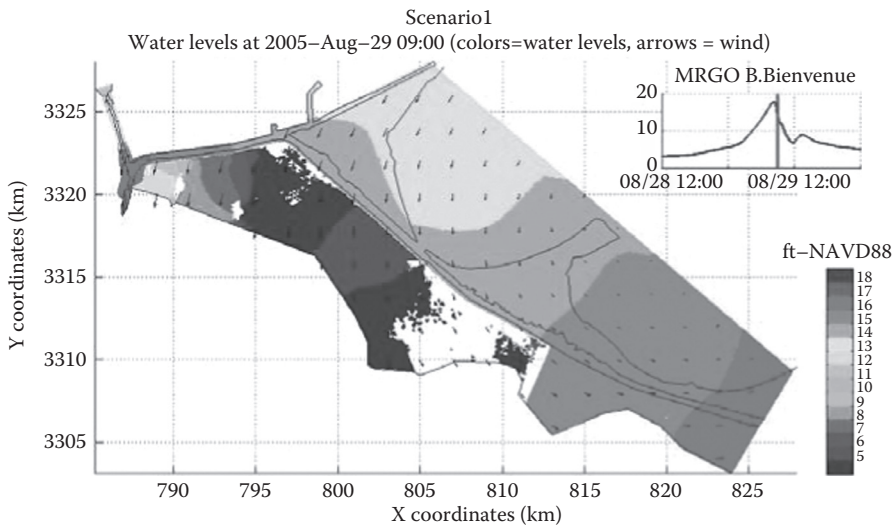


Figure 23.10 (continued) FINEL surge simulation for Katrina-As-Is Scenario 1 at 07:00 (top), 08:00 (middle), and 09:00 (bottom). Overtopping of intact MRGO levee into Central Wetlands Unit begins close to peak surge at 08:00 is most significant at MRGO–IHNC junction and in the vicinity of Bayou Dupre. (From de Wit, L. et al., Flow modeling New Orleans—Mississippi River Gulf outlet, Hurricane Katrina August 2005. Expert report In re Katrina Canal Breaches Litigation, Civil Action No. 05-4182, US District Court for the Eastern District of Louisiana, Section “k”(2), Pertaining to Robinson (06-2268) Judge Duval. <http://katrinadocs.com/report.cfm?r=49>, 2008.)

location by 09:00 as the winds shift. When a channel is absent in Reach 2, there is little reason to think that this cross section should contribute much more flow to Reach 1 than any other marsh traverse of similar length, but it does, roughly 30%, at least until the winds shift. This occurs in all likelihood because as the surge piles up on the MRGO levees along the south margin of the funnel, flow is deflected preferentially along the levee face toward the entrance to Reach 1. Because the water is incompressible and cannot escape, changes made to the geometry in one place propagate throughout the system either as surge elevation increases or decreases or as delays in surge rise or fall.

23.12.3 Overtopping Analysis Using Weir Equation

Locations were selected for calculation of structure overtopping using the FINEL surge output as the upstream input and considering the surveyed elevation of the structure crown in the pre-Katrina condition (Figure 23.15). de Wit et al. (2008) state that during overtopping, the levees can be considered as a perfect weir. The perfect weir discharge can be calculated by

$$q = C_d 2/3 E \sqrt{2/3 g E}$$

where

q is the discharge per m levee ($\text{m}^3/\text{s}/\text{m}$)

C_d is the discharge coefficient (—)

E is the upstream energy level with reference to the levee crest (m)

g is the gravity constant ($9.81 \text{ m}/\text{s}^2$)

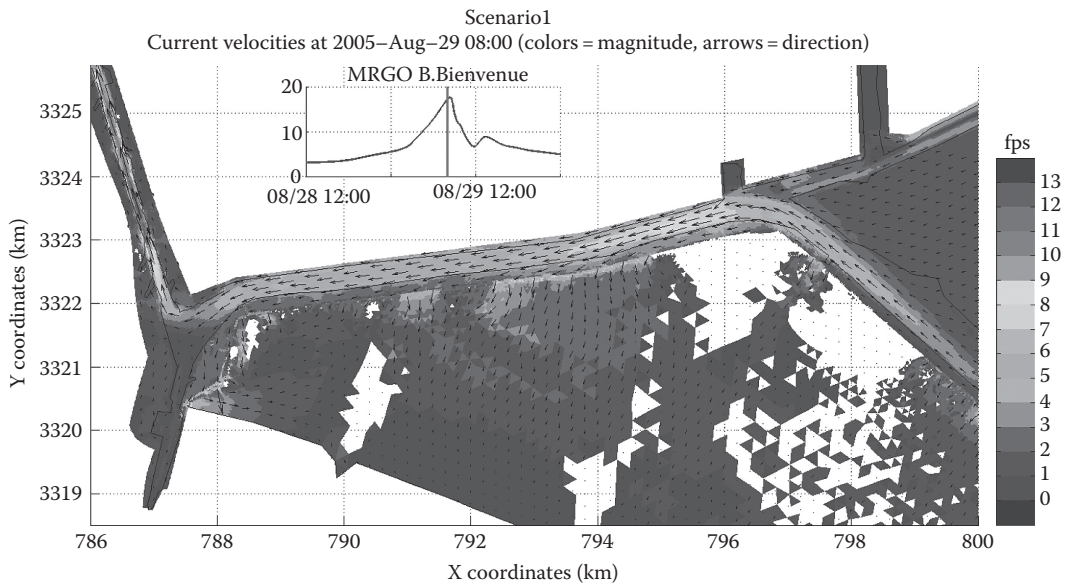


Figure 23.11 Flow velocities and direction in MRGO Reaches 1 and 2 and IHNC at 08:00 for Katrina-As-Is Scenario, showing overtopping across south levee of MRGO Reach 1. Maximum velocities in Reach 1 and IHNC are 8 and 11 feet per second (fps on scale), respectively. (From de Wit, L. et al., *Flow modeling New Orleans—Mississippi River Gulf outlet, Hurricane Katrina August 2005*. Expert report In re Katrina Canal Breaches Litigation, Civil Action No. 05-4182, US District Court for the Eastern District of Louisiana, Section “k”(2), Pertaining to Robinson (06-2268)’ Judge Duval. <http://katrinadocs.com/report.cfm?r=49>, 2008.)

The upstream energy level can be considered equal to the upstream water level. The Dutch ministry of public works executed a study to determine the discharge coefficient for different levee heights/slopes and for perfect and imperfect weir flow (de Wit et al., 2008). They found that the discharge coefficient $C_d \approx 1$ for perfect weir flow for all investigated levee slopes/heights. Therefore, we use a $C_d = 1$ to determine the overtopping rates.

Knowing the elevation difference between the water level in FINEL and the levee crest, a time line of the overtopping rate can be calculated for each selected location (Figures 23.16 and 23.17). The Orleans Metro and New Orleans East polders are not included in the model grid so overtopping into those bowls, as well as breaching, do not occur in the FINEL model. So the FINEL hydrographs in the IHNC and MRGO Reach 1 will be a little higher than what actually would occur in each scenario, as was discussed in the calibration section (de Wit et al., 2008). Overtopping rates in the MRGO Reach 1 and to a greater degree in the IHNC must therefore be considered an upper bound. The surge peak on structures within Lake Borgne will be more realistic estimates when no breaching occurs, because the surge in Lake Borgne is unaffected by overtopping (de Wit et al., 2008).

While we know that FINEL is overpredicting surge in the IHNC and to a lesser degree in MRGO Reach 1, and that this results in higher overtopping rates over the structures along these channels, this is true across the board for all scenarios. The point-by-point comparison acts to normalize these effects, rendering the comparisons meaningful. The first observation is that the Katrina-As-Is Scenario caused more overtopping at all locations where common points could be compared. The best overall performance was achieved in Scenario 2C by returning the landscape

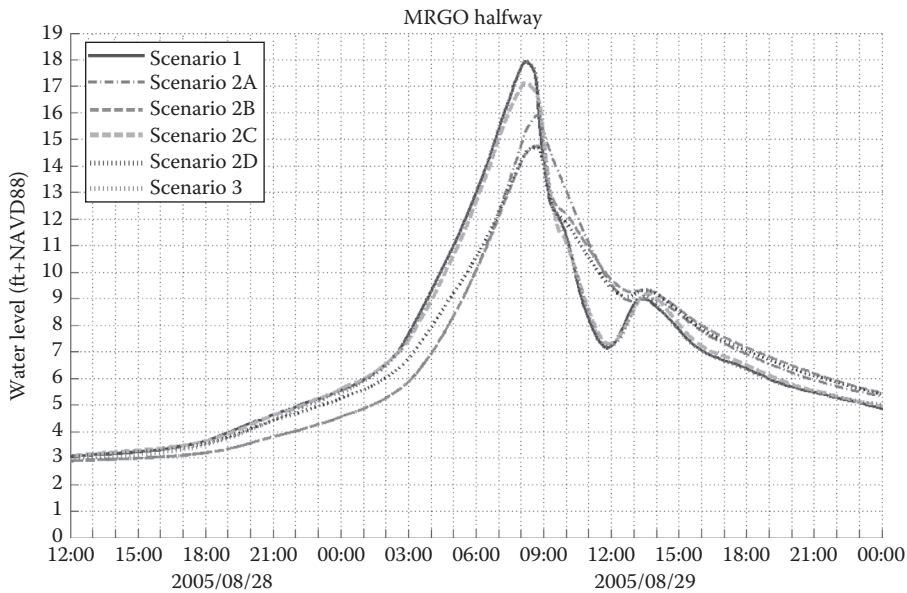


Figure 23.12 FINEL-generated Katrina hydrographs for test scenarios. (From de Wit, L. et al., *Flow modeling New Orleans—Mississippi River Gulf outlet, Hurricane Katrina August 2005. Expert report In re Katrina Canal Breaches Litigation, Civil Action No. 05-4182, US District Court for the Eastern District of Louisiana, Section “k”(2), Pertaining to Robinson (06-2268)’ Judge Duval. <http://katrinadocs.com/report.cfm?r=49>, 2008.*) Scenario 2C, the light grey dashed line, is of interest but is only slightly lower than the Katrina-As-Is run, Scenario 1 at this location (Figure 23.6), with no lag.

to its pre-MRGO condition but with the MRGO hurricane protection levees in place as they were before Katrina. This resulted in a fairly uniform reduction in overtopping volume of 80%–85% at points discharging into all three of the developed polders. Comparison of Scenarios 1 and 2C showed that enlargement of the GIWW to create MRGO Reach 1 provided a much greater potential for conveyance of Lake Borgne surge into New Orleans particularly after the cypress forests were destroyed.

The Reach 2 channel posed less of a problem; however, for enhancing storm surge than Reach 1 until, the surge funnel geometry was worsened by construction of the levees along the its south bank. First, the levees took *off-line* the significant amount of storage afforded by the 32,000 acre Central Wetlands Unit. Second, the levee project introduced a new and very dangerous dynamic in the hydraulic feedback between the ship channel and the adjacent berms. After the hurricane protection was constructed, surge could then build up on the slopes of the MRGO levees and drive added flow through the adjacent deep channel toward Reach 1, an interaction that would not have occurred if one or the other of these projects had not been built in the close conjunction that they were. In the *neutral MRGO*, condition the surge elevation was reduced slightly, and the rise was delayed almost everywhere around the margins of the funnel but more so toward the west. Even slight reductions in peak surge elevation or delays in peak onset could combine to significantly reduce overtopping of the levee flood protection structures throughout the funnel (Figure 23.17).

When both reaches of the MRGO were removed, overtopping was reduced by about 80% for all of the three developed polders that experienced catastrophic flood damage on August 29, 2005.

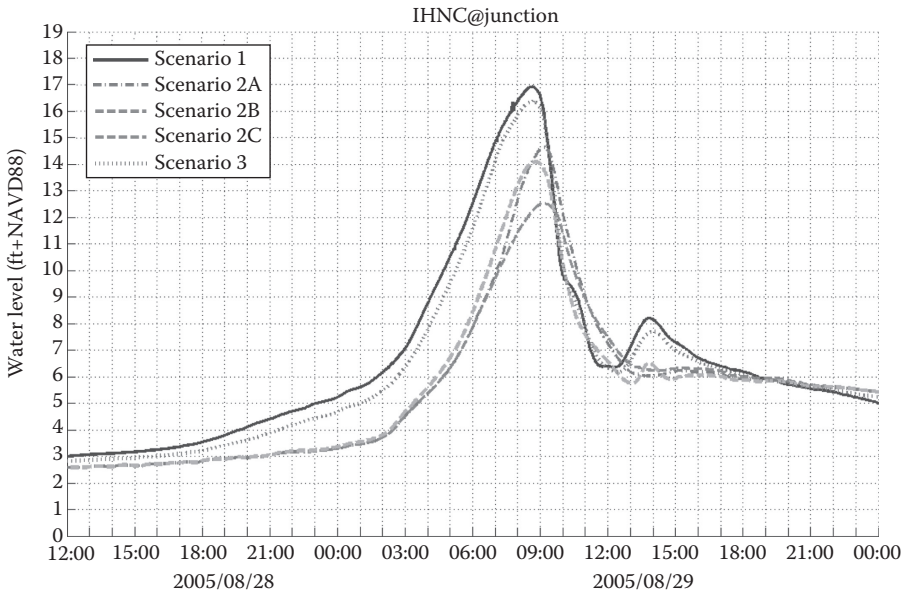


Figure 23.13 FINEL-generated Katrina hydrographs for test scenarios. (From de Wit, L. et al., Flow modeling New Orleans—Mississippi River Gulf outlet, Hurricane Katrina August 2005. Expert report In re Katrina Canal Breaches Litigation, Civil Action No. 05-4182, US District Court for the Eastern District of Louisiana, Section “k”(2), Pertaining to Robinson (06-2268)’ Judge Duval. <http://katrinadocs.com/report.cfm?r=49>, 2008.) Scenario 2C, the heavier grey dashed line is of interest and is lower than the Katrina-As-Is run, Scenario 1, at this location (Figure 23.6), with a pronounced lag and much shorter duration.

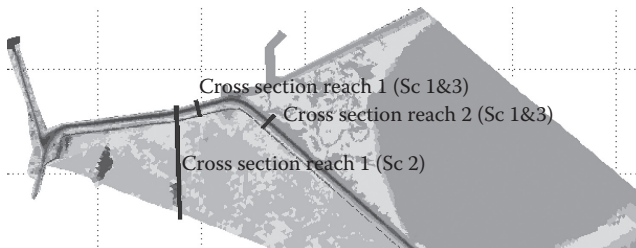


Figure 23.14 Cross sections for which surge discharge was calculated using FINEL. (From de Wit, L. et al., Flow modeling New Orleans—Mississippi River Gulf outlet, Hurricane Katrina August 2005. Expert report In re Katrina Canal Breaches Litigation, Civil Action No. 05-4182, US District Court for the Eastern District of Louisiana, Section “k”(2), Pertaining to Robinson (06-2268)’ Judge Duval. <http://katrinadocs.com/report.cfm?r=49>, 2008.)

23.13 Effects of MRGO Reach 2 on Waves and Flooding

Most of the MRGO Reach 2 levees were constructed of uncompacted hydraulic fill material dredged from the MRGO or GIWW (ILIT, 2006; IPET, 2006). Those that faced a large, open water body like Lake Borgne or the MRGO channel experienced significant damage and

Table 23.2 Cross-Sectional Area for Each Traverse in Figure 23.14 at a Uniform Elevation of +16 Feet (NAVD88)

		<i>Cross-Sectional Area (ft²)</i>
Scenario 1	MRGO Reach 1	67,000
	MRGO Reach 2	75,000
Scenario 2C	MRGO Reach 1	38,000
	MRGO Reach 2	36,000

Source: de Wit, L. et al., Flow modeling New Orleans–Mississippi River Gulf outlet, Hurricane Katrina August 2005. Expert report In re Katrina Canal Breaches Litigation, Civil Action No. 05-4182, US District Court for the Eastern District of Louisiana, Section “k”(2), Pertaining to Robinson (06-2268) Judge Duval. <http://katrinadocs.com/report.cfm?r=49>, 2008.

Table 23.3 Hourly Discharge (cfs) to the West across the Test Cross Sections Predicted by FINEL for Scenarios 1 and 2C

		<i>4:00 am</i>	<i>5:00 am</i>	<i>6:00 am</i>	<i>7:00 am</i>	<i>8:00 am</i>	<i>9:00 am</i>
Scenario 1	MRGO Reach 1	173,000	202,000	236,000	293,000	430,000	234,000
	MRGO Reach 2	149,000	161,000	179,000	211,000	264,000	72,000
Scenario 2C	MRGO Reach 1	44,000	63,000	86,000	117,000	157,000	114,000
	MRGO Reach 2	14,000	20,000	28,000	39,000	48,000	–4,000

Source: de Wit, L. et al., Flow modeling New Orleans–Mississippi River Gulf outlet, Hurricane Katrina August 2005. Expert report In re Katrina Canal Breaches Litigation, Civil Action No. 05-4182, US District Court for the Eastern District of Louisiana, Section “k”(2), Pertaining to Robinson (06-2268) Judge Duval. <http://katrinadocs.com/report.cfm?r=49>, 2008.

were generally classified by IPET after the storm as levee overtopped with breaching (LOB) and in some cases with wave scour (WS). Other similarly constructed levee reaches that had marsh instead of a channel at the toe on the unprotected side, like the reach of the Chalmette levee loop that turns south from the MRGO channel toward the LaLoutre Ridge and road at Verret (Figure 23.18), experienced virtually no damage and were designated LONB by IPET, for levee overtopped but no breaches (Figure 23.19). This east-facing LEVEE segment experienced nearly the same overtopping as that facing the MRGO Reach 2 channel to the west (Figure 23.18) and was no better maintained with respect to crown elevation (Figure 23.20),

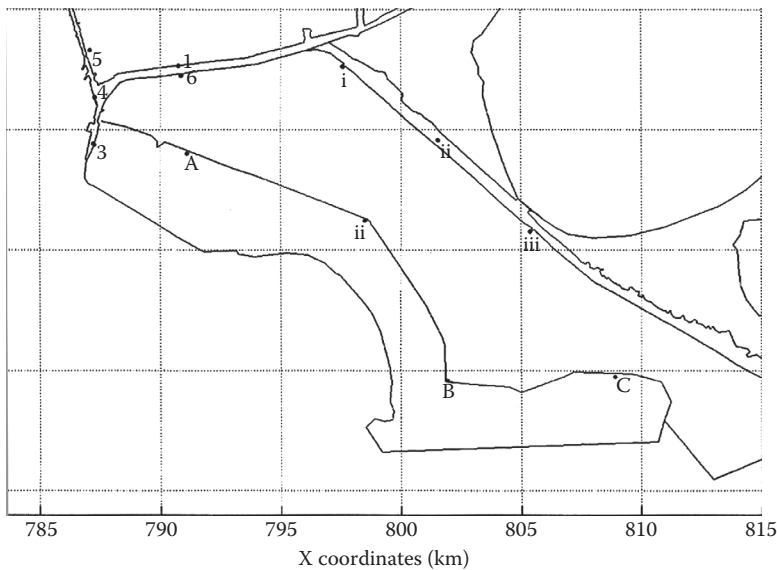


Figure 23.15 Output locations for overtopping volume analysis. (From de Wit, L. et al., *Flow modeling New Orleans—Mississippi River Gulf outlet, Hurricane Katrina August 2005*. Expert report In re Katrina Canal Breaches Litigation, Civil Action No. 05-4182, US District Court for the Eastern District of Louisiana, Section “k”(2), Pertaining to Robinson (06-2268) Judge Duval. <http://katrinadocs.com/report.cfm?r=49>, 2008.)

but experienced virtually no damage. This is a tale of two levees, if the structures could qualify, one with and one without large waves.

The critical point here is that the size of the waves is related to the size of the channel out front. The MRGO Reach 2 during Katrina with a width of up to 3000 ft in places, and more than 40 ft deep at low tide, was a powerful wave magnifier. Anything that magnifies waves breaking on an unprotected earthen structure increases the likelihood of early failure. This battle between grass-covered earth structures and crashing waves was enacted foot by foot, and second by second, along more than 10 miles of MRGO levees, and on more than 4 miles adjacent to the GIWW (Figure 23.19). The earth lost.

One question that appeared to captivate the IPET investigators and, really, the big question to all researchers has been “Were the Reach 2 levees destroyed by water eroding the back side after overtopping or by front side wave attack prior to overtopping?” While this may seem like quibbling, it is actually important to know the answer because it will have implications for how these structures are designed, built, and maintained into the future. The USACE investigators (IPET, 2007) have preferred to explain the observed destruction of these poorly built structures primarily as a result of overtopping, rather than by erosion of the front side. They drive this opinion primarily from post-storm observations of damaged but still surviving structure segments (IPET, 2007). However, these post-storm observations are not a good basis for such an opinion. The potential for preserving unequivocal signs of breaching from front side wave attack all the way through the surge sequence is essentially nil. Reach 2 levee segments breached early by front side wave attack would have attracted intense inflow through those breaches that would remove all signs of the precipitating cause. Many deeply scoured levee breaches also later served as preferred routes for drainage of impounded flood waters after the surge dropped. It is important to look at portions

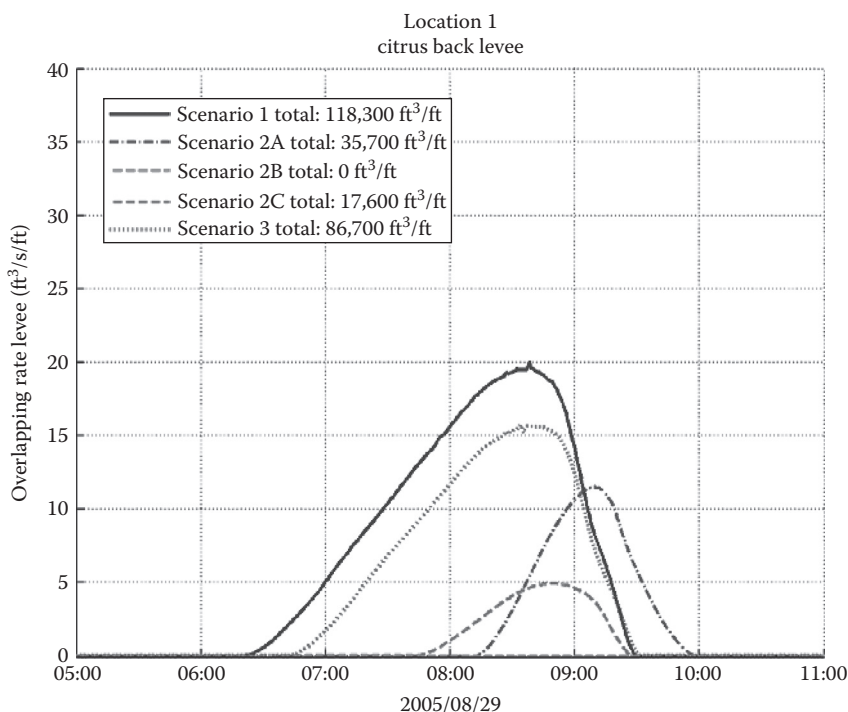


Figure 23.16 Overtopping rates calculated for test scenarios at the Citrus Back levee. (From de Wit, L. et al., *Flow modeling New Orleans—Mississippi River Gulf outlet, Hurricane Katrina August 2005*. Expert report In re Katrina Canal Breaches Litigation, Civil Action No. 05-4182, US District Court for the Eastern District of Louisiana, Section “k”(2), Pertaining to Robinson (06-2268)’ Judge Duval. <http://katrinadocs.com/report.cfm?r=49>, 2008.)

of the structure that almost failed where signs of front side WS and erosion as well as back side erosion are apparent (Figure 23.21).

Additionally, there are some fundamental flaws with IPET’s (2006) wave modeling using the STeady State spectral WAVE (STWAVE) model. STWAVE is an older program that works much like SWAN, using nested grids. If it is operated in a half-plane mode, however, and the grids are not oriented properly to accurately capture waves moving in the direction of the wind, which was essentially perpendicular to the MRGO Reach 2 levees, directly down the 40 mile long axis of Lake Borgne as done IPET, then those locally generated waves will not make it into the results (<http://chl.erdc.usace.army.mil/chl.aspx?p=s&a=PUBLICATIONS;39>). For whatever reasons, it should be noted that there is a fundamental difference between the SWAN simulation of the Katrina wave field developed by Gautier et al. (2008) and that used by the USACE IPET in that the IPET data do not capture the locally generated short-period waves.

23.14 SWAN Modeling of Effects of the MRGO Reach 2 Channel on Waves

Gautier et al. (2008) modeled waves impacting the MRGO Reach 2 levees from well offshore. Waves offshore were huge and reflected the whole evolution of the massive storm, as it intensified

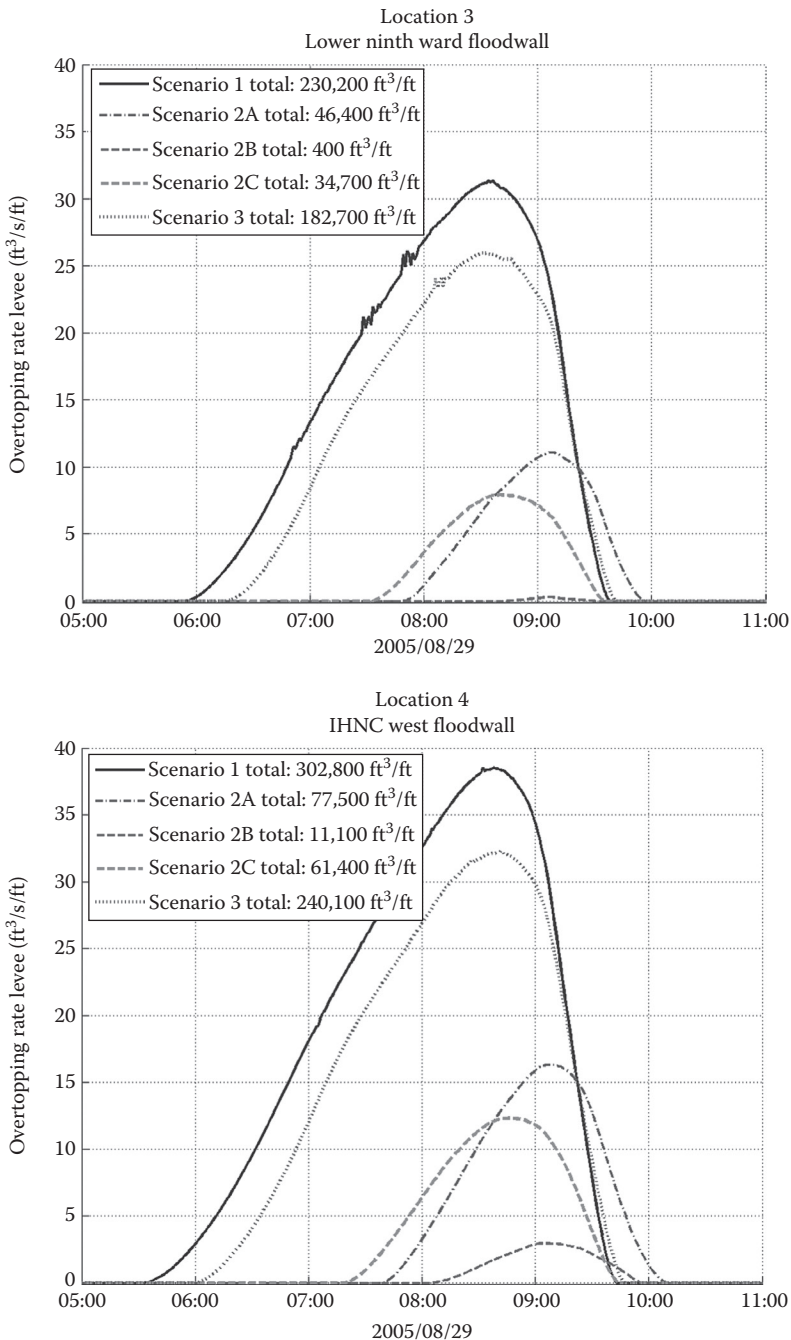


Figure 23.17 Overtopping rates calculated for Scenarios 1 and 2C at location 3 on the Lower 9th Ward floodwall (top) and location 2 on the IHNC West floodwall. (From de Wit, L. et al., Flow modeling New Orleans—Mississippi River Gulf outlet, Hurricane Katrina August 2005. Expert report In re Katrina Canal Breaches Litigation, Civil Action No. 05-4182, US District Court for the Eastern District of Louisiana, Section “k”(2), Pertaining to Robinson (06-2268)/ Judge Duval. <http://katrinadocs.com/report.cfm?r=49>, 2008.)

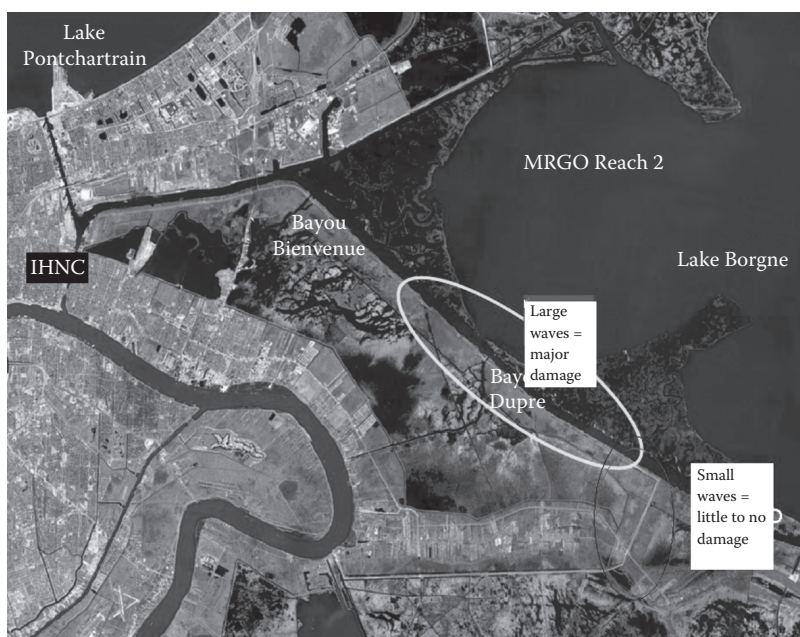


Figure 23.18 A tale of two equally fragile embankments. The one facing north into MRGO Reach 2 was destroyed, while the other facing east with marsh at the toe was hardly damaged. (Modified from IPET.)

and then relaxed somewhat before coming ashore in Louisiana and then Mississippi. Wind speeds over the Lake Borgne–Chandeleur Sound complex ranged up to a maximum of about 90 knots. The prevailing wind direction over Lake Borgne was from the northeast, almost perfectly aligned with the long axis of the lake from 04:00 to 09:00 on the morning of August 29, 2005. Very long-period ocean swells were indeed present at that time but were well offshore (Gautier et al., 2008). In looking at SWAN results for the distribution of dominant wave periods, T_p throughout the domain, it appears that the waves that dominate inshore of the Chandeleur Islands are locally generated wind waves with periods less than 6 s (Figure 23.8).

Finally, looking even closer specifically at transitions near the surge peak in the channel immediately south of the eastern lobe of Lake Borgne, it is apparent that significant wave heights build in the channel up to a maximum of about 9 ft along the whole of Reach 2 in front of the levees (Figure 23.7). Significant wave heights drop appreciably as the surge maximum passes, as can be seen in the 09:00 image (Figure 23.7). The growth of the waves as they cross the 2000–3000 ft wide channel is much more apparent in close-up views (Figure 23.22). What is very evident is that the very wide MRGO channel at the time Katrina hit amplified the waves from a maximum of 5.5 ft with no channel to 9.2 ft with the channel. This characteristic of the MRGO channel of wave amplification was not considered in the design of the Reach 2 levees. In fact, the original design did not account for the presence of the MRGO at all. Similar things are also happening in front of the New Orleans East Back Levee on the GIWW, but the significant wave heights there range from 6 to 8 ft.

In summary, all analyses to date have missed the significance of channel widening on the energy of waves impacting the Reach 2 levees because they have underestimated both the potential

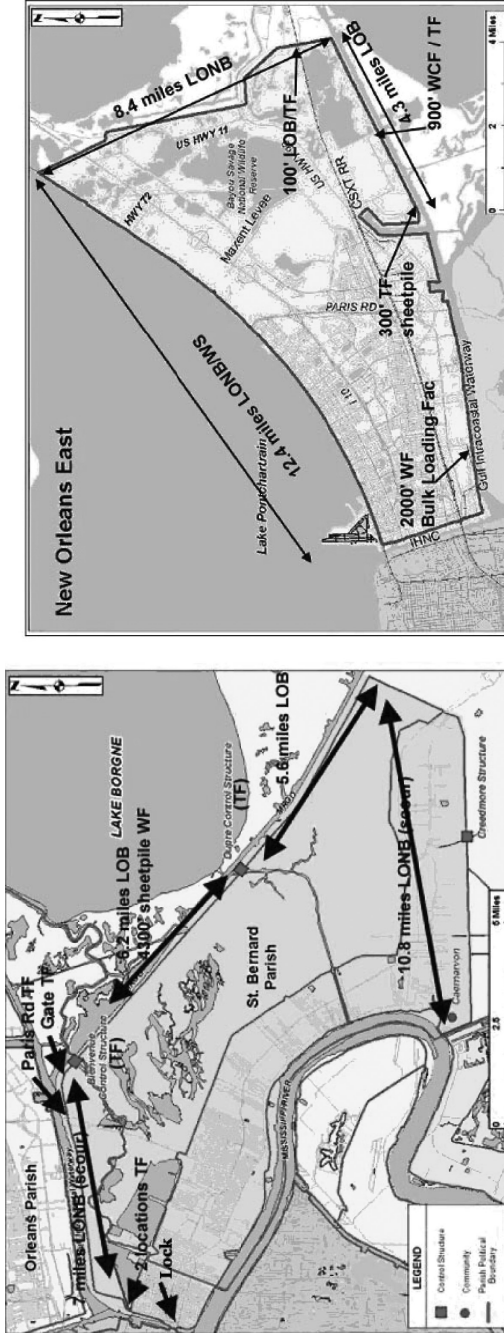


Figure 23.19 Hydraulic fill levees adjacent to the MRGO and GIWW navigation channels on the margins of the Lake Borgne funnel are the only reaches that experienced damage designated by the USACE as LOB, standing for levees overtopped with breaches. (From IPET, Performance evaluation of the New Orleans and Southeast Louisiana Hurricane Protection System. U.S. Army Corps of Engineers, Vicksburg, MS, 2006.)



Figure 23.20 Pre-Katrina crown deviation from design elevation relative to mean sea level for the Chalmette levee loop (white = at design el., all other up to 3.0 feet too low). (From Shaffer, G.P. et al., *J. Coastal Res.*, 54, 206–224, 2009; Morris, 2008.)

for waves to reform in the channel and of the effects of wetland and foreshore erosion to increase the wave energy to which they were exposed during Katrina. Returning to our original *tale of two levees*, it is interesting to note that the waves along the Verret return levee reach, in contrast to those fronting the MRGO, never experienced significant waves over 4 ft high, less than half the significant height of the waves that grew as they crossed the MRGO (Figure 23.18). This is what made the difference for these fragile structures and for the early onset of the flooding in St. Bernard. Utilizing the wave data discussed here, Bea (2008) has estimated that “approximately 35% of the levees along the Reach 2 alignment were breached due to attack by waves, 47% were breached by a combination of wave attack and surge overtopping—backside erosion (including sheet pile repair breaches), and 18% were overtopped but did not breach (intact sheet pile repair sections, Dupre and Bienvenue navigation structures).”

23.15 Conclusions

The MRGO channel increased surge conveyance into the city and created larger waves that destroyed many levee reaches early in the storm. These impacts, while apparently understood by USACE employees, were never included in any design memorandums or analyses. The infrastructure failures observed in the New Orleans area and described herein resulted in the loss of life and major property damage and destruction. These failures were man-made and could have been prevented. A combination of engineering errors and political decisions resulted in a HPS of lesser

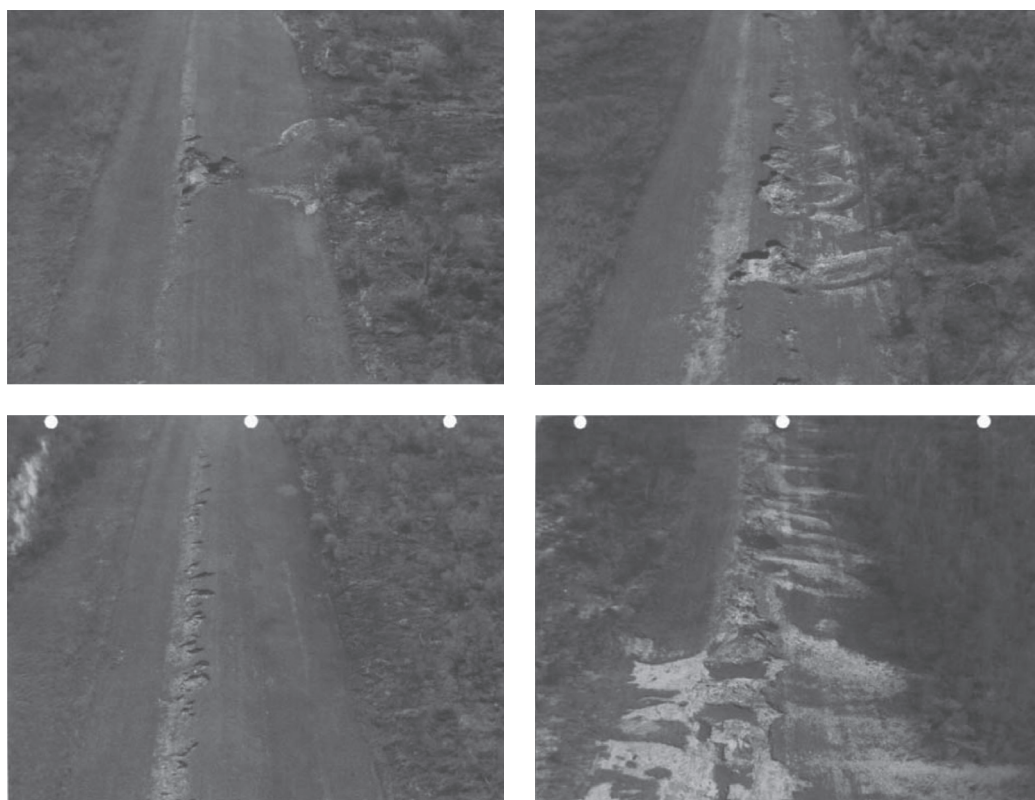


Figure 23.21 Oblique aerial photographs showing various stages of front side erosion along Reach 2. MRGO is to left in all photographs, showing removal of grass by waves on the unprotected MRGO side, erosion of a wave bench in some places, and back side erosion and headcutting with no front side erosion in others.

quality than promised the citizens of Louisiana in the Design Memos, which serve as a contract between the USACE and the people of Louisiana represented by the various levee boards (van Heerden et al., 2007). Congress and society need to *step up to the plate* and ensure that Louisiana gets compensated for the federal government's failures and that the full extent of the 1965 Flood Control Act is implemented. The coast needs to be restored post haste—this is the only long-term solution. The implementation of aggressive coastal restoration strategies and the building of a barrier storm protection system will not be cheap; however, it will ensure the continued existence of coastal Louisiana, its inhabitants, and its unique culture. Additionally, it presents many new opportunities to expand the regions' job base and hence improve its economy.

In April 2009, a trial was held before Federal Judge S. Duval re Katrina Canal Breaches Litigation, Civil Action No. 05-4182, US District Court for the Eastern District of Louisiana. Ordinarily, the USACE is exempt from legal responsibility should a flood project or structure fail. However, this does not hold true for USACE designed, constructed, and maintained navigation channels. In November 2009, Judge Duval ruled against the USACE, the consequence of which could be a total change the civil works landscape in the United States forever.

By December 2009, the USACE had completed construction of a seal in the MRGO at the Bayou La Loutre Ridge and a closure structure fronting the MRGO funnel.

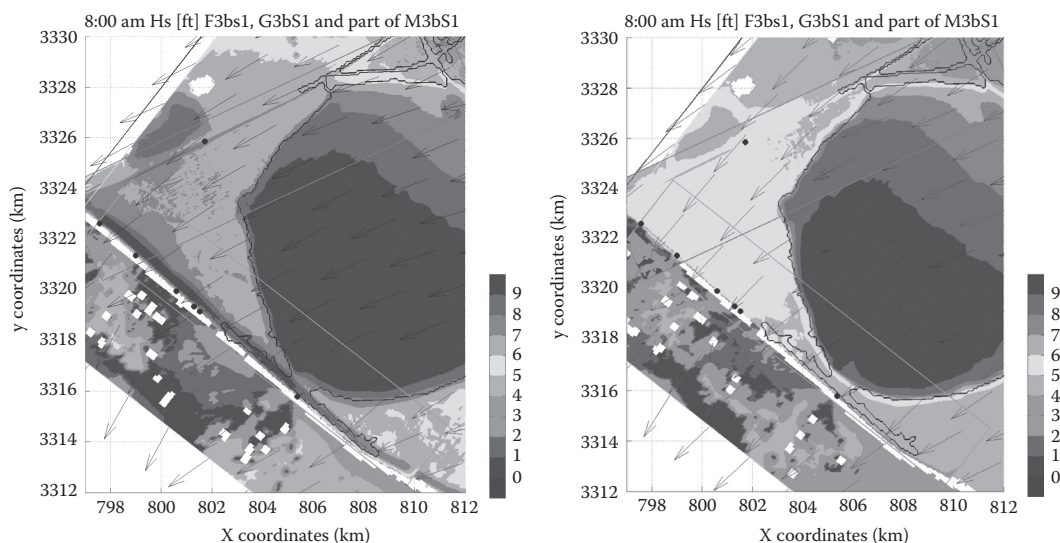


Figure 23.22 Scenario 1 and Scenario 2 C SWAN results Hs (ft) and wave direction, 8:00 am LT. Note how the waves in the MRGO channel are almost twice as high in Scenario 1 as compared to Scenario 2C.

Acknowledgments

Professors Han Vrijling and Matthijs Kok from TU Delft managed the SWAN and FINEL modeling, and their help and expertise are gratefully acknowledged as well as their staff. This research was supported in part through the Team Louisiana effort by the Louisiana Department of Transportation and Development; by the Center for the Study of Public Health Impacts of Hurricanes, a Louisiana Board of Regents Health Excellence Fund Center; and by the McKnight Foundation. The MRGO Litigation Team is thanked for funding the research performed by Delft University. Ahmet Binselam is thanked for assistance in data collection and analysis.

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Chapter 24

Examining Intergovernmental Relations in Response to Catastrophic Disasters

Hurricane Katrina in 2005

Naim Kapucu

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24.1 Introduction

Hurricane Katrina churned out in the open waters of the Gulf of Mexico for days before making landfall close to its projected path over the precariously below sea level area of New Orleans. The preparations for the expected 100 mile per hour winds, excessive rain, and flooding included a mandatory evacuation of the city for all residents. Emergency response professionals had practiced the typical response operations for downed telephone and power lines, keeping generators running to provide power and air conditioning to cramped shelters and food, water, and ice for many residents, but they were not prepared for what they encountered. The levees surrounding Lake Pontchartrain, built to withstand a Category 3 hurricane, burst from the Category 4 storm and filled 85% of the city with 18 ft of water. Emergency operators began receiving calls from residents trapped in their attics by rising flood waters and suddenly, with hundreds of police officers unaccounted for, federal aid yet to be seen, and state aid still in the process of being organized, the city was beyond its capacity to respond to the need of victims (CNN 2005a; Schneider 2005). The following days ensued with media reports of alleged looting; rapes; even murder at the largest shelter, the Louisiana Superdome; floating corpses on the streets; and political battles between Louisiana's governor, New Orleans' mayor, and the federal government. Early estimates placed the death toll at 10,000 in New Orleans alone, indicating the seriousness of this unprecedented situation (CNN 2005b).

The interaction among the local parishes, the state government, and federal response agencies is intergovernmental relationships created to preserve the livelihood of a community after an intense disaster as described previously. Ultimately, no one was prepared for the flooding that consumed the city once the levees broke or the social reaction that followed. Preliminary evaluations of the city's preparations and work with federal agencies such as the Federal Emergency Management Agency (FEMA) and the Army Corps of Engineers suggest that no parties were willing to accept responsibility for the disaster that could happen (Grunwald and Glasser 2005). The overwhelming nature of disasters, like Hurricane Katrina, makes appropriate preparations imperative but the coordination efforts intimidating. The effectiveness of disaster response is precariously balanced on effective relationships (Kim 2005), and Hurricane Katrina exhibits the complex intergovernmental relationships that must be in place for an effective response to large-scale disaster.

Intergovernmental relationships have existed as long as governments have and are a pervasive yet disjointed aspect of federal, state, and local governance characterized by a lack of communication among agencies and duplication of some efforts while other needs remain untouched. Intergovernmental relations, foremost, are those that occur between the federal government and the states and, secondly, are those that occur among the states, counties, and municipalities breaching the gap between the intent and the implementation of the constitution (Cameron 2001). In other words, it is "the subject of how our many and varied American governments deal with each other and what their relative roles, responsibilities, and levels of influence are and should be" (O'Toole 2000: 2). Mutual aid agreements, federal and local disaster response, and homeland security all represent the varying levels and complexity of intergovernmental relations (Kettl 2004). The necessary coordination among public entities is the basis of intergovernmental relationships, but the defining characteristics that make them effective and worthwhile have been under discussion for quite some time (Mushkatel and Wescher 1985; Bardach 1998; Peters 1998; Peters and Pierre 2001; O'Toole 2003; Radin 2003; Smith 2003; Wollmann 2003).

The disastrous consequences of Hurricane Katrina remain a testament to public opinion that the government is incapable of providing quality services at a reasonable price. The incident propels the public's desire and political need to see government services held accountable using

performance measurement standards such as output and outcome measurements, performance-based contracts, and privatization of nonessential services (Kamarch 2004; Kettl 1997). Prior to the measurement of disaster response, the responsibilities and relationships must first be identified and effective means of responding determined. The intent of this theoretical framework is to identify the use and usefulness of networks and collaborations (as a product) and coordination and collaboration (as a process) to improve disaster response. If networks and collaborations and coordination are identified to improve response operations over traditional response methods then accountability standards and measurement indicators identified with increased accuracy are expected.

The purpose of this chapter is to identify a theoretical framework supporting the use of networks, partnerships, and collaborations in intergovernmental relations in a disaster response mechanism using Hurricane Katrina response operations as example. The framework is identified according to recent literature on intergovernmental relations and its use in emergency management and homeland security. First, the chapter discusses recent changes in emergency management within the United States and changes to the intergovernmental framework of disaster response. These changes set up the environment in which new coordination and collaboration efforts must be effectively functioning within expected performance standards. Following the discussion of the current environmental trends, the theoretical framework introduces a governing shift toward a multilevel approach to government, known as *governance*. Governance includes using private and third sector organizations to meet nation-wide goals. The new governance structure allows public organizations to use cooperation to improve service delivery. The role of cooperative products such as partnerships, networks, and collaborations is evaluated in the process of coordination and the process of collaboration. The implementation of the products and processes has had to overcome challenges that are discussed in the following section. The chapter concludes with a brief discussion of the issues that arise when implementing networks within emergency management. The chapter examines the following questions: How can intergovernmental coordination and collaboration improve disaster response? How can networks be utilized as a form of coordination to improve response? What lessons can be learned from previous implementation scenarios to improve disaster response? What lessons can be learned from previous network implementation to improve response operations?

24.2 Environmental Trends and Changes in Disaster Management

After the terrorist attacks of 9/11, emergency management reached a high level of salience in the United States. Understandably, the nation focused on the prevention of terrorism and, to a far lesser extent, on the preparation for the consequences of terrorist attacks. In 2002, 22 federal agencies were reorganized to create the Department of Homeland Security (DHS), charged with coordinating government resources to battle terrorism and secure the United States (DHS 2004). DHS became the second largest government organization, signaling an urgent need to determine how the organization would effectively coordinate their resources to meet their mission. Determining the best way to coordinate extensive federal resources among hundreds of state and local interests has been a trial and error process.

During Hurricane Katrina, FEMA was harshly criticized by the media and elected officials for their perceived inadequate response to the major natural disaster. The criticisms accused FEMA of being slow to respond, not preparing well enough in advance of the storm and not having the capacity to handle all the location sites. FEMA had been accused of similar

trespasses after Hurricane Andrew hit South Florida in 1992. The organization reorganized with a renewed mission and focus. The creation of DHS similarly reorganized the disaster response organization. Prior to the creation of DHS, FEMA was a cabinet-level agency that reported directly to the president and responded under the Federal Response Plan, but after 9/11, FEMA was incorporated into DHS and given a new operating procedure, the National Response Plan (NRP).^{*} These grand structural changes have forced the organization to realign their standard operating procedures the new procedures for intergovernmental coordination when responding to disasters.

The coordination among federal, state, and local emergency management agencies in disaster response is a function of their standard operating procedures. As the federal coordinating agency, FEMA recommends that all state and local emergency management functions implement the *all-hazards* emergency management model of disaster response (FEMA 2003). The all-hazard model is a four-part plan consisting of mitigation, preparedness, response, and recovery. All-hazard mitigation is the process of taking measures to prevent disasters or lessen the effects of those bound to occur. Intergovernmental interaction in mitigation takes form as implementing improved building codes at municipal, county, and state levels and coordinating land use planning at municipal and county levels to prevent development in disaster-prone regions. Preparedness activities arrange responders to react during a disaster and increase their capacity to respond. Creating regional or metropolitan warning systems, practicing response activities with mutual aid partners, and training first responders at municipal and county levels are intergovernmental activities. After a disaster strikes, the response activities take form in addressing the immediate need and can include working with entities from nearby jurisdictions and state and federal authorities to provide rescue, food, water, housing, or medical services. The long-term assistance to communities, or recovery, that extend beyond the initial response such as temporary housing, grants-in-aid, and job assistance are the cooperative effort of the local jurisdiction and the specialized agency (Waugh 2000; Farazmand 2001; Hardenbrook 2005). Each of these phases is independent, but the coordinating resources overlap, and emphasis is placed on the fact that all emergencies begin at the local level; the funding for the local still between level and remains minimal. One reason for federalism is to provide for identified issues that are far too large in scope and money for the local, county, or state governments to handle. Yet when an incident like Hurricane Katrina occurs, blame is often placed on the local government suggesting they were completely responsible for the failures of the system and any measures that would have strengthened them.

The current emergency management environment is highly political and forcing organizations to adapt with little time implement changes. The use of various cooperative mechanisms such as networks, partnerships, and collaborations are now, better suited than ever, to be implemented in the rapidly changing environment. The use of cooperative efforts may be useful in preventing the detrimental consequences that occur when other intergovernmental relationships fail.

Ultimately, the federal system of government, which was designed to protect the rights of the individual states and individual citizens, hampers the ability of local, state, and federal governments to work together in a highly collaborative manner, at least in the early stages of a disaster. Experience has shown there has been hesitation in the initial phases of any disaster response, especially when information is scarce and the scope of the event is unclear. Typically, operations tend to smooth out over time—yet, after action reports are often full of comments indicating problems in intergovernmental relations during the consequences of a disaster. A structural change to

^{*} The National Response Plan forms the basis of how the federal government coordinates with state, local, and tribal governments and the private sector during incidents.

DHS/FEMA may have little impact on such events, unless there is some change to the underlying, enabling legislation supporting emergency management operations, accompanied by a more intensive education campaign.

24.3 Collaborations, Coordinations, and Networks in Disaster Management

A new approach to government referred to as governance has emerged from combining the practices of traditional government with market-driven approaches of the private sector and the resourcefulness of nonprofit organizations (Agranoff 2004). Blending the strengths and needs of the three sectors has created a move from reliance upon a highly centralized, hierarchal control mechanism to equally contributive growth mechanisms. Agranoff defines governance as “the ability to combine the necessary elements toward a result, that is, the capacity to assemble and use needed resources for a policy initiative” (2004: 65). In the twenty-first century, *wicked* problems have emerged proliferating collaborative efforts using any available resources to attack them, such as poverty, the AIDS pandemic, and homeland security. These issues are those that are outside the scope of any one given agency and require interaction for successful response (Wise and Nader 2002; Kettl 2004).

The growing number of horizontal relationships is a result of complex issues requiring the use of management tools that fall outside of the boundaries of the traditional vertical relationship (O’Toole 2004). The organizational need to access nontraditional management methods is leading the revolution from government to governance. Organizations tasked with addressing issues that have a great scope, affect a large population, or require an immense amount of resources have crossed traditional hierarchal boundaries to collaborate with other public, private, and nonprofit organizations. The multiple-level, multiple-agency, boundary-spanning activities organizations used to coordinate and implement their programs represent the shift to governance. Governance is larger than government including the resources of the public and nonprofit sectors in interdependent relationships. To a further degree, multilevel governance emphasizes “power-sharing between levels of government with no center of accumulated authority...The relations are characterized by mutual interdependence on each others’ resources, not by competition for scarce resources” (Smith 2003: 619). However, politics and power issues remain prominent among agencies seeking individual credit for collaborative work (Peters 1998; Kamensky et al. 2004; Mandell 2004).

The horizontal relationships created through governance are forms of intergovernmental relations and can be utilized to identify better ways to respond to disaster situations. Horizontal relationships increase the need for boundary-spanning activities between agencies requiring those agencies to acquire new management skills. These skills include agencies redefining their policy boundaries, their views about the role of government, the interdependence between levels of government, public and private interdependence, and renewing their focus on performance. While intergovernmental relations can take form as a partnership or collaboration, other relationships are created through reorganization, deregulation, devolution, regulation, capacity building, conflict management, and individual and group communication depending on the need of the agencies and the issue (Radin 2003). While coordination and collaboration are often used interchangeably, this framework recognizes coordination and collaboration as separate concepts that utilize the same or similar resources but differ by the level of interorganizational integration with the objective.

24.4 Intergovernmental Relations and Coordination in Response to Extreme Events

Extreme events are occurrences that are notable, rare, unique, and profound, in terms of their impacts, effects, or outcomes. Hurricane Katrina is an example of an extreme event with significant impact upon humanity/community. All members of the community were affected, and no single organization could have managed the response alone. The capacity of a society to understand and manage emergencies depends on its ability to understand, anticipate, prepare for, and respond to them. Aaron Wildavsky (1971: 77) describes resilience as “the capacity to cope with unexpected dangers after they have become manifest, learning to bounce back.” Communities responding to disasters are seen as coping collectively with shared pain, loss, and disruption and as temporarily suspending ongoing conflicts and disagreements in the interest of meeting urgent needs and beginning the recovery process. Resilient communities are characterized by reduced failure, measured in terms of lives lost, damage, and negative social and economic impacts, and reduced time to recovery—that is, more rapid restoration of the social systems and institutions to their normal, predisaster levels of functioning (Comfort and Kapucu 2006).

Organizations can contribute to resilience in a society by incorporation with other emergency response organizations based on trust and by integrating volunteers into emergency response operations as appropriate. In response to the extreme event, organizations realized that the response and recovery task, if it was to be performed fast enough to prevent further disaster from occurring, lay well beyond their capabilities as individual organizations. Because many of the organizations, not all, involved in the recovery effort had previously exchanged information and resources with each other, they made use of lines of communication, information resources, and social networks that were already established. Good planning prior to disasters and trust among the organizations prior to disasters helped interorganizational networks work in disaster response operations.

Intergovernmental relations are used to coordinate between and among the various levels of government focusing on interorganizational coordination to implement policy decisions (O’Toole 2004; Waugh 2004; Wollmann 2004). Coordination requires that different positions or actors perform subtasks of the decision in a sequential order versus collaboration where team members must cooperate throughout all stages of the task (O’Brien 1968). Furthermore, coordination is focused uninterrupted operation of the sequential tasks with no reference to outcome while collaboration is highly focused on achieving the intended outcome (Denise 1999). The differentiation between coordination and collaboration makes them useful tools depending on the nature of the cooperative effort (Mandell 2004).

There are three commonly referred to types of coordination: hierarchy, network, and market (Peters 1998; Wollmann 2004). Hierarchy, the traditional model, moves the decision from the top, most authoritative position down throughout the ranks of the organization. Networks, on the other hand, are loosely formed associations of voluntary organizations, where the network is “based on shared values, trust, solidarity or consensus” (Wollmann 2003: 595) and bargaining and negotiating are treasured qualities (Agranoff 2004; Mandell 2004). The third form, market coordination, allows participants to use their individual resources to achieve their separate self-interests. Individuals can combine their resources in support of one interest and coordinate action to support the group interest using their personal resources. The market form of coordination relies heavily on the availability of resources to individuals and their knowledge to use their resources to their advantage (Wollmann 2003). Intergovernmental relations use all three forms of coordination, but this discussion will focus on the use of network coordination.

While the term network is often used loosely to incorporate all coordination that is not hierarchical or market, there are three types of network coordination that rely upon voluntary participation and mutual trust to succeed: partnerships, networks, and collaborations. Partnerships, networks, and collaborations have distinguishing characteristics that are identifiable by the participating parties' investment and formality in the relationship. Partnerships occur when public or private organizations agree to work together to meet a mutually decided goal. These relationships are generally limited in scope, and the organizations remain independent of one another but can become more integrated as the relationship grows (Klitgaard and Treverton 2004; Mandell 2004). Conversely, networks are characteristically defined by the level of interorganizational dependence, variety of actors and goals, and length of relationships. Based upon these characteristics, networks can be placed on a continuum based upon "the degree to which the individual members remain separate and autonomous or form a new, combined, unit for long-term change and interactions" (Mandell 2004: 5). Agranoff (2004) identified four types of networks named informational, developmental, outreach, and action that as titled described the intent and purpose of the network. These networks as applied to the network continuum provide a good base for using network characteristics to define it because as you move from one end of the continuum to the other, the degree of interdependence and the need for collaboration varies.

Networks and partnerships are commonly referenced as the vehicles of collaboration, but collaboration can also be a product of a highly distinguished, interdependent relationship (Kamensky and Burlin 2004; Mandell 2004). Whereas networks and partnerships represent high levels of autonomy and separation, the organizations of collaboration are highly interdependent to the point of creating a new entity from the collaboration process (Mandell 2004). Collaborations occur when interorganizational relationships go beyond coordinating implementation but actually integrate to create a new entity (e.g., community, organization, or service) to address the issue. Collaborations will be discussed further in the next section. Identifying the delineation between these modalities allows them to be applied to individual situations and contexts. Mandell (2004) argues that networks are a better fit when the goal is to coordinate activities while collaborations work better to make changes in institutional arrangements.

Network membership implies that participating organizations are equal and interdependent, agreeing to rely upon one another to meet the defined goal, but each member of any network must work within their own organizational constraints including the political arena, legislative and funding mandates, and client needs. Leadership falls to all members to follow through with their responsibilities, which is the basis for trust within the network. Accountability is difficult to determine because there is no authority figure for the network. Each organization representative is accountable to his or her home organization, but determining network-wide accountability is more difficult (Agranoff 2004). If a network is being used specifically for coordination (e.g., coordinating disaster response) then the overarching federal agency (e.g., FEMA) may be able to act as the facilitator and maintain the overarching accountability of the subagencies.

Finally, coordination is a political process. Interorganizational relationships among government agencies and any other type of organization occur in a political environment. Within this environment, the most successful coordination efforts are those that are done voluntarily but result in a trade-off in how well these voluntary actors can perform (might want to explain why their performance might drop) (Peters 1998). Coordination among networks can be guided by understanding the organizations underlying values. "If there is common logic across organizations then coordination is more likely to occur without using authority and if organizations share

common policy values coordination is also likely with less disruption of organizational routines” (Peters 1998: 299). Networks created to implement coordination of activities are best created of voluntary organizations with similar intents and purposes.

24.5 Intergovernmental Relations as Interorganizational Collaborations

Intergovernmental relations act as interorganizational collaborations when multiple organizations go beyond simply coordinating activities and resources. Collaborations occur when a new entity is produced from the combined effort of organizations and resources (Denise 1999; Mandell 2004). Partnerships and networks have both been used in collaborative efforts although they are not necessarily the highly integrated outcome of collaboration (Tierney 1985; Waugh and Sylves 1995; Wright 1998; Donahue and Joyce 2001; Kamensky et al. 2004; Mandell 2004; Waugh 2004). The use of highly integrated, interdependent collaborations as a form of intergovernmental relations allows public and private organizations to work together and create a new solution to a problem larger than any one organization can handle.

When a group of previously unorganized organizations forms to create a new entity concern may arise about the organizations’ ability to work together efficiently. In many relationships, trust develops over time increasing the effectiveness of the relationship. However, Weick and Roberts (1993) describe an important concept for understanding how collaborations can work despite being created as a temporary entity on an as-needed basis. That is, when the task is accomplished, the collaboration is disbanded. Collective mind is the intentional connection of activities while acting as part of a group, or collective, based on the group’s norms. The research identified that both well-established and unfamiliar groups did not affect the group’s mind, the connection of activities within the collective. When applied to collaborations or networks (less formalized group), a collective mind can initially be developed and will become stronger as the group continues to work together over time (Morgan et al. 1994; Ostrom 1990). Applied to intergovernmental relations, the creation of new groups with little familiarity of one another does not necessarily doom the outcome of the group nor limit its productivity until the group has had time to adjust. Instead, if a developed collective mind exists, then collaborations of less formalized groups can successfully create new products by relying on mutual respect, coordination of action, trust, and strategic communication (Weick and Roberts 1993).

In addition to group processes such as respect, trust, and regular interaction, organizations must have the capacity to collaborate in order to be successful. An organization’s capacity to collaborate includes having the appropriate resources (e.g., financial, technological, human, and time) to contribute to a collaborative effort to create a new product. Not only does an agency need to be able to support their commitment to the collaboration, they need to be able to effectively communicate within an interagency context. Bardach (1998) identified interagency collaborative capacity (ICC) as an important framework for creating new collaborative efforts. Building ICC is compared to building a house; it requires tools and supplies but the knowledge to build the house correctly. Successful collaboration capacity building is a “function of the skill and purposiveness of craftsman interacting with the quality of available materials and the craftsmen’s ability to fashion protections against potentially destructive environmental forces such as personnel turnover and the erosion of political alliances” (Bardach 1998: 49). Building capacity for interagency collaboration requires that participating managers remain steadfast in the process without giving in to the personal preferences. Collaboration efforts integrate multiple organizations to create a new

product, yet the product belongs to the organizations and the collaboration, not the individuals. The power of creation can be confused with ownership and the need for control, which is actually detrimental to the collaborative effort.

The use of collaborations to create new entities to address wicked problems and complex issues consists of much uncharted territory. The use of collaborative efforts such as networks and partnerships are complex and difficult to manage because they each have organizational restraints and are limited by their commitment to the effort. However, the creation of new entities through collaboration requires another level of commitment from the participating organizations and environment. The creation of new collaboration entities requires that leadership, management, and employees participate under the name of the new entity. When many network participants do so in addition to their everyday job, the creation of a new entity requires that new rules be written.

24.6 Intergovernmental Relations in Practice: Implementation Challenge

The implementation of intergovernmental relationships in culturally and structurally diverse organizations has faced various challenges including a lack of common understanding among actors, low levels of trust, limited authority, and limited capacity to participate (NAPA 2004). Public administrators faced with the task of coordinating the efforts of networks or creating a new product through collaboration are not necessarily experts on working in an interagency context. In a network, the implementation of network programs is often done in home agencies. The individual agencies take their network assignments and implement them with their organization's resources, which lies outside the direct view of network peers. However, this limits the ability of the network to ensure successful implementation because, ultimately, the agency is independent (Agranoff 2004). In collaborations, the challenge exists in overcoming the organizations' structural and cultural differences and "determine its strengths and weaknesses for encouraging cooperative effort; and then to tap common interest and exchange, as appropriate and practical, to increase prospects for success" (O'Toole 2003: 238). The prospects for success are highlighted by bringing onboard capable partners, developing a supportive environment, and structuring to achieve results (NAPA 2003).

It is important for all implementation plans to identify not only the number of participating agencies but also the type of relationship they have (O'Toole 2003). High levels of interdependence are often correlated with high levels of bureaucracy and slow administrative response, but intergovernmental relations do not have to be bogged down with unnecessary processes and outdated measurement systems. To be effective, the agencies must reciprocally command the support, resources, and commitment of the other (O'Toole 2003).

Intergovernmental relations in emergency management is the coordination of multiple agencies with independent responsibilities that come together to accomplish a task that cannot be accomplished alone. This synergy is exemplified by the efforts of first responders in disaster situations. Local emergency management officials hold the emergency operations center (EOC) as the nucleus of response operations where representatives of public safety, fire/rescue, law enforcement, city and local health departments, and local water districts meet to ensure that necessary information is communicated in a timely fashion. Press conferences are held to inform residents of the current disaster situation and provide additional instruction. Various informal networks respond during a disaster such as those providing immediate shelter, food, or health services during and

after the disaster. Public, private, and nonprofit organizations align themselves with one another based upon their purpose and coordinate their efforts by communicating through the EOC to support the community. Applying this framework to homeland security becomes unclear as the scope of the disaster become wider and more ambiguous and the size of the agencies participating grows.

Networks must overcome social issues before they are able to work together cooperatively. A successful organization is built upon interdependency, trust, and sharing the credit for successes (Agranoff 2004), but large federal organizations have years of disloyalty, mistrust, and selfishness to overcome before they are able to successfully participate in homeland security networks. Developing trust among agencies is done by mutual learning and action in a network. The action that builds trust is the completion of accepted assignments, follow through, and commitment to the cause (Agranoff 2004). A high level of interdependency among agencies also builds trust and strengthens the network because agencies recognize the reciprocal need to be a competent peer (O'Toole 2003; Agranoff 2004; Mandell 2004). If one partner does not perform their objectives in an interdependent relationship, the other is bound to fail as well. This places accountability with each agency, and their peer is likely to be their biggest motivator. In addition, individual organizations accepting praise for a network success breed discontent among the network agencies and, overall, negatively affect the network (Agranoff 2004). Effective horizontal relationships are essential to improving the disaster response mechanisms that currently exist (GAO 2002; Kettl 2005). Kettl discussed the urgent need for cooperative coordination among homeland security agencies because the unknown threat waiting beyond the *homeland* is larger than any one agency or any level of government:

The key to an effective homeland security system is, in fact, connecting the dots – ensuring strong coordination among those responsible for prevention and those charged with response. No single agency, no single level of government – indeed, no government itself, without the active partnership of its citizens can hope to forestall attack. Should an attack occur, no one agency, level of government – or even government itself – can adequately respond. (Kettl 2004: 28)

24.7 Assessment of Intergovernmental Relations in Response to Hurricane Katrina

Prior to the NRP being activated, a state governor must request that the president declare that an emergency exists. Then, the Secretary of Homeland Security must declare the emergency to be an *incident of national significance*. In the meantime, the state and local governments are responsible for implementing their own emergency plans (DHS 2004). In response to Hurricane Katrina, blame has been placed on all levels of government. Mayor Nagin of New Orleans and Governor Blanco have been criticized for not following the Louisiana State Emergency Plan. On August 26, Governor Blanco declared a state of emergency, yet the mandatory evacuation was not issued until 2 days later, August 28. President Bush had issued an emergency declaration the day before on August 27. The inadequacy of the local response and preparation is further evidenced by situations such as the 200 school buses that were left abandoned in downtown New Orleans, flooded by the storm. These buses could have evacuated 13,000 people (Mulrine 2005a).

The Secretary of Homeland Security, Michael Chertoff, was “extremely pleased with the response of every element of the federal government,” yet President Bush said the response to

Hurricane Katrina was “not acceptable” (Mulrine 2005b). FEMA’s response to the disaster seemed disorganized, and drew criticism from many. In one particular situation, FEMA directed emergency personnel to Charleston, South Carolina, to await 180 evacuees, only to find that the evacuees were being flown to Charleston, West Virginia. FEMA officials had made the same mistake only 6 h before (Mulrine 2005a). There were reports that FEMA did not coordinate its response with local governments, rather, its efforts hindered local recovery efforts. The president of Jefferson Parish, Aaron Broussard, reported that FEMA blocked delivery of trucks of water to Jefferson Parish and delivery of fuel from the Coast Guard and cut communications lines without notice. However, Broussard’s own actions in response to Katrina have been criticized, and he “has admitted to ‘flaws’ in the parish disaster plan,” including the evacuation of pump workers to shelters in Washington parish. The inability of these workers to return to restart water pumps at the levees is being blamed for the flooding of thousands of homes (Krupps 2005).

Communication failures plagued the recovery efforts; many cell phones and landline telephones were inoperable. Amateur radio provided emergency communications and health and welfare information to the public. Protection of critical infrastructure is an area of homeland security that was apparently underestimated in New Orleans. Before Hurricane Katrina, the Army Corps of Engineers warned that the levees surrounding the city may not withstand a Category 3 hurricane. The construction of the levees themselves increased the vulnerability of New Orleans, causing the city to sink further below sea level. Budget proposals to restore and strengthen the levees were cut by the Bush Administration from \$14 billion to \$540 million over 4 years (Grunwald and Glasser 2005).

Critics of the NRP note the unwieldy nature of the document, “[t]he size and complexity of the NRP inhibits its full implementation when state and local governments who are relied upon to carry it out have not been full partners in its creation and have little control” (Neuby 2005). Other concerns include lack of federal assistance to fund activities required by the NRP. The federal grant process is slow, as well as is the pass-through money provided to the states for the distribution to cities. Also, it is claimed that the state and local officials have not been given enough access to intelligence available to federal authorities because of a lack of security clearance (Neuby 2005). Secretary Chertoff addressed information sharing following terrorist attacks in London in July of 2005: “The ability to share information with our state and local partners and with the private sector, law enforcement and first responders is absolutely critical to our success. Otherwise, we are effectively tying the hands of those who are on the ground and charged with the responsibility of protecting their community, their neighbors and their family” (Chertoff 2005). Chertoff further praised state and local responders and admitted the need for a “richer intelligence base” shared between federal, state, and local officials, as well as the private sector. A six-point agenda was presented that included “enhance information sharing with our partners” (Chertoff 2005). Whether or not DHS will successfully act on these statements is yet to be seen.

Even in the wake of Hurricane Katrina, DHS plans to remove the responsibility of national disaster preparedness from FEMA (Holdeman 2005). Secretary Chertoff announced that there are plans to “retool FEMA,” in light of its shortcomings in response to Katrina. Chertoff cited poor performance in logistics, contracting and procurement systems, communications, handling disaster-assistance phone calls, the distribution of aid, and staffing (Strohm 2005). Before Katrina, in July of 2005, Chertoff had already announced plans for structural changes to DHS. Some key points included strengthening intelligence functions and information sharing, improving coordination and efficiency of operations, and enhancing coordination and deployment of preparedness assets (DHS 2005). This disaster seems to have proven the need for a national response, a federal form of leadership in emergency management. Many are concerned that DHS is too focused on

acts of terrorism to devote sufficient attention to the management of natural disasters. The director of the King County Office of Emergency Management feels that the state and local practitioners are left “with no national leadership and no mentors. We are being forced to fend for ourselves, making do with the ‘homeland security’ mission” (Holdeman 2005).

A criticism of FEMA and DHS’s current structure is the line of authority. Many, including Governor Bush of Florida, feel that the FEMA director should have a direct report to the president; they should not have to report first to the Secretary of Homeland Security at DHS. This reporting structure, as well as the structure of the divisions within FEMA, needs to be changed to allow for a swifter, more efficient response in emergencies (Bush 2005). In light of Chertoff’s announcement to reorganize DHS and FEMA, it has been suggested that the congress explore other options. One option is strengthening FEMA, rather than weakening it. Another option is to reexamine and perhaps change the authority of other emergency agencies not within DHS. A third option that the congress has been encouraged to consider is authorizing FEMA as an independent agency, outside of DHS (Bea 2005).

24.8 Lessons Learned

The response to Katrina, like many disasters preceding it, has highlighted the flaws and inadequacies of state, local, and national emergency management. There are many lessons to be learned from the incident that can improve the NRP and the implementation of the NRP in the future.

24.8.1 Federal Budget Should Emphasize Disaster Preparedness

As evidenced by the cutting of funds to strengthen the levees in New Orleans, there has been a lack of support in the federal budget for emergency preparedness. The Government Performance Project of 2005 evaluated and graded all 50 states on their ability to manage money, people, information, and infrastructure. An examination of the infrastructure grades is telling and alarming. Twenty-one states, including the southeastern states of Louisiana, Mississippi, Georgia, South and North Carolina, and Alabama, received grades of C or below on their ability to manage infrastructure. These states are prone to hurricanes every year, yet they are evaluated as being inadequate in their daily management of roads, bridges, and buildings. The performance of these state’s management systems in disasters seems questionable (Kettl 2005). Currently, the receipt of federal assistance is tied to National Incident Management System (NIMS); states are supposed to meet a minimal level of preparedness before receiving emergency preparedness funds. However, many local governments complain that they are not receiving the needed federal assistance. At the US Conference of Mayors in 2004, 52% of 231 cities surveyed across the United States reported that they have yet to receive any money from the state-block grant program. This is a homeland security program that provides funds for first responders at the local level (Spears 2004). Perhaps if more federal funds were made available for emergency preparedness, and levels of preparedness at the state and local level were more closely regulated, response plans could be implemented more effectively.

24.8.2 Incident Command System and a Clear Leadership

One lesson is the importance of a functioning incident command system. There was a lack of communication and chain of command in and around New Orleans. For instance, evacuees leaving

New Orleans on foot after the issuance of the mandatory evacuation were turned away by police in an adjacent town, Gretna. Obviously, these municipalities had not established a functioning incident command system. The president of the International Association of Fire Chiefs, Bill Killen, was quoted as telling the congress that “Louisiana had a system based on” incident command “but did not utilize it” (Swope and Patton 2005).

After 9/11, Mayor Giuliani was a clear leader and built a network of horizontal partnerships (Kapucu 2003). Four years later, Louisiana did not have a clear leader, the state and the city of New Orleans did not exhibit a clear chain of command. The immediate response seemed to be a struggle over which government official was responsible for the disaster. This disorganization and lack of preplanned structure likely increased the negative impact of the disaster. Disasters, whether they are natural like Hurricane Katrina, or man-made like 9/11, do not occur within our preset jurisdictional lines. Our plans to handle emergencies must cross boundaries; they must coordinate state, local, and federal jurisdictions and create a clear chain of command (Kettl 2005). To facilitate a timely response to disasters and mitigate the loss of life and damage to property, there must be *prearranged decision protocols*. These protocols must be repeatedly rehearsed by the people who will be involved in the actual emergency so that the response is as effective and efficient as possible. Practicing the plan for emergencies is vital. In Florida, Jeb Bush touts the state’s emergency plan and the staging of tabletop exercises several times each year testing various disaster scenarios (Bush 2005). When practicing emergency response scenarios, emergency plans must take into account the very likely possibility that a percentage of emergency responders will not be able to perform their duties. After Katrina, 15% of New Orleans police officers did not report for duty. During 9/11, 409 of the casualties in the World Trade Centers were emergency first responders (Swope and Patton 2005). Emergency plans must be able to operate with a greatly reduced force of people.

24.8.3 Communication and Coordination

Another very important lesson that must be learned is that in a disaster, there will be breakdown in communication, both telecommunications and information technology infrastructures will be disrupted. Mayor Nagin of New Orleans and his staff did not have communication for 2 days after the storm hit. Unable to establish a communication system, Nagin sent messages through CNN reporters and, eventually, was able to use an Internet telephone account set up for personal use by a staff member (Kapucu 2005; Kettl 2005). During 9/11, the breakdown of communications left police officers, firefighters, and rescue workers unable to communicate with each other because of incompatible radio frequencies (Swope and Patton 2005). The Government Accountability Office’s (GAO) report on Hurricane Katrina regarding preparedness, response, and recovery noted that communications and coordination among first responders were lacking, despite previous recommendations in GAO reports issued in 2003 and 2004 (GAO 2005). In a disaster, the normal means of communication, cell phones, landline phones, the Internet, even radio frequencies will most likely be inoperable. Emergency plans must include alternate methods of communication, and plan ahead in the event that communication is impossible, operations still run as planned.

Florida uses a statewide radio system that allows emergency responders to communicate in a disaster, regardless of the frequency they normally use. Over 200 public safety dispatch centers in every Florida county are able to connect to this system (Bush 2005). Global positioning systems (GPS) are a tool that can improve coordination and preplanning in response to emergencies. For instance, in the event of a hurricane, GPS can help predict the path and strength of the storm and assist in the identification of which populations need to evacuate and which do not need to evacuate.

Besides technology, handling communication and coordination begins with developing relationships between people. Public officials must establish relationships between municipalities and agencies before a disaster strikes. Preexisting trust is vital for effective coordination in an emergency (Kettl 2005). Among other factors, high performance in disasters depends on the coordination and development of positive, trusting relationships between emergency agencies and responders that allow for the suspension of rules because of unexpected needs (Kapucu 2006). The GAO has issued many reports related to emergency management, including a report following September 11. These reports contain several recommendations, especially concerning coordination at the top levels of government. However, it has not been determined if these previous recommendations have been implemented (GAO 2005).

24.8.4 Media and Public Response

The management of the media and relaying messages to the public are important aspects of disasters that need to be planned. The media can help or hinder disaster response, depending on the level of cooperation with localities. For example, after Katrina, the media saturated the news with images of looters, dead bodies in the street, and people trapped on their roofs. Intense images on the news can sway the public, as well as emergency responders. In New Orleans, the media coverage of looters pressured police to stop the looting, though this may not have been initially the first priority for the police force (Swope and Patton 2005). The media can be a tool to aid in the response to disasters, as evidenced by the public's contribution of 1.4 billion dollars in response to 9/11, which was broadcast on national television as the event occurred.

Another lesson to be learned from Katrina is that many people do not listen to the government. Approximately 100,000 people remained in New Orleans, ignoring the mandatory evacuation. According to a poll conducted by the Washington Post, over half of evacuees admitted they could have evacuated New Orleans before Katrina made landfall but chose to stay. The majority of these evacuees claimed they did not believe that Katrina would be so devastating. State and local emergency managers need to address this issue; people who remain in disaster situations put themselves, as well as emergency workers, in danger (Swope and Patton 2005).

24.8.5 State and Local Governments Are Initially Responsible

Effective emergency management must come from the bottom up, state and local governments must take responsibility. The federal government also plays an important role, as Jeb Bush stated in his Testimony to the House Committee on Homeland Security, "FEMA should serve as a conduit to the tremendous resources available at the federal level" (Bush 2005). The NRP provides a structure in which local governments must be prepared to sustain themselves for up to 72 h before federal aid can reach the disaster area. If a local government needs assistance in preparation or response to a disaster, it is their responsibility to request assistance from their state government (DHS 2004). New Orleans did not seem prepared to respond to a recovery without immediate federal aid.

28.9 Conclusions

Intergovernmental relations are complex interactions among the multiple levels of government that require a coordinated effort but also creativity to successfully address the needs of national

issues. Large, complex, and seemingly unsolvable wicked problems are best approached from a cooperative effort combining resources and preventing duplication; however, organizing the cooperative effort is almost as difficult as the problems they are created to address.

The current era of public administration requires that public managers know more than traditional organizational management methods. Public administrators must learn to solve problems within the cultural, structural, and political boundaries of networks, partnerships, and collaborations while still managing the boundaries of their own home organization. The values of new public management extol accountability, performance measurement, market demand, and customer satisfaction. New public management values coupled with cooperative efforts in policy implementation have created a bolder intergovernmental force at an appropriate point in time.

The policy environment since the attacks of 9/11 has been focused on serving the country's homeland security needs. Those needs are revolving and reiterating with each new experience, proving to be unapproachable from the centralized hierarchy as seen by the perceived failed response to Hurricane Katrina victims. The complex needs of homeland security (intelligence, border patrol, immigration, disaster response, and law enforcement) have forced the creation of a unique and complex network of agencies. The horizontal relationship among these agencies and the unfaltering need for a coordinated effort from these agencies supports the growth and implementation of networks, partnerships, and collaborations as modalities for addressing new policy issues.

In general terms, intergovernmental relations are the working relationships that various levels of government create in order to more effectively meet community needs. Classic administrative theory describing managerial principles focused on departmentalization and specialization of administrative functions to increase effectiveness and improve overall efficiency. Compartmentalized and specialized agencies and administrative functions have served as the rule leaving open unmet needs. Agency focus on producing a certain product has created gaps of service between the individual functions. Those gaps, or the need to fill those gaps, motivate units or agencies to align with others to provide a needed service. In addition to specialization, often times agencies do not have the resources or capacity to reach the goal alone. Partnerships and alliances create new funding sources, alleviate staffing deficiencies, and provide opportunities for good public relations. In many communities, public and nonprofit agencies must work together to be eligible for state and federal funding. The dimensions of intergovernmental relations include division of powers and functions among many levels of government; administrative and political relations between levels of government; and gap-filling activities, relationships and organizations that arise between levels and units.

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Chapter 25

Learning from the Katrina Crisis

A Global and International Perspective with Implications for Future Crisis Management

Ali Farazmand

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The study of crisis and emergency management—or mismanagement—during Hurricane Katrina will continue to proliferate academic literature in the near future. This chapter presents a global and international perspective on Katrina as a case of “grand failure” in crisis and emergency management, with lessons and implications for future crisis management. Benefiting from empirical data collected from international interviews, the chapter presents a theoretical analysis of emergency governance and crisis management, discusses a detailed global perspective on Katrina crisis management as a “management and leadership crisis,” offers a number of key lessons learned from Katrina, and draws policy and administrative recommendations for future crisis and emergency management through

a theory of “surprise management” that is adaptive, collaborative, and citizen engaging, and draws on chaos and complexity theories to cope with hyperuncertainties and unknowns.

Throughout history, governments have been tested for their competence in governing crises and managing emergencies, preventing or managing catastrophic disasters, saving lives and property, and providing security for their citizens. Failures of such tests have brought down governments and triggered regime-changing revolutions. This test of competence is much more significant today than ever before, as modern governments seem to be better equipped technologically and must rely on “legitimacy” and the trust of their people in order to govern.

...No government is immune to the chaotic crises that can cause system breakdown....

Failure to respond to and govern effectively during crisis situations and to manage disaster-driven emergencies may result in the loss of legitimacy and cause system breakdown; it can create chaos and lead to crises with far-reaching consequences and uncontrollable outcomes. For example, political crises led to the collapse of the French government several times from the nineteenth century well into the mid-twentieth century. This also caused the fall of the Soviet Union at the height of its global position as a superpower, and a similar political crisis—of both legitimacy and performance—led to the Revolution of 1979 and the fall of Shah’s absolutist regime in Iran. A vivid illustration of this test of government competency failure is the conduct of the Iraq War by the George W. Bush and Tony Blair administrations, which caused a lingering legitimacy crisis for both. This failure forced Blair to step down and sunk the Bush presidency to the lowest level in both the US public opinion and the eyes of the world. Similarly, the failure of the Israeli army—one of the largest in the world—in its 32-day war against a small Hezbollah group in Lebanon in 2006 caused a deep crisis of legitimacy in Ehud Olmert’s government and fostered a broken image of one of the world’s most formidable armies.

Thus, no government is immune to the chaotic crises that can cause system breakdown and transformation or regime change. Managing natural disasters and coping with “inconceivability and hyperuncertainty” in modern public management are keys to the test of competency in sound governance and public administration. Sudden floods, earthquakes, and tsunamis illustrate disasters that, unless managed effectively, can lead to crises having serious consequences. Similarly, hurricanes, terrorist attacks, and violent revolutions can produce crises with potentially chaotic dynamics and far-reaching consequences, unpredictable outcomes, or even system breakdowns. Thankfully, they usually give plenty of warning signals, time in which response planning and preparation can be organized, so the devastation they may be causal outcomes of earlier ill preparation, poor governance, and mismanagement or maladministration. They are consequential crises, whereas the former crises are chaotic, sudden, and nonlinear, with hypercomplexities and potentially unknown outcomes. A central feature of all these crises is the sense of *urgency* demanded in managing them. Yet, if this is the story of yesterday’s and today’s emergency and crisis management systems, tomorrow’s will be a much tougher, much more complex one, as we will be facing a world of much more “inconceivable” (Dror 2001), “unthinkable” (Handy 1998), and “unknowable” challenges (Stacey 1992).

Crisis are borne out of short chains of events, often unpredicted and unexpected. They develop with dynamic and unfolding events over months, days, hours, or even minutes. They disrupt the routine events of life and governance, disturb established systems, and cause severe anxieties. They produce dynamics that no one can predict and control. This is the case with most popular revolutions and, certainly, it was the case with the Hurricane Katrina crisis, a crisis borne of a grand failure of emergency management and governance that led to mismanagement and a

leadership crisis of megamagnitude. Once elevated to the crisis level, disaster management during Katrina shifted into chaos, requiring a set of knowledge, skills, and sense of urgency that had been absent in the preparation and response stages of crisis management in New Orleans.

...What lessons can be learned from Katrina for the research and practice of emergency and crisis management worldwide?

This chapter presents a global and international perspective on Katrina crisis management—or rather, its leadership and management crisis—with implications and lessons for future crisis governance and management. Hurricane Katrina produced a catastrophic disaster that caught the focused attention of the entire world with sympathy, concern, and shocked amazement. In this age of information technology and globalization, peoples and governments of the global community watched live 24 hour television reports as the appalling events of the crisis unfolded. As horrifying as these images were, what really shocked the world was the miserable failure of preparedness and the response systems of the city, state, and federal governments of the United States and their leadership failure in managing the crisis that engulfed New Orleans and the nation. Hardly anyone missed seeing such a grand failure of the most advanced nation on earth in coping with a chaotic crisis within a fairly defined geographic area. They all observed through realtime and report coverage how an advanced nation, the United States, was caught by surprise and unprepared to deal with a sudden, chaotic, large-scale system crisis that seemed to paralyze all administrative and governance capacities. This failure of leadership burst the bubble of belief that the United States was a great nation, let alone a global leader; where the country's leadership once had stood as an example to be emulated, it was now a case study in failure. And then, the situation worsened.

This grand failure has raised many questions for scholars, experts, citizens, policymakers, and practitioners worldwide, not only in public management and administration but also in governance and international relations, as well as in the private and nonprofit sectors. Knowing the elevation of New Orleans was under sea level, why were the levees not built for a Category 5 hurricane in the first place? Why was the entire emergency response system not prepared for unexpected events? Why was a management system not developed for such an unexpected emergency and crisis situation? Why did the leadership at all levels of government fail to act in time? Why did it take 5 days for the federal government to respond? Why were people not evacuated when plenty of warnings had been issued in advance? How does this affect America's image and prestige as a superpower in the eyes of the twenty-first-century world of nations and their peoples? What would America do if faced with multiple crises and simultaneous popular revolutions challenging its global hegemony and dominance around the world? How reliable is its capacity and willingness to help friends and foes in other crises around the world? What would this mean to the future of crisis and emergency management in developed and developing nations? And finally, what lessons can be learned from research on Katrina for the practice of emergency and crisis management worldwide?

These are big questions in need of book-length investigations. No doubt, there are many implications, beyond administrative and policy questions, that will affect our way of thinking about management and governance in the increasingly unknowable world of hyperuncertainty and inconceivability, as well as about crisis management theory and practice. This chapter addresses a global perspective, from the outside in, on the Katrina crisis and emergency management, presents several key lessons learned from the Katrina crisis, and offers some global implications with recommendations for future crisis and emergency management. This essay argues that crisis and

complex situations require new ways of thinking and a new mind-set, a complexity-driven management system that can accurately read chaos and crisis situations with unfolding dynamics and surprises, and manage crises through what I call a “surprise management system.” This is a prescription for survival in the age of rapid globalization, hyperchange, hypercomplexity, and an “unknowable world” (Stacey 1992). This study benefits from 47 informal interviews conducted after Katrina with international scholars; ordinary people, including taxi drivers, teachers, shopkeepers, and government officials; and crisis and emergency experts representing more than 13 countries (France, Germany, the Netherlands, Iran, India, England, South Korea, China, Japan, Chile, Venezuela, Trinidad and Tobago, and South Africa).

The next section presents a theoretical analysis of emergency governance and crisis management. This is followed by a detailed discussion of Katrina as a “global case of crisis governance and management failure” from a global perspective and includes several international implications, identifying the key areas of failure as evidenced in poststorm investigations, scholarly studies, and reports. The next section offers several important lessons learned from Katrina—good, bad, and ugly—that may help us understand the mistakes and prepare better for the future. The final section offers recommendations for capacity building—through “anticipatory surprise management”—in emergency governance and crisis management theory and practice, education, and training in the age of globalization, and chaotic uncertainty.

25.1 Theories of Emergency Governance and Crisis Management

Theories of crisis governance and management offer rich knowledge of what needs to be done in the case of emergencies and crises facing modern governments. Some ancient great powers, such as Rome and the world-state empire of Achaemenid Persia, had in place elaborate and highly flexible emergency management systems throughout their far-flung territories as part of their “strategic” public management systems. Their proactive efforts were to create efficient bureaucracies and administrations to deal with floods, storms, earthquakes, and political or military emergencies (Cook 1983; Farazmand 2001; Olmstead 1948). Today’s modernist theories of emergency and crisis governance inform us with fresh knowledge of how “sound governance” (see Farazmand 2004) may and should perform in such situations (Allison and Zelikow 1999; Balke 1996; Dror 2001; Leng 1990; McCormick 2000; Schmitt 1963; Schumpeter 1942).

In public administration, there is a growing body of literature on the twin fields of crisis and emergency management that spans nations, cultures, and areas of security administration, terrorism, disasters, and catastrophes (Comfort 1988; Farazmand 2001, forthcoming; Haddow and Bullock 2006; Mitroff 2004; Perrow 1984; Pinsdorf 2004; Rosenthal et al. 2001; Sagan 1993; Schneider 1995, 2005; Steinberg 2000; Waugh 2000; Wise 2006). In emergency and crisis governance, a crucial mandate appears to separate the functions of governance from those of management of public organizations across the board, ranging from situations considered “extraordinary” and emerging, such as political riots and upheavals, revolts and revolutions, foreign military threats, to economic breakdowns with potential consequences that threaten political system collapse. Although common among underdeveloped or developing countries, such destabilizing forces of crisis and chaos are becoming common threats to modern democracies of the West, as well (Dror 2001). Global transformations may inevitably produce major breakdowns in social systems, engulf major countries and regions, and “constitute a major challenge to capacities to govern in the foreseeable future” (Dror 2001, 204).

While some breakdowns may be “birth pangs of a better future,” constituting what Schumpeter (1942) called “creative breakdowns,” we still have very little knowledge of the transformation breakdowns, and this we can learn from chaos theory (Dror 2001; Farazmand 2004; Kiel 1994; Prigogine 1984). What we do know, however, is that catastrophic and chaotic breakdowns can become very disruptive, brutal, and result in much human suffering with aggressive behaviors. Thus, emergency and crisis-driven breakdown situations require “extraordinary” governance and politics on a transient basis, demanding an “emergency governance and management regime” to cope with and manage the situations (Balke 1996; Schmitt 1963). The authority of a sovereign power to declare a state of emergency is recognized in governance theory (Schmitt 1963) as a viable method to cope with emergency situations (McCormick 2000). This must, of course, be done with care and stop far short of becoming dictatorial regimes—including imperial presidencies or constitutional dictatorships—that threaten democracy and civil liberties. Emergency regimes are dangerous, and no one likes them—nor should they—especially when they adopt many unnecessarily harsh policy measures (Gomien 1993; Leng 1990), tend to become aggressive, and seek to perpetuate themselves. However, also very harmful and devastating are situations in which “no government can be maintained, law and order breaks down and societies approach total collapse” (Dror 2001, 206). Thus, in this age of rapid globalization and global threats of violence, terrorism, conflicts, war, poverty, and insecurity crisis and emergency governance arrangements must be instituted and constantly upgraded to respond to the needs of the time, especially by global institutions such as the United Nations (Bartholomew 2006; Hoffmann 2006; UN 2001).

What emergency governance regimes do in crisis situations is a subject for many studies beyond this short essay, but a few comments are necessary here. The key purpose of emergency government is first to arrest the evolving emergency or crisis situation that may transform into a chaotic one with unfolding dynamics. The sense of being in charge through a central command system alone provides the structure necessary in all emergency situations. Steps following this stage may vary from response strategies to recovery and normalcy plans that help reduce the extraordinary situation, making it possible to pass through the transient stage of emergency governance and learn from the experience. Obviously, not all emergencies produce crises, and not all crises demand a state of emergency, but all crises and emergency situations give signals for *urgency* in action before rising to higher levels of criticality. Despite the effectiveness of emergency and crisis regimes from time to time, there is no guarantee that such governance measures will always succeed, especially when the political legitimacy of the regime is questioned. Examples include the revolutions in France, Russia, Iran, Nicaragua, and elsewhere around the world. In all these cases, the emergency regimes trying to stop the revolutionary movements failed because of a legitimacy crisis, but such measures did seem to work in situations such as the social upheaval in Los Angeles in 1980s and France in 2006. Key to emergency governance is application of “specialized” expertise outside the bureaucratic structure of government, one that is flexible, robust, upgraded constantly, and well informed. Yet, it is still bureaucratic capacity that provides mass power to the state in crisis situations.

In military emergencies, it is the army bureaucracy that is behind the flexible central command structure with special forces, but in social crises and emergencies, bureaucracy is too slow to act as a leader and must be supplanted by a central command system that can mobilize the forces of government (the bureaucracy), along with a host of other organizations such as networked systems, voluntary forces, and foreign assistance contingents. An important aspect of crisis and emergency governance is a sharp and timely recognition and definition of a situation as an emergency or crisis, as opposed to routine functions in disturbance. Such distinction is not often easy, as there may not be an immediate consensus among key actors or leaders as to what

constitutes a crisis. Nevertheless, governance theories do inform us of the necessity for emergency regimes and crisis governance systems. The leaders and peoples of the United States and the Soviet Union experienced this unpleasant situation during the Cuban missile crisis of the 1960s. Both countries came to the realization of the possibility for mutual destruction in the face of a thermonuclear conflict and agreed to a collaborative working relationship by the 1970s (Allison and Zelikow 1999).

The twin fields of crisis and emergency management in public administration have been growing slowly but steadily, though they have a long way to go to reach a level of intellectual and practical maturity. Recent national and global events, including the 9/11 attack in New York, the Oklahoma City bombing, the London and Madrid train bombings, and potential threats of nuclear, biological, and hazardous challenges, seem to have established an *urgent* need for such a body of knowledge in crisis and emergency management. Today, this issue has become a global challenge, as the threat of terrorism has threatened global security and peace. At the global level, this imperative has already been addressed by the United Nations and its member states through plans and programs to mitigate risks to societies, prepare for natural and man-made disasters, and respond with better capacities in crisis and emergency situations. The Asian tsunami disaster of 2005 affected several nations, took more than 200,000 lives, and involved the entire global community in coping with the crisis that devastated economies and social systems. Today's other global crises include Darfur and Palestinian–Israeli conflicts, the Iraq War, refugee crises, genocides, poverty, and floods and earthquakes that afflict nations and demand global solutions.

In public administration, as the world enters new stages of rapid globalization the body of knowledge in crisis and emergency management is now expanding beyond its traditional scope and parochial parameters to embrace new concepts, approaches, and capacity building through chaos and complexity theories, adaptive and flexible system designs, and global or international dimensions. Traditionally, crises were considered the manifestation of “unness” (Hewitt 1983), with natural disasters viewed as acts of God that were “unwanted, unexpected, unprecedented, and almost unmanageable, causing widespread unbelief and uncertainty” (Rosenthal et al. 2001, 5). Today's concepts of crisis and emergencies are no longer mainly externally oriented; they are everywhere with us, and they have become part of our lives.

Modern crises are characterized by complexity, interdependence, and politicization. “Tomorrow's crisis, in turn, will look different from today and yesterday's crises” (Rosenthal et al. 2001, 6). Yet, this reality is not widely understood, as assumptions and perceptions about emergency and crisis management are still rooted in traditional ground. For example, Schneider (1995, 36–37) identified five major assumptions—all false—that hinder today's effective crisis and emergency management. These include the location of natural disasters in a limited geographic area asking for local response only, close cooperation of all levels of government (May and Williams 1986); the existence of administrative capacity and resources to handle disasters or crises; public officials' awareness and understanding of crises and their ability to handle them, the ability of the Federal Emergency Management Agency (FEMA) to hold states and localities responsible for their response systems, and people outside the response system understanding how it operates. These are reasonable assumptions. However, according to Schneider (1995, 38–39), reality presents a different picture. First, different levels of government and their officials have different perspectives pointed toward their own advantages. Second, crisis and emergency officials have coordination problems that often render them unable to “coordinate” the actions of “other participants in the process.” Third, emergency relief operations are generally underfunded and do not take top priority on the government's agenda (Vaugh 1990). Finally, the credibility of the emergency management operation is generally low, suffering from low respect in the overall government system and

contributing to the perception that people working in the area are untrained and unprepared for the job, inept, and unprofessional, and are dumped in from “old military personnel or political hacks who can not find other employment” (Schneider 1995, 39; Wamsley 1993). Unfortunately, Katrina mismanagement reinforced most of these assumptions and misperceptions in the eyes of the global community.

Against these perceptual and reality backgrounds, however, we must search for new ways of thinking about crisis and emergency management. More recent studies shed some light and point to the complexity and imperative of developing the twin fields of crisis and emergency management in theory and practice, and through education and training. Today, the fields are growing, and a new body of knowledge is emerging that can guide theory and practice in crisis public management (see, e.g., Farazmand 2001, forthcoming; Haddow and Bullock 2006; Waugh 2000; Wise 2006). What is emerging is an understanding that effective management of crises and emergencies requires serious preventive planning and preparation, institutionalized response systems with strong central command structures, a well-coordinated network of response and recovery systems, a specialized crisis management team along with decentralized field commands armed with flexibility, and the presence of a functioning expertise in distinct areas of crisis situations (Farazmand 2001, 2–5).

Increasingly important to this new way of thinking and capacity building is taking a *global* perspective to guide nation-state governments and administrative systems, learning lessons from each and every crisis and emergency incident that afflict countries, and bringing these understandings to the forefront of theory and practice to help mitigate and manage future crises. Increasingly important is taking a global perspective to guide nation-state governments and administrative systems, learning lessons from each and every crisis.

25.2 Katrina: A Global Case of Grand Failure in Governance and Emergency Management

If there is any single phrase to characterize Katrina crisis management, it is “grand failure.” This grand failure was manifest in every dimension of governance and public administration at all levels. However, what is most disturbing about this catastrophic disaster is the “global perspective and international implications” that this grand failure produced for governance and public administration worldwide. Scholarly and governmental studies have examined the Katrina crisis extensively, and there is a growing body of literature on what went wrong during that disaster and what can be done to prevent similar crises in the future. Katrina studies will continue to cover areas of governance and public administration, emergency and crisis management, and the capacity to manage crises and emergencies for the foreseeable future. Sadly, there are few, if any, success stories coming out of the Katrina case. Thus, this short chapter will not detail what went wrong during Katrina and how the ensuing crisis was mismanaged. This has been documented by others (e.g., in US congressional hearings, published articles, and books; see, in particular, Brennan and Koven, forthcoming; Farazmand, forthcoming; Kiefer and Montjoy 2006; Schneider 2005; Wise 2006), as well as in this special issue of *PAR*.

What is missing in most of these studies, however, is the global and international perspective of this grand failure in governance and public management and the serious implications it may have produced for global crisis management, international peace and security, and future emergency management theory and practice worldwide. As part of this study, this author has conducted more than 47 personal interviews with ordinary people, professional administrators and

public managers, academic scholars, and crisis and emergency managers from 13 countries. This brief section addresses—through a positive lens—a short list of the critical failures that were identified by respondents, with the hope of articulating several major “global lessons” learned from the Katrina crisis that may serve as principles central to effective crisis and emergency management in the future. Finally, to advance knowledge and improve the practice of emergency governance and crisis management, a suggestive “theory of anticipatory surprise management” is offered.

Global observations and perspectives of the Katrina crisis management may be grouped into three major areas: (1) the governance capacity to manage Katrina-like emergencies and crises by advanced countries such as the United States; (2) the ability of nation-states to cope with chaotic crises and extreme emergencies and the United States’ role in the global community; and (3) the strategic global and international implications of this grand failure for the United States as a superpower.

Regarding the first, the entire world of global institutions, peoples, and governments watched with unbelievable shock at how the world’s most advanced nation was caught by complete surprise, unprepared and unable to cope with the Katrina crisis. The world observed with disbelief a disaster mismanagement system quickly turning into a profound management and leadership crisis. The capacity to govern under extreme crisis is paralyzing no matter how powerful and resourceful a country is. The situation in New Orleans looked like an extremely underdeveloped African nation, hopelessly trying to get the attention of the world, and yet nothing was happening. This was an ugly picture the world took notice of; it was not just bad governance but “ugly” governance. Sadly, this ugly picture also translated, in the eyes of the global community of friends and foes alike who followed its development with sympathy and disbelief, into more implications for democratic governance, human rights, and the role of race, color, and minority status in American society.

In response to this author’s inquiry about what they thought of the crisis situation, the vast majority (45 out of 47) of interviewees seemed to wonder, “If this is what happens to American people on their own land, what would the people of the world in developing countries expect of America in similar situations?” This is a devastating observation with far-reaching implications for modern governance and international relations. Undoubtedly, the image of the United States was tarnished in the global community. But perhaps, a more disturbing impact of the Katrina crisis has focused on its “capacity to cope with and manage multiple crises and emergency situations.” What would happen if two or three Katrina crises hit a country like the United States, a country that stages wars on other nations and extends its military forces through more than 737 bases to at least 100 nations worldwide? (Bartholomew 2006; Hoffmann 2006).

Katrina crisis mismanagement and governance failure also affected the ability of nation-states to cope with crises and emergencies in two ways, negatively and positively. Sadly, the negative impact was a psychological one, reinforcing the traditional perspective of viewing disasters and crises as acts of God—unexpected, unprepared, and unbelievable, and therefore something about which little or nothing can be done (Hewitt 1983; Rosenthal et al. 2001). The inability of the United States to cope with the Katrina crisis has produced a fatalistic and helpless attitude in many poor and developing countries toward the management of serious disasters. Paradoxically, at the same time, the positive impact of the Katrina crisis has also been observed across the globe—that is, a stronger feeling of self-reliance, self-confidence, and self-capacity building for future crisis management. “Actually, we have not been doing bad at all and have done even better in many cases,” is the sentiment that many interviewees shared with this author. This attitude has a motivational effect on promoting confidence and building capacity among developing nations. We may therefore consider the ability of nation-states to cope with serious crises to be positively or negatively affected by other nation-states’ successes or failures in coping with and managing disasters

and crisis situations. We may also expect a greater role for the United Nations in promoting crisis prevention, preparation, and response systems across the world as globalization accelerates, with differential consequences affecting nation-states unequally.

Perhaps the most important long-term impact of Katrina crisis mismanagement is to be found in its implications for the United States as a superpower in the global community. This is the least considered and most highly neglected scholarly subject, and yet it is the most important global perspective on the Katrina crisis. Great powers, mighty empires, and strong governments are often tested by small and unexpected or sudden crises and chaotic incidents. This is a test of history, and most great powers have failed—with far-reaching consequences. In chaos theory, this is called a “butterfly effect”: a small but chaotic change may produce large-scale changes by sending severe shock waves into the nerve systems of an empire, an organization, or an organism, pushing the system to the edge of chaos and breakdown, with unpredictable outcomes.

The ability of the system to survive a potential breakdown is highly dependent on its quality of self-reorganization and self-renewal, that is, its ability to return the system to a state of *autopoiesis* (Farazmand 2004; Morgan 2006; Prigogine 1984). Katrina crisis management failures sent a shock wave throughout the world, especially among developing and less developed nations, their people, and revolutionary organizations worldwide regarding the ability and capacity of the United States as a globally hegemonic superpower acting as a “global empire” and claiming to dominate the entire world (Freeman and Kagarlitsky 2004; Hoffmann 2006; Johnson 2002). The Katrina grand failure broke the myth of US global power in the eyes of millions of people worldwide, and certainly in the eyes of the people and revolutionary organizations or governments feeling dominated and exploited by the United States.

The motivation to challenge this global hegemony has certainly become stronger after Katrina than before, as the weakness of this superpower has been exposed through Katrina and the Iraq War. What would happen if the United States faced several simultaneous crises of revolution across the globe challenging its hegemonic dominance, say, in Latin America, Africa, and Asia? How would the US government cope with two or three Katrina crises and perhaps more 9/11 situations? These are serious questions with long-term implications for the United States among its allies and adversaries. International relations are shaped by power positions and the ability of nation-states to exercise diplomacy and politics in regional and global affairs, and this ability is tested by time, crises, and the capacity to govern during extreme emergencies (Dror 2001). A global perspective on this observation is that the United States’ image as a superpower seems to have been seriously eroded by the administrative response to Katrina, a perspective that has been reinforced by the Bush administration’s deepening failures in Iraq and the broader Middle East.

As a global case of grand failure, the Katrina crisis revealed a number of failures that can inform future crisis and emergency management theory and practice. Evidence shows there was prior knowledge that, as a result of land erosion, New Orleans was unprepared for—and the levees would not stand—a large Category 4 or 5 hurricane, and yet nothing was done about it (Carter 2005). The U.S. Army Corps of Engineers’ estimate of \$2.5 billion to upgrade the levees against a Category 5 hurricane was ignored, and lesser amounts were spent on special interest projects (Carter 2005). The poor preparation to mitigate the disaster or its severe impacts was a major cause of the catastrophic result, and this was evidenced during the 2004–2005 simulations, with major problems surrounding the evacuation task that never got corrected (Glasser and Grunwald 2005). Despite several days of warnings, local and state government leaders failed to evacuate the local population, most of whom were poor and stranded, and when they did evacuate, just before landfall, it was either too late or the poor mobilization activities hampered the task, with most transportation facilities useless under the water.

Leadership failure was also evident at the federal level. Despite requests by the Louisiana governor Kathleen Babineaux Blanco to President Bush to declare a state of emergency under the provisions of the National Response Plan, giving the president the authority to bypass state and local governments in catastrophic situations, that power was “not used during Katrina” (Wise 2006, 305). The federal government leadership waited 5 days after landfall to take coordinated action by putting the federal military and Coast Guard on assignment, far too late and a glaring failure of crisis leadership. FEMA and its director, Michael Brown, failed miserably at coordinating a multi-institutional network of organizations and volunteers during the response process. Appointed on a patronage basis, the FEMA director had no experience or specialized expertise in crisis or emergency management, and he was more interested in his media images than in responding to the crisis (Schneider 2005). Volunteer forces from across the country were ordered by Brown to take a 2-day preresponse training in Atlanta instead of taking them into the field, where their assistance was desperately needed. A central command structure to provide leadership and to coordinate state and local efforts, was also lacking, so hundreds of network organizations and volunteers were unable to work together in a flexible and collaborative way. The Superdome and convention center became death traps for tens of thousands of people, with the local homeland security officials and Brown either claiming not to know about it, despite published communications to the contrary, or failing to provide victims there with help (Cooper 2006). Further, there was the total communications failure among the police and other government agencies—a total system collapse resulting in complete chaos and costly misunderstandings, a crisis situation that no one was trained or prepared to cope with (Baum 2006).

Finally, there was a total intergovernmental management failure: at the local, state, and federal levels, in addition to horizontal coordination failures in coordinating nongovernmental, nonprofit, and volunteer organization networks present on the scene. In fact, coordination and leadership constituted the biggest failures during Katrina crisis mismanagement (Brennan and Koven, forthcoming; Wise 2006). Socially and politically, Karl Marx is an apt figure to include here, as what happened constituted his philosophy made reality. He would have admonished the ruling-class bourgeoisie at all levels of government for its failure to manage a crisis that did not touch that class and only affected the working-class poor. One can hear his voice claiming that the image of a global war on terrorism was more important for the national governing elite than an act of caring for the working-class citizens trapped in the disaster—hence the fallacy of bourgeois democracy in capitalism. The stakeholders were poor, black, and underclass, and they had no power to influence the governing elites. Watching the drama on television screens across the globe, international observers could and did easily agree with Marx’s assessment of the situation during and after the Katrina crisis.

25.3 Lessons Learned, with Implications for Future Crisis Management

Lesson 1: Never compromise the long-term strategic goals of a nation, system, or organization with short-term political or economic benefits. Building and upgrading the hurricane protection infrastructure for Category 5 storms, an expense of \$2.5 billion, would have saved the city of New Orleans in the first place and would have saved more than \$200 billion in damages, plus the inestimable cost of human lives. This means that *sound governance matters*.

Lesson 2: Build capacity; preparation is key to the mitigation and response system in disasters and crises. Never compromise on prevention and response preparation plans, and never leave specialized crisis and disaster management tasks to generalist politicians who are interested in image making rather than saving lives and property. This is a lesson learned more than 2500 years ago, when the Persians under King Darius the Great organized “specialized emergency task forces” on the side of the efficient bureaucracy to deal with trouble spots and disaster-driven crises across the far-flung empire (Cook 1983; Olmstead 1948). Capacity building requires education, training, exercises, technological capacity, and financial resources, as well as competent human resources with expertise, upgraded constantly to meet the challenges of an increasingly unknowable world.

Lesson 3: Coordination is a key to response systems. Vertical coordination through intergovernmental organizations and horizontal coordination through interstate and network-based organizations are key structural features, to be matched by process and cultural coordination systems, and they require serious cultural unlearning and relearning for tomorrow’s crisis management. This was a big failure in Katrina.

Lesson 4: Leadership and central command structures are the most important elements in crisis and emergency governance and management. There is no substitute for sound leadership through a central command structure that is positioned well in advance and provides flexible and well-coordinated command systems in the field that are capable of adapting to changing conditions as they unfold. Taking timely and decisive actions during the unfolding dynamics of a crisis situation is a key characteristic of effective crisis leadership.

Lesson 5: Traditional emergency management techniques are no longer useful. Prepare with advanced, nonlinear, and chaos management systems that can be applied beyond tomorrow. Prepare for an unknowable world (Stacey 1992) to manage crises effectively—train and develop crisis expertise with inconceivability scenarios.

Lesson 6: Learn from past experiences and build capacity for the future; learn from other nations and global best practices. The experiences in flood control in the Netherlands and England can teach us quite a bit. The successful earthquake preparation and response systems, as well as the effective crisis management system, of Iran can shed light on future crisis and emergency management needs around the world. Iran evacuated more than a million people without a single loss of life in the face of the Category 3 Hurricane Guno that hit the southern coastal cities and towns of the country in the Persian Gulf on June 7, 2007; it took more than 50 lives in Oman (*Hamshahri Daily*, June 9, 2007).

Lesson 7: Governments are tested for their competency in saving lives and property during disasters and crises; they are the institutions that are ultimately responsible for the failures that affect their legitimacy, an element necessary for survival and governance. Democracy matters, but failing to act in time during an extreme emergency or national crisis can have far-reaching adverse consequences for citizens, governance, and democracy. Bureaucracy may be too slow and unsuitable in crises and emergencies, but its institutional capacity to provide a reservoir of expertise to crisis leaders and managers is immense and should not be overlooked.

Lesson 8: Engage people and be honest with them. Partnerships with people during crisis situations are essential to reduce anxiety and opportunities for panic and chaos. Locals are in the trenches and know the place better than anyone else. Local institutions and community and neighborhood organizations are essential partners in crisis and emergency management. People “who know the culture and speak the language, whom locals consider ‘one of us’” should be a main part of the process.

Lesson 9: Prepare for simultaneous and multiple crises or disasters, and institutionalize a new way of thinking about crises as sudden, unexpected, and inconceivable events that may happen any time and any place. This capacity needs to be institutionalized to avoid surprises. Continually upgrade these capacities.

Lesson 10: The adage “Success has a thousand fathers, failure but one” (Pinsdorf 2004, 107) may apply to many cases but not to Katrina. Every official, and even the Red Cross, failed during Katrina. The director of the Red Cross was more interested in protecting and promoting her “personal friend George W. Bush” than in doing her job during Katrina; she did not survive the mounting criticisms and soon was out of the job.

25.4 Conclusion: Building Capacity with Anticipatory Surprise Management

There is generally a big gap between the routine tasks of governance and administration, on the one hand, and the emergency nonroutine tasks that demand urgency in attention and action, on the other hand (Schneider 1995). Bureaucratic expertise may be suitable for routine tasks, but bureaucracies are no match for crisis and emergency-driven events with chaotic and unfolding dynamics. The latter requires a different set of institutionalized ways of thinking, a new mind-set out of the traditional box filled with rules, control, and procedures. It demands new knowledge, skills, and attitudes that can read inconceivability and unthinkable impossibilities. This is beyond the realm of ordinary management and governance capacity.

A key characteristic of all chaos and dynamic crisis situations—such as spontaneous revolutions, Katrina-type crises, and the like—is the presence of a high number of inconceivables and unexpecteds that surprise everyone. All officials and organizational actors were totally caught by surprise—surprise that paralyzed the entire response system and produced more chaos and further surprises, triggering disaster after disaster. This could have been avoided had there been capacity building for “chaos and surprise management” in advance. We simply cannot manage chaos with routine administration and governance. Surprise management is what we need in order to develop a new capacity to manage emergency governance and crises, as globalization tends to produce more crises worldwide because it is concerned with short-term profits while neglecting the long-term strategic issues of our planet (Regester and Larkin 2005, 70).

In this age of rapid globalization and nonlinear chaotic changes, “surprise” may be the “most commanding dimension of uncertainty” (Hermann 1969, 29), but in order to manage surprises, one must acquire the knowledge, skills, and experience of surprise management. Surprise may cause discomfort to policymakers and planners with sudden ignorance and serious consequences, but to an intelligent analyst, everything is expected. Nothing will outdo the impact of the full-fledged surprise attack” (Kam 1988; Rosenthal et al. 2001, 7) and the most damaging forces of nature—tornadoes, earthquakes, and sudden floods—strike unexpectedly with surprise. Anticipatory crisis management must integrate “surprise” as a key element of effective governance and public administration. The lack of such capacity building—planning, preparation, response flexibilities, and so on—will surely lead to a total paralysis in the face of surprise.

Crisis and emergencies produce complexities, and complex systems require complex management systems that are adaptive, skilled in extraordinary capacities, and responsive to the harshest possible conditions. They carry a changing degree of chaos and unfolding dynamics with unpredictable outcomes, resulting in disorder, but an anticipatory capacity can mitigate many such

manifest behaviors and reduce the level of criticality by arresting the chaos in the early stage, while managing crisis elements.

This is exactly what happened in December 2004 during the massive earthquake that destroyed the southeast ancient city of Bam (including its 2500-year-old standing citadel) in Iran before dawn, collapsing the entire system of governance and administration hundreds of miles in every direction and killing more than 50,000 of the city's 80,000 residents. By 3:00 p.m. the same day, a centralized national command structure had already been set up and was in operation in Tehran, giving information and coordinating multiple vertical and horizontal network structures of organizational and voluntary response systems. In less than 24 hours, chaos had been arrested. The response system was so effective that international response teams, including the Red Cross and FEMA, found themselves with little to do upon arrival. Key to such effective emergency and crisis management was a surprise management system coupled with a "five-step forward-reading strategy" that had anticipated all possibilities and impossibilities beyond five levels, including sudden desert sand storms, potential foreign invasion by the United States, and more.

25.4.1 Concept and Principles of Surprise Management Theory

Surprise management draws on chaos and complexity theories (Kiel 1994; Pascale 1990; Prigogine 1984; Stacey 1992; Waldrop 1992; Weick and Sutcliffe 2001). As a social and political construction, the theory of surprise management is based on at least four principles. First, it rejects anything that is routine and expected. Second, by extension, it is fluid and constantly changes in its nature, degree of flexibility, and adaptability. Third, it demands certain preconditions to qualify as surprising and chaotic, nonlinear and unexplainable, as distinct from linear and predictable causal behaviors. Fourth, surprise management demands cutting-edge knowledge, skills, and attitudes beyond the comprehension of most people in routine environments of governance and administration. Finally, it requires extraordinary and disciplined authority, and power with unrestrained resources. Surprise management thrives on chaos and crisis situations; therefore, the more ambiguous the conditions, the better the capacity building in surprise management.

25.4.2 Strategic Conditions for Surprise Management

Short-term thinking bores surprise managers and their teams, and thus, strategic thinking is what makes up the essence of the concept. Yet, surprise management takes on small and short-term crisis conditions as bites for sharpening its teeth. It is expensive to develop and maintain, but it is a national asset with no substitute. Democracy needs surprise management systems more than any other systems, but the idea must be nurtured to institutionalize its values. Strategic conditions refer to four key points of attention: foci, loci, positions, and who's. *Foci* refer to the areas of focus or stress in crisis situations (political, social, disaster, and international relations). *Loci* refer to locations, organizational level, and governance areas (local, state, federal, and global) on which the focus is placed or the crisis is happening. *Position* means the strategic positioning and repositioning of key players, actors, and participants in the crisis or surprise management process. Finally, the *who* refers to individual and institutional actors in strategic positions, making crucial decisions and acting accordingly.

25.4.3 Requirements for Surprise Management

Surprise management requires ample resources to operate, with no constraints but clear accountability. It also requires critical opportunities to practice surprise management. It demands full

attention, talent, language, and communication, as well as personality skills, mostly uncommon ones, to engage extreme unthinkable conditions and circumstances, people, and dynamics. Surprise management also requires specialized and rigorous training and development for various foci, loci, and dynamic positioning purposes in crisis management. Surprise management requires autonomy and authority in performance, but it is also accountable to democracy. Nothing comes as a surprise to its players.

25.4.4 Capacity Building in Surprise Management

Educational and training programs, formal and informal, periodic and continuous, are required to train and develop surprise management teams, leaders, and managers for crisis management in the age of rapid and nonlinear changes. Weick (1995) reminds us that most managers make the mistake of trying to solve organizational problems through linear thinking; they must get out of this mind-set and think both strategically and in nonlinear ways to manage the “unexpected” (Weick and Sutcliffe 2001). Managing complexity on the “edge of chaos” (Pascale 1990) requires a different set of organizational learning, a learning to learn and surprise management capacity (Waldrop 1992). Recent studies suggest imperatives of “adaptive management” in coping with crises and disasters (Wise 2006), but others argue for “collaboration over adaptability” (Jenkins 2006), while still others argue for a network-based organizational system to crisis management.

A theory of surprise management integrates all features of the authoritative, collaborative, participative, and adaptive models with a quality of self-organizing fluidity and hyperflexibility; it possesses an unmatched capacity for crisis and emergency management. It is suggested here that universities and institutions of higher education across the globe develop and offer academic degrees and professional courses in chaos and surprise management as part of capacity building for future emergency governance and crisis management in an age of increasing global insecurity, risks, disasters, and inconceivable surprises.

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Chapter 26

Japan's Disaster Governance

Initial Response to Huge Tsunamis and Fukushima Nuclear Crisis

Yuko Kaneko and Itoko Suzuki

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26.1 Introduction

The Great East Japan Earthquake registering a M.9 on the Richter scale, combined with the worst tsunami this country has ever experienced and the immediately ensuing INES Level 7 Fukushima Dai-ichi nuclear power plant accident, occurred on March 11, 2011, in the northeast Pacific (Tohoku) region in Japan. This 3.11 three-pronged disaster cannot be declared over as at the end of 2013 while highly radioactive water has been still leaking at the damaged Fukushima Nuclear Power Plant (NPS) site. The effects of the continuing radiation spread and contamination caused by the nuclear accident on the environment, soil, food, and public health in broader areas around Japan are still unknown and being examined. The nuclear power plant accident has emerged as the gravest issue in the 3.11 disaster, not only delaying the recovery and reconstruction from the natural disaster but also endangering Japan's energy and people's health security, and consequently the Japanese economy as a whole.* The exact monetary total of all the damage combined with the economic suffering permeating the entire country still remains unknown.

Learning from the previous experiences, in particular the Great Hanshin-Awaji Earthquake of 1995, Japan as a disaster-prone country had since established a solid disaster management system in both the central and local governments as well as local communities. As a result, great strides had been made for the prevention and preparedness of natural disasters along with the

* In this unprecedented severe disaster since postwar Japan, there was an immediate loss of about 20,000 lives, including thousands missing as recovery continued to be cautiously undertaken due to the multiple layers of debris. The initial number of evacuees was estimated over 500,000; even limiting the number from Fukushima still now over 150,000 are unable to return. Additional losses included land, housing, factories, fisheries, farms, roads, ports, and further levels of infrastructure, even an entire community swept away in the affected region by the tsunami.

combination of much needed legislation, local ordinances, organizational arrangements, mechanisms, and crucial training. By 2005, when Japan hosted the UN-ISDR Hyogo Conference, the Japanese disaster reduction and management system was highly commended worldwide as an effective model. However, the tremendous scale of the 3.11 severe disasters unveiled several critical issues in the country's disaster governance and particularly its crisis and emergency management system. The nuclear meltdown accident and the ensuing response and recovery effort still continue to expose not only the serious crisis management system but also Japan's governance system as a whole.

This chapter provides an initial temporary report to the researchers and interested readers in the international community with interim analyses based on the information available at end of 2011. The minimal updates are inserted in October 2013. The chapter provides, in its second section, a brief overview of the disaster damages; in Section 26.3, disaster preparedness mechanisms established prior to 3.11, legal and organizational, are discussed; actual immediate responses taken to the earthquake and tsunami disaster are outlined in Section 26.4; and those for the nuclear accidents are described in Section 26.5. The brief summary of the very initial recovery and reconstruction measures is described in Section 26.6. Final analysis would be possible only after the fact-finding research by various groups including Parliament, Government and non-governmental completed. Section 26.7 explains the temporary conclusion, although limited and time bound.

26.2 Brief Overview of the 3.11 Disaster

26.2.1 Facts on the 3.11 Earthquakes and Tsunami Scale*

The Pacific coast area of eastern Japan was struck by the firstly named Tohoku District-off the Pacific Ocean Earthquake, later officially known as East Japan Great Earthquake which occurred at 14:46 on March 11, 2011. This earthquake occurred in an area where the Pacific plate sinks beneath the North American plate and the magnitude of this earthquake was 9.0, the largest in Japan's recorded history. The seismic source was at latitude 38.1 north, at longitude 142.9 east, and at a depth of 23.7 km (indicated as X in Figure 26.1).

26.2.2 Initial Quakes and Tsunami Damages

The crustal movement induced by this earthquake extended over a wide range, from the Tohoku District to the Kanto District. Afterward, tsunamis struck the Tohoku District in a series of seven waves, resulting in the inundation of an area as large as 561 km². A total of 19,747 people[†] were reported dead or missing with 1,016,040 houses[‡] gone or damaged.

In terms of the area inundated by the tsunami, according to the Geospatial Information Authority of Japan (GSI), Miyagi Prefecture had an area of 327 km² inundated, Fukushima Prefecture an area of 112 km², and Iwate Prefecture had an area of 58 km² inundated. The total inundated area[§] was up to 561 km².

* Based on the Mid-June 2011 White Paper on Disaster Management.

† Based on the report of the National Police Agency as of October 6, 2011.

‡ Based on the report of the Fire and Disaster Management Agency as of December 12, 2011.

§ GSI No. 5 Report of April 18, 2011 on approximate inundated area.

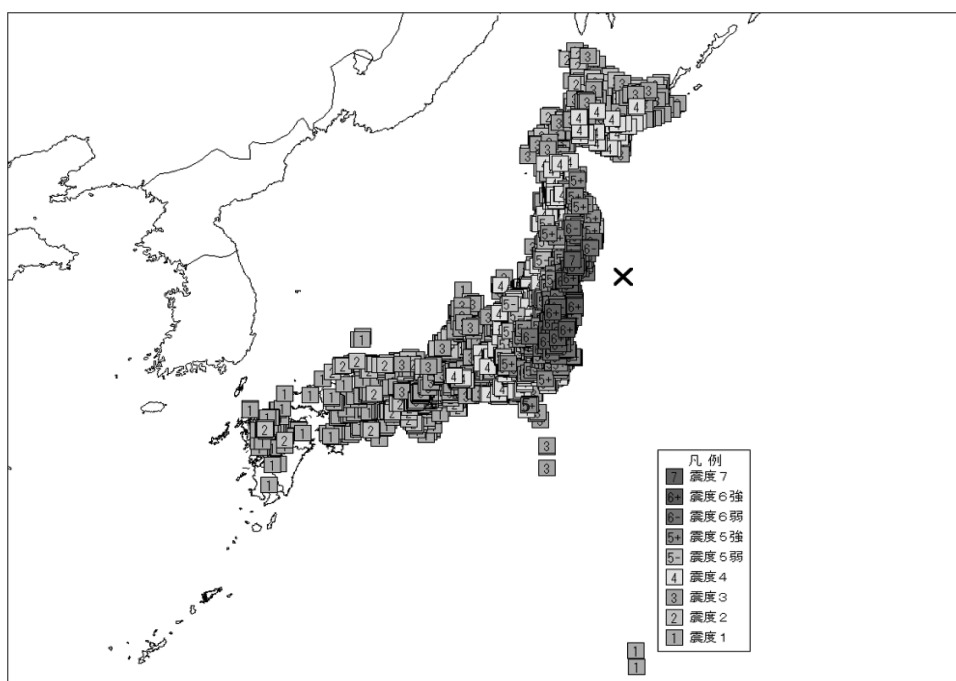


Figure 26.1 Intensity of tremor of the Great East Japan Earthquake, according to the Japanese scale with intensity 7 darkest, followed by decreasing shades of grey. (From Cabinet Office, White paper on disaster management, 2011.)

Regarding the extent of damage to infrastructural lifelines, there were approximately 4000 spots of road damage identified and approximately 7280 spots of damage to railways.* In addition, approximately 460,000 households suffered from gas supply stoppages, approximately 4,000,000 households were cut off from electricity, and 800,000 phone lines were knocked out.† There were over 120 sites of damage from landslides including mudslides, slope failures, and ground deformation. Dams burst, and several people went missing in Fukushima Prefecture. Large-scale ground liquefaction occurred in the Pacific coastal areas of northeastern region of Japan.

26.2.3 Initial Nuclear Power Plant Accidents

The Fukushima Dai-ichi (First) Nuclear Power Station (NPS) was hit by the first enormous wave at 15:27 on March 11 and the next gigantic wave around 15:35. In terms of the operating status at the Fukushima Dai-ichi NPS before the 3.11 earthquake, Unit 1 was under operation at its rated electric power, Units 2 and 3 were under operation at their rated thermal power, and Units 4–6 were not under operation at that time under periodic inspection. Units 1–3, which

* Including approximately 1680 spots caused by the tsunamis.

† Sources: Emergency Disaster Response Headquarters as of 16:00 on May 30; East Japan Railway Company as of April 17; Japan Gas Association, as of March 12; Ministry of Economy, Trade and Industry as of April 12; Emergency Disaster Response Headquarters, peak damage estimate calculated from 12:00 on March 12.

were under operation, were automatically shut down at 14:46 on March 11 due to strong quakes. All six external power supply sources were lost because of the earthquake. This caused the emergency diesel power generators to start up. However, seawater pumps, emergency diesel generators, and distribution boards were submerged because of the tsunami strike, and all emergency diesel power generators stopped except for one generator in Unit 6. For that reason, all AC power supplies were lost except at Unit 6. The loss of the safety mechanism was assumed to have led to the meltdown of the reactor core, hydrogen explosion, leakage of cooling water, and finally to the discharge of a great amount of radioactive materials to the environment. The damage to the Fukushima Dai-ni (Second) Plants, although the scale of initial damage was similar to the Dai-ichi Plants, leading to the evacuation of the nearby residents, was less serious than the one at the Dai-ichi Plants.

26.2.4 Economic Damages by the Great East Japan Earthquake

Damaged stocks in disaster areas are estimated to be approximately 16.9 trillion yen.* This includes the wreckage of buildings, lifeline utilities, and social infrastructure but excludes damages from the Fukushima Dai-ichi nuclear power plant accidents. This 16.9 trillion yen is 1.76 times larger than the economic damage of the Great Hanshin-Awaji Earthquake of 1995. At the time of completing the manuscript, the government declared on 16 December 2011 that the reactors and spent fuel pools had been brought to a stable cooling condition, and that the release of radioactive materials had been mitigated. But the emerging leak of the contaminated water as at October 2013 indicated the uncontrolled situation without a valid scenario to end the Fukushima nuclear crisis. The timing of the return of the evacuees, recovery of contaminated debris, or normalization of the afflicted economy would still remain uncertain. The detailed overviews are discussed in Sections 26.4 and 26.5 in relation to the initial government responses to the disaster.

26.3 Institutions for the Disaster Preparedness and Emergency Management

26.3.1 Overall Framework of the Disaster Management Systems

Disaster management includes various policy measures such as for disaster prevention, emergency disaster control, and disaster recovery and rehabilitation. The volume and variety of programs in disaster management are in fact too many for a single central government ministry to take charge. In Japan, all the central government ministries are in charge of disaster management in respective fields. Therefore, overall coordination of disaster management programs of each ministry is indispensable to effectively undertake disaster management measures. Disaster management mechanisms are also organized by local governments and private sector companies that run public utilities, public transportation, or broadcasting businesses. In addition, disaster management operations, particularly relief operations, have vigorous participation from community organizations, NPOs, and citizens in cooperation with the relevant local and central governments, particularly after the Hanshin-Awaji Great Earthquake of 1995, thus making a substantial institutional arrangement for disaster preparedness.

* According to the Cabinet Office's estimates on June 24, 2011.

For the legal framework, among many other disaster measures, laws, and ordinances, the Basic Act on Disaster Control Measures legislated in 1961 is the most fundamental one. This act stipulates the basic framework for disaster countermeasures and preparedness as well as outlines respective roles and responsibilities of those stakeholders to be involved. The act also stipulates the basic plan for emergency preparedness system. As there is no single ultimate entity to directly control the disaster prevention measures, the Basic Plan for Emergency Preparedness is prepared by the Central Disaster Management Council, which is established in the Cabinet Office. Based on this basic plan, central government ministries and specific public corporations* should prepare their respective disaster management operation plans. Likewise, prefecture and municipality disaster management councils are to prepare their respective local disaster management plans, subject to local circumstances and based on the Basic Plan for Emergency Preparedness of the central government.

Disaster management councils are established as overall coordination organs for institutionalizing and planning disaster management in the national, prefectural, and municipal governments. These councils are in nature advisory bodies but possess the roles to prepare disaster management plans. The Central Disaster Management Council is headed by the prime minister. Likewise, the prefecture disaster management councils or the municipality disaster management councils are headed by the governors or mayors, respectively.

During the emergency of actual disasters, based on the Basic Act on Disaster Control Measures, an ad hoc Disaster Management Headquarters or Extreme Disaster Management Headquarters is to be established to be headed by the prime minister to take charge of coordinating emergency operations by ministries, local governments, and public corporations as well as to implement plans for emergency measures to be prepared at the time of major disasters. However, the designated administrative organizations, local governments, and public corporations are not in the chain of command from the prime minister. This means that the authority of the prime minister provided by this act in reality cannot be exercised. Moreover, in exercising this authority, the prime minister is to convene a meeting of this ad hoc headquarters that may hinder immediate directive from him. Therefore, disaster emergency responses are in principle being conducted by respective administrative organizations, local branch offices, local governments, etc., thus making the prime minister difficult to exert leadership, as was exhibited in the actual 3.11 disaster time.

26.3.2 Major Institutions for Disaster Countermeasures

26.3.2.1 Self-Defense Forces of the Ministry of Defense

While disaster rescue and relief operations are not the main responsibilities of the Self-Defense Forces (SDF), article 83 of the SDF Act stipulates, with or without the local government's request, the defense minister can dispatch the SDF for rescue and relief operations in both natural and man-made disasters. SDF has established the liaison offices for disaster emergency in all 47 prefectures. This revised arrangement was used at the time of the 3.11 disaster.

26.3.2.2 Fire Fighters

In Japan, fire fighting services are usually delivered by the municipal governments. Fire fighters are civil servants of the municipal governments. Fire and Disaster Management Agency in the Ministry

* Specific incorporated administrative agencies, Bank of Japan, Japan Red Cross, NHK, Expressway companies, International airport companies, JR, NTT, Gas companies, Electricity companies, KDDI, NTT Docomo, Japan Post Company, Japan Postal Network Company, etc.

of Internal Affairs and Communications takes charge of the preparation of necessary legislation, as a central government, providing necessary equipments for more effective fire fighting services and coordinating municipal fire fighting organizations for the countermeasures to the disaster or terror.

For instance, an Emergency Fire Response Team System is organized to construct mutual cooperation system among municipal fire services for ensuring effective and prompt rescue operations on a nationwide perspective to respond to large-scale severe disasters in the afflicted region. A total of 3961 teams are registered among nationwide 789 fire fighting headquarters as of October 2008. This system contributed to the rescue effort during the 3.11 large-scale severe disasters, which could have not been managed by municipal fire fighters alone.

26.3.2.3 *Volunteer Fire Corps*

Additionally, a volunteer fire corps system exists in Japan based on the provision of the Fire and Disaster Management Organization Act. A volunteer fire corps comprises volunteers who are ordinary citizens carrying out fire fighting activities when a fire occurs in their vicinity. They are part-time civil servants* of a municipal government but very lowly paid, about 10,000 yen per person per year. The system has been accepted by the volunteer fire fighter groups with pride as participating in a dignified public service to the community. The fire fighting headquarters of municipal governments provide necessary fire fighting equipments and outfits. Volunteer fire corps is organized in every local community with provisions of regular annual fire fighting training. The number of volunteer fire corps members stands at 883,698 as of April 1, 2010.

26.3.2.4 *Police Officers*

The organization and responsibilities of the police are stipulated by the Police Act. There are two layers of police organizations: the central and the prefectural police administration. At the central level, the National Public Safety Commission, and at the prefectural level, 47 prefecture public safety commissions exist, and each commission has police headquarters. The Prefecture Police Headquarters is an executive organization of each prefecture government, and police officers enter into the police service as the prefectural local civil servants. However, when one is promoted to an inspector position, he or she becomes a civil servant of the central government. All the heads of the Prefecture Police Headquarters are seconded to the prefectural level by the National Police Agency.

Under this structure, an interprefecture emergency rescue unit system was introduced after the Great Hanshin-Awaji Earthquake in June 1995. This system aims at mobilizing great number of police officers from the early stage of a disaster in collecting disaster information, conducting the rescue and relief operation of disaster victims, securing the emergency road transportation, etc. The interprefecture emergency rescue units are set up in all the Prefecture Police Headquarters. The number of team members is about 4700. They are nominated by the head of the Prefecture Police Headquarters by taking into account their capabilities, physical and mental strength, and experiences of disaster operations to become real experts in disaster countermeasures of the country.

26.3.3 *Nuclear Emergency Response System*

The Basic Plan for Emergency Preparedness also includes nuclear emergency response measures to prevent occurrence and expansion of the nuclear disaster and to restore the nuclear disaster.

* Any adults above 18 years who live or work in the vicinity can apply.

In addition to the Basic Act on Disaster Control Measures, a special Act on Special Measures Concerning Nuclear Emergency Preparedness* was enacted to cope with the critical nuclear emergency after the grave accident at the JCO nuclear fuel fabrication facilities in 1999.

The Basic Act on Disaster Control Measures mainly stipulates the duties and responsibilities of government organizations in disaster management, and the obligation of private entities and individual citizens stated in the act is rather vague. On the other hand, the Nuclear Emergency Preparedness Act stipulates the specific duties of an entity that obtains the license to construct a commercial nuclear reactor from the minister for the Ministry of Economy, Trade and Industry (METI) in accordance with the provisions of the Reactor Regulation Act. The licensee's main duties are described as follows: to prepare its Nuclear Disaster Management Operation Plan after consultation with the prefecture governor, to notify the plan to the minister for METI, to establish a unit for nuclear disaster prevention at the nuclear reactor site, to appoint a manager for nuclear disaster prevention, to report to the minister, prefecture governors, and municipality mayors when a specific event stipulated by law occurs, and to install necessary radiation measurement facilities, radiation prevention equipments, emergency communication equipments, etc. (see Section 26.5).

The Nuclear Emergency Preparedness Act stipulates in the following the procedures to take in the time of nuclear emergency as taken at the time of the 3.11 nuclear disaster accidents (see Section 26.5):

- The licensee of the reactor operation has to immediately report to METI and heads of local governments when a specific event stipulated by law occurs.
- The minister for METI, receiving the notification, is to trigger activities according to the procedure stipulated by law. Staff with expertise in emergency measures is to be sent to local governments on request. The senior specialists for nuclear emergency preparedness assigned to work onsite are to collect information and perform duties necessary to smoothly implement the prevention of the expansion of a nuclear disaster.
- When the minister for METI recognizes that the specific event has exceeded the predetermined level and developed into a nuclear emergency situation, the minister is to immediately report it to the prime minister.
- The prime minister shall declare a *Nuclear Emergency Situation* in response to it and direct relevant local governments to take emergency response measures such as sheltering or evacuation and preventive stable iodine administration.
- The prime minister shall establish the Nuclear Emergency Response Headquarters in Tokyo, which he or she shall head, and the Nuclear Emergency Response Local Headquarters at the concerned off-site center.
- Local governments shall establish their own emergency response headquarters.
- In order to share information among the national government, local governments, and related organizations such as licensees, etc., and, if necessary, to coordinate emergency measures to be implemented by the respective organizations, the Joint Council for Nuclear Emergency Response shall be established at the off-site center.

26.3.4 Overview of Other Disaster-Related Laws[†]

In Japan, many other disaster laws have been legislated following the bitter experiences of large-scale natural disaster and accidents for disaster countermeasures. There are 55 disaster management–

* Nuclear Emergency Preparedness Act.

† See “Disaster Management in Japan” http://www.bousai.go.jp/1info/pdf/saigaipanf_e.pdf.

related laws according to the government report on *Disaster Management in Japan* released by the Cabinet Office in February 2011.

26.4 How the 3.11 Emergency Responses for the Natural Disaster Were Conducted

26.4.1 Overview

This section covers the emergency countermeasures for immediate response actually taken for the 3.11 natural disaster damages. Many citizens and NPOs, not only from Japan but overseas, have been providing relief and recovery operations till now. Many overseas governments have also provided relief personnel and goods. This section covers only those organized by the Japanese central and local governments mainly for the initial disaster countermeasures. Pre-empted initial emergency measures as explained in Section 26.3 were actually invoked in accordance to the emergency preparedness legal framework and guideline available at the time of the 3.11 disaster. Some major actions are described in this section that were primarily performed for the immediate natural disasters (earthquake and tsunami), while the emergency responses taken for the nuclear power plant accidents are discussed in detail in Section 26.5.

26.4.2 Ad Hoc Extreme Disaster Management Headquarters

Based on the provision of the Basic Act on Disaster Control Measures, the Extreme Disaster Management Headquarters was established within 30 min after the first strike of the 3.11 earthquake. The headquarters, headed by the prime minister, consisted of all the ministers of state and some parliamentary vice ministers, and the deputy chief cabinet secretary for crisis management was established and acted as explained in the previous section for the disaster.

26.4.3 Organizations Involved in Immediate Rescue and Relief from the Disaster

The immediate rescue and relief operations were conducted hand in hand by the fire fighters, volunteer fire corps, police, coast guard, and SDF. These organizations actually served in the forefront of rescue and relief operations, immediately after the first earthquake hit the afflicted areas. Unfortunately, the scale of the earthquake and resultant tsunami was far beyond that expected so additional resources were needed for rescue and relief operations. With regard to this, the National Police Agency and the Fire and Disaster Management Agency requested the prefecture police and the municipal fire fighters in the undamaged areas to send rescue and relief teams to the damaged areas. The systems as explained in Section 26.3 did work immediately after the first strike of the earthquake. By the end of May 2011, the number of police officials dispatched to the damaged three prefectures totaled 307,500 and the number of police helicopter totaled 566.

The Fire and Disaster Management Agency also directed the Emergency Fire Response Teams to conduct rescue and relief operations (see Section 26.3). As of 18 March 2011, 1912 response teams of 7,035 fire fighters from 44 prefectures were involved in the operations. The number of teams totaled 27,373 and that of fire fighters totaled 103,600 at the end of May 2011, in addition to firefighters from the affected municipalities who conducted emergency services and immediate rescue operations.

As for the Japan Coast Guard, 4413 ships, 1564 airplanes, and 1510 special rescue team officials were involved in the rescue and relief operations. Joint mission corps was organized from the units of the land force, maritime force, and air force to carry out more integrated rescue and relief missions. Reservist defense officials were called up for the relief based on the SDF Act for the first time. By the requests from the governors of three heavily stricken prefectures, and by instructions from the prime minister, as of 26 March, 107,000 defense officials were in charge of rescue and relief operations. The number of rescued people by the police, fire fighters, coast guard, and SDF was recorded as 26,707 by May 30, 2011.

26.4.4 Activities by the Self-Defense Forces of the Ministry of Defense

As for the rescue and relief operations, the SDF in fact played crucial roles from the beginning. The 3.11 earthquake occurred at 14:46 on March 11, 2011. The Self-Defense Forces (SDF) Disaster Response Headquarters was established at 14:50 headed by the defense minister. Eleven aircrafts responded within a mere 30 min after the headquarters was established. Within March 11, 2011, 25 aircrafts were sent for collecting disaster information. As for the disaster dispatch requests, the governor of Iwate prefecture requested at 14:52, Miyagi prefecture at 15:02, and Fukushima prefecture at 16:47. The minister of defense issued a large-scale earthquake disaster dispatch order at 18:00 on March 11, 2011.

The number of dispatched SDF officials rapidly increased: 20,000 on 12 March, 50,000 on 13 March, 66,000 on 14 March, 70,000 on 15 March, 76,000 on 16 March, 106,000 on 19 March, and 107,000 at the highest on 26 March to mean about half of all SDF officials (227,950).^{*} At 9:00, on August 31, 2011, the defense minister issued an order of terminating the large-scale earthquake disaster dispatch.[†]

26.4.5 Organizations in the Damaged Local Governments

At the damaged prefectures, disaster management headquarters were established based on the respective local disaster management plans as explained in Section 26.3. Having accomplished the planned work, Iwate abolished the local headquarters on 11 August. As for Miyagi and Fukushima, the headquarters remained at the end of 2011.

26.4.6 Personnel Dispatch from National and Local Governments to the Local Governments in Afflicted Municipalities

Among the damaged municipalities, due to the scale of disasters, some municipality governments of the disaster-affiliated areas could not conduct necessary countermeasures. For example, in Ozuchi town, most of the high-ranking officials including the mayor of the town government were swept away by tsunami and the countermeasure operations were not conducted fully. Most of the municipality governments in severely damaged three prefectures lost their officials more or

^{*} 26,000 at the 1995 Great Hanshin-Awaji Earthquake time.

[†] SDF officials conducted following rescue and relief operations: disaster information gathering by aircrafts; rescue of the disaster victims (the number of rescued victims totaled 19,247, comprising 72.1% of all the rescued victims); transportation of personnel and supplies; delivering meals, water, bathing services, and medical services to the victims; emergency operations to the Fukushima NPS; opening the roads blocked by disaster debris; removal of disaster debris, etc.

less by tsunami, rather than by the earthquakes. Rescue and relief operations after the earthquake and tsunami required a massive manpower at the damaged municipalities.

To cope with such situations, officials of the central government as well as prefectural and municipal governments outside the damaged areas were dispatched to the damaged municipalities, totaling about 55,100 officials as of August 29, 2011, excluding fire fighters or police officers who totaled 56,923 persons as of July 1, 2011.

26.4.7 Nationwide Evacuee Information Exchange System

Many disaster victims formerly residing in the damaged municipalities have evacuated to different areas all over Japan, especially from municipalities in Fukushima prefecture because of the nuclear power plant accident. To deliver information to those about the ongoing situation of their former residence, such as the progress of recovery and reconstruction, the damaged municipal governments should have the current residence information of the former residents. For that purpose, the nationwide evacuee information exchange system was introduced based on the collaboration among the Ministry of Internal Affairs and Communications, prefecture governments, and municipality governments. In this system, evacuees may register their currently residing addresses, etc., at their residing municipal governments so that these municipal governments can deliver the address information received to the former residing prefecture/municipality governments.

26.5 Crisis Management of the 3.11 Nuclear Emergencies: With Particular Reference to the Government Crisis Communication Issues

26.5.1 Initial Emergency Actions Taken in First 5 Days by the Established Nuclear Disaster Management Mechanisms

Fukushima Dai-ichi NPS accident has not finished yet. Various fact-finding committees are making research and full damages are yet to be found out, while recovery is a continuing process. It is not possible to adequately analyze the 3.11 nuclear power plant disaster management at this stage. This section therefore concentrates on one aspect of the disaster crisis management, focusing on the government crisis communication issues experienced in the initial responses taken in the first 5 days from March 11 to March 15, 2011.

The sequence of the nuclear disaster accident responses were taken basically in accordance with the legally established nuclear disaster preparedness mechanisms explained in Section 26.3. Actual responses that appeared in the crisis communication during the first 5 days are outlined in Table 26.1.

26.5.2 Government Crisis Communication in the 3.11 Nuclear Power Plant Accident during Initial 5 Days

For better understanding of the actions taken in initial 5 days for 3.11 nuclear accidents, the respective missions of the involved organizations are briefed later. In Japan, regulatory functions for nuclear safety are scattered in various government organizations. The Nuclear and Industrial Safety Agency, NISA, was located in a central government ministry and METI was a main government nuclear

Table 26.1 Sequence of Responses

<i>Day/Time</i>	<i>Actor</i>	<i>To Whom</i>	<i>Action/Information</i>
11-March			
15:42	TEPCO	NISA	Reported the Fukushima Dai-ichi NPS accidents
	NISA		Established the Nuclear Emergency Preparedness Headquarters at METI
16:36	Deputy chief cabinet secretary for crisis management		Established Emergency Response Office for the nuclear accident at the prime minister's office
	TEPCO	NISA	Reported inability to inject water to the damaged reactors due to the core cooling system being down
16:40	SPEEDI		Appeared to have recorded the high distribution of gamma radiation dose rate
19:03	Prime minister	The press	Declared the state of nuclear emergency
	Prime minister		Established nuclear emergency response headquarters and local nuclear emergency response headquarters
19:30	Defense minister	SDF	Ordered the SDF dispatch to the plant accident sites
20:50	Governor of Fukushima	Okuma Town and Futaba Town	Instructed to evacuate their residents within 2 km radius from Fukushima Dai-ichi NPS
21:23	Prime minister	Heads of Fukushima pref. and four towns	Issued instruction to evacuate those within 3 km radius from Fukushima Dai-ichi NPS and order those within 10 km radius to stay home
21:52	Chief cabinet secretary	The press	Announced that the reactor lost its cooling down capability and indicated the possibility of radiation leak but assured no danger in radiation spread and that this was just a precaution

Table 26.1 (continued) Sequence of Responses

<i>Day/Time</i>	<i>Actor</i>	<i>To Whom</i>	<i>Action/Information</i>
12-March			
0:15	Chief cabinet secretary	The press	Updated relief operation; informed the public no health danger by radiation spread in evacuating zones; no concrete data indicated
3:12	Chief cabinet secretary	The press	Announced TEPCO informed the need to vent pressure of the containment vessel of Unit 1
5:44	Prime minister	Residents of 10 km radius	Instructed to evacuate from Fukushima Dai-ichi NPS area
6:14	Prime minister		Flew by the SDF helicopter to Fukushima Dai-ichi NPS
15:36	Live TV coverage at news break time	The general public	Explosion of Reactor 1; later reactor 3 explosion; no explanation of the danger by government
18:25	Prime minister	Heads of Fukushima pref. and nine municipalities	Instructed to evacuate their residents within 2 km radius due to possible risks by multiple reactor damages
13-March			
13:28	Chief cabinet secretary	The press	Announced the possibility of a hydrogen explosion in Unit 3 of Fukushima Dai-ichi NPS; no explanation on the danger outside the plant facility
14-March			
7:30	NISA	The press	Announced the first environmental radiation monitoring information gathered by the Local Nuclear Emergency Response Headquarters
11:01	Live TV coverage at news break time	The general public	Explosion in the Fukushima Dai-ichi NPS Unit 3
11:40	Chief cabinet secretary	The press	Reported the explosion of Unit 3 of Fukushima Dai-ichi NPS; suggested no severe leakage of radioactivity just as in the case of the Unit 1 explosion; no explanation on the danger

(continued)

Table 26.1 (continued) Sequence of Responses

<i>Day/Time</i>	<i>Actor</i>	<i>To Whom</i>	<i>Action/Information</i>
12:39	Chief cabinet secretary	The press	Announced the hydrogen explosion of Unit 3 but no damage on the containment vessel and presumed no meltdown
16:16	Chief cabinet secretary	The press	Announced all units of Fukushima Dai-ichi NPS at a lull
21:03	Chief cabinet secretary	The press	Reported cooling system resumed at 20:00 after Unit 2 exposed fuel rods were uncovered for some time
15-March			
0:20	TEPCO	The press	Announced fuel rods in Unit 2 of Fukushima Dai-ichi NPS were exposed again around 23:00 on March 14
5:25	Prime minister		Made a visit to TEPCO President and announced the establishment of Joint Nuclear Emergency Headquarters at TEPCO Tokyo office to share information
6:14	Live TV coverage at news break time	The general public	Explosion in Unit 2 of Fukushima Dai-ichi NPS
6:42	Chief cabinet secretary	The press	Announced damage to the suppression room connecting reactor containment vessel of Unit 2
9:38	Live TV coverage at news break time	The general public	Fire broke out in Unit 4 of Fukushima Dai-ichi NPS
11:00	Prime minister	Heads of Fukushima pref. and 12 municipalities	Instructed their residents of 20–30 km radius to take indoor refuge
11:07	Chief cabinet secretary	The press	Reported a fire broke out in Unit 4; radiation level around Unit 3 reached 400 $\mu\text{Sv/h}$ possibly affecting human health

safety regulatory organization. Minister for METI delegated the nuclear regulatory functions to NISA, which independently made decisions or consulted proposed decision with the minister. METI, as the central government ministry, has the jurisdiction over nuclear power reactor facilities with the authority to provide a license for a commercial nuclear reactor installment. This means that the same ministry engaged in both promotion and safety regulation of the nuclear power plants. The Tokyo Electric Power Company, TEPCO, a private sector company, is a licensee from METI to install nuclear reactors for generating electricity. The Nuclear Safety Commission, NSC, served as an advisory organization established under the Cabinet Office and made recommendations not directly but through the prime minister. The Ministry of Education, Culture, Sports, Science & Technology conducts monitoring and measurement for preventing radiation damages. Postdisaster organizational reforms based on the 3.11 experience are described in Section 26.6.

The major source of immediate information on the accident was the licensee itself, that is, TEPCO. The company and the government held daily press conferences independently on initial days of the crisis. As the media and the citizens complained, and as the government itself admitted in their reports to IAEA, some discrepancies appeared in the information and comments delivered a few times each day by the three parties at different press conferences, that is, the chief cabinet secretary, NISA, and TEPCO. These discrepancies and lack of clear information and explanation gave rise to certain confusion and even doubts on the credibility of the information released in Japan. Such confusion resulted in some skepticism if the Japanese government or TEPCO was hiding serious information from the public. Later, in response to the criticisms, joint press conferences of NISA, TEPCO, and other relevant organizations were held at the Joint Headquarters of Fukushima NPS Emergency Responses since April 25, to correct their inconsistencies, but whether their information was accurate or transparent including the appropriateness of holding the joint conference was yet to be examined.* Such joint conference itself can be questioned on the grounds of government responsibility and accountability in the time of national crisis for the national security cause.

In Japan, crisis communication methods have been established to inform the residents in multiple methods, including the local community firefighter's speakers, radio, TV special tones to alert about the disaster and facilitate guidance. Press releases and press conferences were widely used. Citizens received from the media, the crisis information almost live during the accident news break program[†] and the news break was often accompanied the explanation of the professionals within the media who added the meaning of the government announcement together with advice such as wear mask or wear long sleeve when outing and wash after return, etc. Such media information was much more useful and understandable for the citizens than the government one. In the initial days of the disaster, the chief cabinet secretary, NISA, or TEPCO usually added that what was happening would not be of immediate danger, without explaining the basis of such optimistic prediction, except for providing the arithmetic scale of the size of the quakes or nuclear accidents.[‡]

26.5.3 *Bad Case Scenario Needed in the Government Crisis Communication*

Critical crisis information communicated from the government to the public needs to include possible risks or the course to take even if it is a depressing news. Such crisis information was

* This headquarters was renamed as the Government—TEPCO Integrated Response Office on May 9, 2011.

[†] After the occurrence of the 3.11 earthquake, TV stations broadcasted nothing but the crisis news for the first few days.

[‡] No immediate risk involved according to them.

grossly missing in the initial days of the 3.11 nuclear disasters. The lack of such information was in itself one of the causes of anxiety among the citizens and overseas governments. Japanese media could not inform the bad prediction or scenario, and this lack in crisis communication in Japan caused a certain information gap between the Japanese community in general and the international community. A notable example of communicating *bad news or case scenario* by the foreign media can be illustrated from the article of March 13, 2011, from Washington by *NY Times*, which was significantly different from the Japanese government information that was being circulated in the Japanese society.* Learning the news of the first hydrogen explosion of the Fukushima Dai-ichi nuclear power plants, the reporters included in this article both the bad news and predictions such as the possibility of the meltdown seriously contaminating the environment and the risks at that stage, with the title caption “Radioactive Releases in Japan Could Last Months, Experts Say”.†

This article included at least 10 times the bad news not communicated in Japan or the possible course of the process to take before the cease of the accident. Table 26.2 indicates the predictions or bad scenarios described in this *NY Times* article, as compared to the Japanese government information disclosure.

It is interesting to note that the aforementioned *NY Times* bad news or prediction as early as March 13,‡ 2011, later turned out to be true and was announced by the government much later. The article was reportedly based on the US government and experts who designed the nuclear power plant reactors as well as Japanese experts. A comparison table of the timing is provided in Table 26.3. Similar information like that provided by the *NY Times* on 13 March§ was circulated worldwide through the Internet or other media. This means that unless the government vigorously provided PR activities,¶ it would be difficult to counteract the well-publicized shocking news of the crisis in the Internet age.

26.5.4 Possible Causes of the 3.11 Nuclear Disaster Crisis Communication Predicaments

26.5.4.1 Some Background Information for the Discussion

Japan had been utilizing nuclear energy almost 1/3 of the entire electricity until the 3.11 accident, and the government policy was to increase the level to 1/2. After the 3.11 accident, the country is for the promotional use of the renewable energy, while still the safer nuclear technologies are wanted at least during the long process before achieving the state of stable control of the accident and shut down of the damaged nuclear power plants.

* Some information contained was after March 14, 2011, and the time difference in NY and Tokyo need to be considered in reading this article.

† Reported by Keith Bradsher as contributed reporting from Hong Kong, Hiroko Mabuchi from Tokyo, and Henry Fountain from New York. This article has been revised to reflect the following correction: March 23, 2011; An article on March 13 about Japan’s nuclear reactor emergency caused by the earthquake on March 11 misidentified one of the two dangerous isotopes that Pentagon officials suspect were among the radioactive particulates found in small amounts on American helicopters flying 60 miles from the damaged Fukushima Daiichi Nuclear Power Station. Besides cesium-137, iodine-131—not iodine-121—was one of the isotopes.

‡ In Japan, 14 March.

§ In Japan, 14 March.

¶ Government report to the IAEA stated they did, but probably too late.

Table 26.2 Comparison of *NY Times* Prediction with Japanese Government Information Disclosure

<i>Japanese Government Information Disclosure</i>				<i>New York Times Prediction</i>	
11-March				14 March Japan time, 13 March New York time	
	19:03	Prime Minister	No impacts from radioactive materials upon the area outside of the facilities have been confirmed. Radioactivity is not in fact leaking out of any nuclear facilities	1	"Radioactive Releases in Japan Could Last Months, Experts Say," presumably leaking more radiation
	21:52	Chief Cabinet Secretary	Announced on reactor lost cooling down capability and indicated possibility of radiation leak but assured no danger in radiation spread and just a precaution	2	Small amounts of radioactive particulars presumed to include cesium-137 and iodine-131-suggesting widening environmental contamination
12-March				3	The tens of thousands of people who have been evacuated may not be able to return to their homes for a considerable period.
	0:15	Chief Cabinet Secretary	Updated relief operation; informed public no health danger by radiation spread in evacuating zones; no concrete data indicated	4	Shifts in the wind could blow radioactive materials toward Japanese cities rather than out to sea
	3:12	Chief Cabinet Secretary	Announced TEPCO informed the need to vent pressure of the Containment Vessel of Unit 1	5	Under the best scenarios, this isn't going to end anytime soon.
13-March				6	When the steam was released in a troublesome form with the damaged fuel, the steam is getting dirtier.
	13:28	Chief Cabinet Secretary	Announced the possibility of a hydrogen explosion in Unit 3 of Fukushima Dai-ichi NPS; no explanation on the danger outside the plant facility	7	Another potential concern is a possible reclaimed plutonium being used, possibly the released steam could be more toxic.

(continued)

Table 26.2 (continued) Comparison of *NY Times* Prediction with Japanese Government Information Disclosure

<i>Japanese Government Information Disclosure</i>				<i>New York Times Prediction</i>	
14-March				8	Water out of the basement, difficult to reach due contamination, suggesting the near future release to outside the plant.
	7:30	NISA	Announced the first environmental radiation monitoring information gathered by the Local Nuclear Emergency Response Headquarters.	9	A cooling pond inside the plants had been exposed and began letting off potentially deadly gamma radiation. While estimates vary, a condition can quickly lead to melting and ultimately to full meltdown.
	11:40	Chief Cabinet Secretary	Reported the explosion of Unit 3 of Fukushima Dai-ichi NPS; suggested no severe leakage of radioactivity as the case of the Unit 1 explosion; no explanation on the danger	10	The process of pouring water into an inflated balloon without learning how much were in or whether they are really covering the cores.
	12:39	Chief Cabinet Secretary	Announced the hydrogen explosion of Unit 3 but no damage on the containment vessel and presumed no melt down		
	16:16	Chief Cabinet Secretary	Announced all units of Fukushima Dai-ichi NPS at a lull		
	21:03	Chief Cabinet Secretary	Reported cooling system resumed at 20:00 after Unit 2 exposed fuel rods uncovered for some time		

The major reason for Japan's heavy dependence on nuclear energy for electricity is driven primarily from its lack of fossil resources. The use of nuclear energy was promoted especially after the oil shock, and the more recent increased dependence on nuclear energy resources was in order to comply with the international environment policy to reduce carbon monoxide emissions.

For the Japanese government and the citizens, decision to utilize or promote the civil use of nuclear technology was not easy due to the country's unique experiences of Hiroshima and Nagasaki right before the end of WWII. The government had to carefully implement the promotion policy of nuclear energy power plants. Japan was lucky after WWII, having the new

Table 26.3 Comparison between *New York Times* Prediction Time and Public Release Time in Japan

<i>New York Times Prediction</i>	<i>New York Times Prediction Time</i>	<i>Public Release Time in Japan</i>	<i>Japanese Government Reporting</i>
"Radioactive Releases in Japan Could Last Months, Experts Say," presumably leaking more radiation.	13-March	12-April	NISA reported level 7 accident to IAEA including the large amount of radioactive materials released in the atmosphere.
The tens of thousands of people who have been evacuated may not be able to return to their homes for a considerable period.	13-March	21-August	In Japan it was announced at last on 21 August, 2011 right before the step down of the Prime Minister Kan, in his remarks that those evacuated from within 3-km zone uninhabitable for many years.
Water out of the basement, difficult to reach due contamination, suggesting the near future release to outside the plant.	13-March	4-April	In fact later needed to flash the contaminated water to the Pacific Ocean that caused the problem with neighboring countries
A cooling pond inside the plants had been exposed and began letting off potentially deadly gamma radiation. While estimates vary, a condition can quickly lead to melting and ultimately to full meltdown.	13-March	18-April	This scenario turned out to be true as disclosed on April 18, 2011 by the announcement of NISA.

constitution dropping the use of force and not involving directly in war, and thus the civil use of nuclear technology was not discussed in connection with the national security issue and did not become the active interest of the general public despite occasional protests from opponents. Some argue that this situation led to a gross lack of transparency in the information disclosure needed to judge correctly on the nuclear technology safety or national security issue and led to the Japanese indulgence in the lucky state of so-called *peace senility*.

26.5.4.2 Some Possible Causes Leading to the 3.11 Nuclear Disasters

Since the nuclear meltdown was disclosed by the government and the seriousness of the radioactive contamination and spread became widely known in the Japanese society, a variety of discourses have been argued about what led to the severe nuclear power plant accident. Some argue that the 3.11 nuclear power plant accident could have been avoided if past alerts were taken seriously and proper countermeasures installed. Several possible causes that led to the severe accident have since been discussed in Japan, and some are outlined here (A–C).

A. *“Nuclear Power Plant Village” in creating nuclear safety myth*

Nuclear safety myth had been shared long among the nuclear power specialists, well-known, highly sophisticated brains who have for long established a strong inner circle, which was named after the 3.11 crisis as the *Nuclear Power Plant Village*, insinuatingly rejecting any criticism on safety doubts and creating the safety myth that had been blamed as a cause of aggravation in the 3.11 accident. These handful of highly sophisticated scientists or professionals had long been liaising with each other in academic institutions, METI, NISA, and NSC or other government nuclear-related institutions or power plants. They came to be well connected among themselves since their college education time. Among them, an expression of an unwanted opinion was considered as a criticism or a possible negligence of the predecessors or those who had been engaged in the nuclear power safety use of government or plant operation. Expressing a possible danger or omissions takes a risk for students, bureaucrats, and professionals to lose decent jobs or usual promotion.

B. *Lack of culture of sharing information*

Those in the inner circle did not have much contact with specialists in other disciplines such as seismology or tsunami who in fact had alerted some dangers existing in the nuclear power plant operations in the academia and even to TEPCO during their inspection or research. Several warnings had been published but were unfortunately ignored. The investigation report of the National Diet clarified that this *nuclear safety village* culture of refusing any negligence to safety or not imagining bad scenarios prevented from taking helpful advices or knowledge from other disciplines that could have avoided the 3.11 disaster.* TEPCO had reported the survey result to NISA on September 2009, and necessary plan was completed by November 2009, but the final research finding was only reported to NISA from TEPCO on March 7, 2011, a few days before the actual accident happened.† Some scientist disclosed the simulation result of the meltdown of the No. 2 nuclear power plant units that could have been avoided if the sea water cooling started 4 hours earlier.‡

C. *Lack of clear-cut division of responsibilities in the Emergency Preparedness Act*

The lack of preparedness in anticipating the worst scenario can be also traced to the ambiguity in the Basic Nuclear Emergency Preparedness Act. The act and the related government regulations describe the duties and the authorities of the government including its relevant ministries and institutions. But the act lacks well-defined responsibilities for each actor or the roles of the local government at the time of crisis, which resulted in the delay of communication flow or the exertion of the leadership of organizations, even the prime minister. The act described, on the other hand, detailed concrete steps to be taken by the reactor licensee§ (see Section 26.3).

26.5.4.3 Two Additional Issues

Following (D–E) may further explain the causes resulting in the 3.11 crisis government communication predicaments:

* NISA's head, who was in charge during 3.11 accident, confirmed that TEPCO had a research result submitted to NISA in 2008 concerning the possible height of a huge tsunami, which might be over 15 m high, in case it hit Fukushima Dai-ichi Plants, which was the same height that the tsunami waves actually reached this time. Sources: Yomiuri August 26, 2011 morning version, p. 3.

† Sources: Yomiuri August 26, 2011 morning version, p. 3.

‡ Sources: Yomiuri News, September 18, 2011.

§ TEPCO.

- D. *Lack of consciousness and capability of government bureaucrats in crisis communication disclosure to the public with an excuse of paternalism “not to frighten the local citizens”*
- E. *Local communities accepted the joint persuasion by governments and power plant builders for plant construction to benefit the local economy*

Since the passage of months after the 3.11 accidents, many episodes have been disclosed by media of the jointly fabricated actions to induce the local residents to accept the nuclear power plants by METI, NISA, local governments, and TEPCO. Any undesirable safety information details had not been from this picture disclosed, or criticisms had likely been buried.*

26.6 Road to Recovery and Reconstruction after the Great East Japan Earthquake

26.6.1 Government Supplementary Budgets for Fiscal 2011

The Japanese government made three successive supplementary budgets to carry out emergency rescue and relief operations, to conduct difficult tasks of restoring the damaged nuclear power plants as well as providing necessary assistance for the disaster victims, and to undertake reconstruction programs from May to November 2011. The total amount of the fiscal 2011 general account budget stood at about 106.40 trillion yen, the largest ever.

26.6.2 Basic Guidelines for Reconstruction and the Basic Act on Great East Japan Earthquake Reconstruction

The government decided on July 29, 2011, the Basic Guidelines as a blueprint for the government to tackle numerous challenges in the reconstruction process in response to the Great East Japan Earthquake. The guidelines identified that at least 19 trillion yen would be necessary by the end of fiscal 2015.

The Basic Act on Great East Japan Earthquake Reconstruction was enacted on June 20, 2011. The act stipulates the basic principles for reconstruction and organizations responsible for reconstruction.

26.6.3 New Institutions to Be Created from Lessons of 3.11 Experiences

As for the promoting agency for reconstruction, the Reconstruction Agency was established in February 2012 with the limited duration of 10 years as the government currently assumed to be necessary at minimum for reconstruction period. The Reconstruction Agency is headed by the prime minister himself, and cabinet minister in charge is established one rank higher than the other ministers.

As a lesson from the experience of 3.11, to strengthen the nuclear safety regulatory function, the government decided to create a new Agency of Nuclear Safety as an external agency of the Environmental Ministry at the cabinet meeting on August 15, 2011. Other measures including the reform of NSC were to be implemented together in April 2012.

* The minister in charge for nuclear accidents on October 9, 2011, announced to perform a so-called stress test of all the nuclear plants before resuming operations, while the October 10, 2011, NHK opinion polls indicated that the local government, which had accepted the power plant, would not base the stress test—only 17%, but rather the willingness of the local community citizens 59%.

26.6.4 Social and Economic Situation of the Most Damaged Three Prefectures and Their Crucial Reconstruction Measures for Them

The social and economic situation of the three prefectures, Iwate, Miyagi, and Fukushima, that suffered the major degree of the destruction caused by the earthquakes and tsunamis is illustrated here by use of statistical data (see Table 26.4). About 5.7 million people lived in these three prefectures as of October 2010. That accounted for 4.4% of the total population in Japan. Gross production in these prefectures accounted for 4.0% of GDP in Japan. Neither the size of the population nor the GDP ratio represents a substantial percentage in the total Japanese economy. The ratios of value-added by agriculture, forestry, and fisheries are rather higher than the national average. The distinctive features of the percentage of persons engaged in work by industry in three prefectures compared with the national average are higher percentage of workers in agriculture, forestry, and fisheries and in construction. The ratio of small- and medium-sized enterprises in all three prefectures is noticeably higher than the national average.

Based on these analyses, reconstruction measures focusing on agriculture, forestry, and fisheries and small- and medium-sized enterprises should be prioritized. Proprietors in agriculture or fishery are in principle self-employed and do not have strong financial standings and cannot easily borrow working capital from the private financial institutions. They have formed a cooperative to construct facilities for water supply and drainage for the farmland or marine product processing facilities with financial support from the governments such as subsidies. Small- and medium-sized enterprises also have weak financial standings and they cannot easily borrow necessary fund from the private financial institutions. Therefore, the recovery and reconstruction measures for agriculture, fishery, and small- and medium-sized enterprises should be prioritized among recovery and reconstruction programs of the government.

26.6.5 Future Perspective

The agricultural facilities and fishery-related facilities damaged by the earthquake and tsunamis will be reconstructed by the central and prefecture governments and/or with the support from the central and prefecture governments. Recovery assistance to small- and medium-sized enterprises from the central and prefecture governments will continue. Private sector investment by way of deregulatory measures can be possibly promoted.

However, the reconstruction of these local communities cannot be smoothly carried out due to the interest-driven conflicts among land owners in the case of city planning or between those already having fishery rights and those seeking new fishery rights. Some disaster stricken communities and citizens have started to restore their businesses and houses on their own. The government should be in a position to support such undertakings as initiated by the stricken local communities and people. Government had for the recovery and reconstruction from the 3.11 disaster, established a special tax programme to be collected from the Japanese taxpayers for the duration of 25 years (Nov. 2011 Ministry of Finance).

26.7 Temporary Conclusion

Looking back, although the rehabilitation and reconstruction of the disaster-affected areas are still on the way including the radioactive debris treatment that requests the help of unaffected prefectures and municipalities and requires improved policy management, as far as the immediate

Table 26.4 Selected Statistics

Unit	Total Population	Gross Prefectural Production at Current Price	Value-Added by Agriculture, Forestry, and Fisheries	Workers in Agriculture, Forestry, and Fisheries	Workers in Construction	Small- and Medium-Sized Enterprises
Year	Person	Billion yen	Ratio to total (%)	Ratio to total (%)	Ratio to total (%)	Ratio to total (%)
All Japan	2010 128,057,352	Fiscal 2008 505,016	Fiscal 2008 1.10%	2005 4.80%	2005 8.80%	2006 66.20%
Iwate	1,330,147	4,391	3.70%	13.60%	9.90%	87.10%
Miyagi	2,348,165	8,193	1.70%	6.30%	9.90%	79.60%
Fukushima	2,029,064	7,667	2.00%	9.20%	10.10%	82.70%
Sources	2010 Population census	National accounts and prefectural economic accounts, fiscal 2008	National accounts and prefectural economic accounts, fiscal 2008	2005 Population census	2005 Population census	2006 Establishment and enterprise census

rescue and initial relief operations right after the 3.11 earthquake and tsunami disasters to the three most afflicted prefectures are concerned, it appears that the disaster countermeasures worked in accordance to the pre-empted laws and guidelines adopted from the lessons learned from the 1995 Great Hanshin-Awaji Earthquake. But, in regard to the third element of the 3.11 disaster, that is, the Fukushima NPS accidents, the nuclear safety and disaster countermeasures, immediate responses taken by the government in the initial days, and the processes of relief and recovery, including the prolonged problems of evacuation and rehabilitation of livelihood and environment contamination, all raise much more complicated and overwhelming issues to the country. The nuclear disaster recovery may take many decades to come.

Although this chapter covered only the effort made by the government sector for recovery and reconstruction, citizens, both senior and junior, NPOs from inside and outside Japan, as well as the private sector have participated in many relief and recovery operations for the disaster-stricken areas and people. The full analyses on the roles of NPOs, citizens, and private sectors that contributed to the relief and recovery operations may reveal interesting new features of the nongovernmental stakeholders of the disaster governance for better disaster preparedness of the society.

This chapter mainly reflected only the initial government response to the 3.11 crisis highlighting the transparency and accountability issues unveiled in government crisis communion problems based on the information available at the end of 2011. As such, for the analyses of Japan's Disaster governance, the research is incomplete. Meaningful analysis will be only possible by taking into account of major investigation reports of Fukushima NPS accidents published in June 2012, and after renewed disaster management and governance systems placed.

In light of the international assistance Japan received this time, the Japanese government has expressed the possibility of organizing the next UN Disaster Mitigation Conference to update the UN decade of disaster reduction platform (currently in the Hyogo Framework for Action 2005–2015). Such an opportunity, coupled with research on the lessons learned from the 3.11 disaster experience, would contribute to the global exchange of information and construct improved knowledge on the capacity building of the disaster governance and crisis management.

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***Part III: Crisis and Emergency
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Chapter 27

Crisis and Emergency Management in Korea

Pan Suk Kim and Jae Eun Lee

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27.1 Introduction

Life is filled with the uncertainty and the complexity of turbulent environments. Most nations in the world have been affected by numerous crises, such as earthquakes, hurricanes, floods, chemical spills, and collapsing buildings. Society has to pay a heavy price during times of crisis if there is not an organization prepared to deal with such an event. This is why more people are demanding that the government, which is responsible for protecting the life and safety of citizens, be prepared to respond to crises proactively and effectively.

Traditionally, crisis management in Korea has been related to natural disasters, such as damage from storms or floods, rather than man-made disasters. The Korean government, like other developing countries, has accelerated its economic development at a much faster rate than is the norm in the process of societal evolution and adaptation. Up until recently, man-made disasters had not been fully realized nor prepared for by the government in Korea. In fact, over the past few years, a series of major man-made disasters have stricken Korea. During these times of crisis, the government has shown itself to lack a system to deal effectively and efficiently with a crisis situation. Consequently, the question of how to deal with man-made disaster management is a timely subject in Korean society.

27.2 Conceptual Frameworks

27.2.1 Definition of Crisis

Throughout human history, crisis has been an inherent part of human existence. All human beings experience crisis, uncertainty, and environmental threats. Even though a society might initially appear to be safe, the potential for crisis does exist. It is necessary to recognize that crisis is a subjective concept: what is considered as a crisis for one party may not be a crisis for another, as crises are part of human life. It is, therefore, no surprise to discover that various definitions of *crisis* exist.

Crisis, with its varying definitions, also has varying effects, not only for different cultures, situations, and times, but also for researchers. As such, it is possible, and even likely, that researchers will have a subjective view of crisis.* For example, while natural disasters may be viewed as acts of God within determinism or creationism, they may be seen as objects to be overcome by society within evolutionism or volunteerism (Wenger 1978:20).

According to the Webster's dictionary, crisis is defined as "a decisive moment or a turning point, the point in time when it is decided whether an affair or course of action shall proceed, be modified, or terminate" (*Webster's* 1966:537–538). By other accounts, it is defined as an event or a series of events that occur in a system (Jackson 1976:210–211).

* According to Robinson (1974:510–513), because of its varied meanings, the term *crisis* has not been useful in building *systematic knowledge* about social phenomena. So crisis will become a useful concept when it plays a part in theoretical formulations.

However, the earlier definitions are so general and broad that they are difficult to apply to crisis management in policy studies. It is possible to investigate the specific meanings of crisis in terms of an organization's survival in external and internal environments. D'Aveni and MacMillan (1990:635) define a crisis as any event or condition that threatens the survival of the organization. Hermann (1963:63–65) has suggested a working definition, formulated along three dimensions. An organizational crisis (1) threatens high-priority values of the organization, (2) presents a restricted amount of time in which a response can be made, and (3) is unexpected or unanticipated by the organization.*

Finally, observing the consequences and effects of crisis, Barton (1993:2–3) has argued that a crisis is a major, unpredictable event that has potentially negative results. So, the event and its aftermath may significantly damage an organization and its employees, products, services, financial condition, and reputation.

The operative definition of *crisis* in this discussion will be an event and/or a situation that endangers the established system, the health, life, and property of its members. Assuming that the forecast, preparedness, and response to crisis depend on management efforts, effective crisis management must be rooted in prevention, a refusal to allow past crises to recur, and a commitment to be prepared for any and every eventuality.

In short, when crisis prevention and response are the policy objectives of crisis management, it is then possible to prepare for crisis. This is based on the definition that crisis is an event and/or a situation that threatens the existence of a system, including the state, social community, government, organization, natural environment, and ecosystem. Until now, little distinction has been made between the concepts of crisis and a number of related terms such as disaster, hazard, danger, calamity, catastrophe, emergency, risk, threat, incident, and accident. It is possible, of course, for a researcher to make an operational definition or redefinition for his work. In this chapter, the term *crisis* is treated as being separated from some of these other concepts based on the intensity and scope of influence. The terms *disaster*, *hazard*, *accident*, etc., refer to only one event and/or situation, while *crisis* includes the concepts of natural disasters, man-made/technological disasters, and social disasters.

27.2.2 Types of Crisis

Crisis may be classified systematically. That is, crisis may affect political, economic-technological, social, and/or natural systems. First, crises that occur in political systems may be as follows: war, armed strife, coup d'état, terror (Rapoport 1992:1070), subversive activities, and hijacking (Waugh and Sweeney 1988:131). Second, crises occurring in economic-technological systems may be hazardous waste spills (Zimmerman 1985:30), radioactive contamination, oil spills, destruction of ozone layer, etc. The form and frequency of man-made disasters depends heavily on the level of technological development. Not only do disastrous events increase in frequency with increased technological sophistication, they also intensify or worsen (Fowlkes and Miller 1988:23). Third, crises such as the emergence of contagious disease or an unidentified epidemic, and violent protest or rioting, are socially derived. Finally, there are many natural disasters or crises—such as floods, typhoons, earthquakes, droughts, cold-weather damage, and storms.

* Kim (1987:67) defines crisis as a state that makes goal achievement difficult under certain conditions which incur a loss and danger to a system. Pauchant and Mitroff (1990:121) define a crisis as a disruption that either affects or has the potential to affect a whole system, thus threatening the very core of its social identity.

The stereotypical crisis is a natural disaster that originates from the unbridled play of the forces of nature (Fowlkes and Miller 1988:23).

Traditionally, crisis and emergency management has emphasized natural hazards rather than man-made technological hazards (Zimmerman 1985:29). While natural disasters (floods, earthquakes, droughts, etc.) are caused by natural phenomena and affect the physical and financial health of human beings, man-made or technological disasters caused by human error also have a baneful influence upon human beings. Technology and its consequences have emerged as a major hazard for modern society (Kasperson and Pijawka 1985:7).

Natural disasters have always been considered a grave occurrence, but they were part of nature's order, something that had to be accepted as part of life (Clary 1985:20). Nonnatural disasters, however, are a modern occurrence whose effects are similarly grave. In this chapter, the nonnatural disasters are divided into two categories for appropriate crisis management: man-made technological disaster/crisis and social disaster/crisis.* The two areas, man-made technological disasters and social crisis, differ substantially in terms of their nature and the management style of emergency management. This chapter expands on the importance of emergency management for social disasters.†

27.2.3 *The Importance of Crisis Management*

Every year, numerous natural, man-made, and social disasters occur in the world, but before the mid-1980s, there was little research on proper policy and administration in the area of crisis and emergency management (Mushkatel and Weschler 1985:45). Since that time, significant progress has been made in the United States, in terms of emergency management to deal with various disasters. Before the 1990s, most public officials in Korea were not fully familiar with the processes for recovering heavy financial, structural, and human losses in the event of natural disasters. In those days, preventative methods for man-made disasters were not fully developed.

Supposing that the primary function of government—any government in any country—is to protect the lives and property of its citizens (Giuffrida 1985:2), crisis and emergency management needs to be regarded as an important part of government's responsibilities to preserve and protect its people. Therefore, crisis and emergency management, which is the process of

* Hoetmer (1991:xxi) identified four types of disasters: natural, technological, civil, and ecological. According to him, violent natural events (e.g., earthquakes, floods, tornadoes) that have an extreme impact on human beings are natural disasters. Events that have an extreme impact on human beings, but are caused by human omission or error, are technological disasters. Deliberate human acts, such as wars, that cause extensive harm are categorized as civil disasters. Finally, ecological disasters, a fourth type of disaster, are caused principally by human beings and initially affect, in a major way, the earth, its atmosphere, and its flora and fauna rather than human beings. He has said that ecological disasters, unlike other types of disaster, are usually insidious rather than dramatic, but ultimately they are just as deadly.

† Social crisis is a criminal event and/or a situation where a certain group of people try to achieve their illegal, political, ideological, ethnical, religious, or secular goals. For example, on March 20, 1995, a total of 12 people died and approximately 5000 were injured when terrorists released sarin, a nerve gas, in the Tokyo subway (*Newsweek*, April 3, 1995:11–16). On April 19, 1995, approximately 150 deaths and more than 500 injuries occurred when a truck bomb exploded, destroying the federal building in Oklahoma City, United States, in what was thought to be a terrorist act (*Time*, May 1, 1995:27–34). It is widely accepted that these criminal events may well be examples of social crisis. According to Weinberg and Davis (1989:6–13), terrorism is a politically motivated crime intended to modify the behavior of a target audience and also has been used by groups pursuing ethnic-separatist or nationalist aims.

developing and implementing policies and programs to avoid and cope with the risks to people and property from natural and man-made hazards, has to be considered as a national policy objective or an administrative process (Cigler 1988).*

Technological malfunction has emerged as a major source of hazard for modern society. With urban public services and facilities multiplying, man-made technological disasters in modern cities have a greater likelihood of occurring than in the past. Also, in modern society, property damage and injury caused by conflicts among various groups—ethnic, religious, or political—are on a larger scale than other disasters.†

27.2.4 Climax of an Interdisciplinary Approach to Crisis Management

Because the scope, range, and extent of crisis/emergency management are very broad, it is impossible for students of a single discipline to manage disaster and crisis situations thoroughly. On the contrary, many professionals in diverse academic fields must intervene to manage a crisis. For example, Pauchant and Mitroff (1990:122–127) discovered that in the Bhopal crisis, on December 2, 1984, a leak of a highly toxic gas that originated in Union Carbide (India) Ltd. (UCIL), began as an *incident* at the unit level, quickly accelerated into an *accident* that then affected the total system, finally turning into a full-blown crisis.‡ According to reports, the issues relating to the Bhopal crisis are inordinately complex. They involve a web of financial, legal, medical, technical, managerial, political, communicational, and therapeutic factors. The qualified professions required to deal with all of these factors cover a range of disciplines including sociology, psychology, management science, engineering, political science, law, economics, anthropology, ethics, health science, religion, and theology.

Above all, as modern scientific technology's development is accelerated, more human knowledge is required to meet the demands of crisis management. With hundreds of corporate calamities and/or industrial crises in international and multinational businesses (Gladwin and Kumar 1987:23) being added to the list of crises, the need of interdisciplinary approaches becomes absolutely necessary.§

* Rosenthal and Pijnenburg (1991:3) have argued that crisis management involves efforts to prevent crises from occurring, to prepare for a better protection against the impact of a crisis agent, to make for an effective response to an actual crisis, and to provide plans and resources for recovery and rehabilitation in the aftermath of a crisis.

† In building an effective emergency management system, one should think over the following eight variables: time, space, culture, environmental uncertainty, information, types of crisis, financial conditions, and actors (Lee 1992:48–55).

‡ Sethi (1987:103) has said that it is reasonable to conclude that the Bhopal accident was not a natural disaster, which could not be foreseen or prevented. It was not the price of progress that must be paid. It was instead a combination of small errors, postponed maintenance, and poorly trained personnel whose cumulative effect resulted in the ensuing catastrophe.

§ In contradiction to this theory, Quarantelli and Dynes (1977:43–45) have argued that the history of interdisciplinary research, including efforts in the area of disaster, does not support the ideas that better research results are obtained or that applications of findings are more easily accomplished by taking an interdisciplinary stance. They feel that in such an approach, contributions of different disciplines are often reduced to the lowest common denominator, which is sometimes only slightly, if at all, above a common-sense level. Quarantelli and Dynes further state that research findings in an interdisciplinary setting are often even more difficult to translate into practical terms.

27.3 Area of Crisis Management as a Policy Object

Different types of crisis events, including natural and technological disasters, civil disturbances, terrorist actions, acute international conflicts, and nuclear accidents, are all serious threats to basic social, institutional, and organizational interests and structures (Rosenthal et al. 1991:212). Thus, the time to deal with emergencies is before they happen (McLoughlin 1985:165). For that reason, it is necessary for us to examine the areas of crisis and emergency management as a policy object.

27.3.1 Crisis Area as a Policy Object

Existing crisis management research, involving crisis and/or emergency management functions, has generally been lacking a discussion of the issues regarding crisis as a policy object, focusing instead on the governmental response to disasters. Without fully discussing the area of crisis as a policy object, governmental preparedness and/or response to various crises may be ineffectual.

While every person has the same propensity to abhor and/or avoid the large or small crises—which may intimidate them and pose threats to their property, family, or organization—each person has his or her own peculiar response to a crisis. Kharbanda and Stallworthy (1989:86–87) have argued that, depending on their background and upbringing, people react differently even to the same factor. Accordingly, there is a very wide gap between the real risk and the perceived risk as far as the general public is concerned. Even though human beings experience the same crisis, perception and response modes differ within one's sociocultural contexts. The first step in the process of defining a situation as a crisis involves perceiving an event in the environment that triggers the crisis (Billings et al. 1980:302). This, therefore, allows one to consider crisis within a sociocultural category as well as a scientific technological category (Kim et al. 1995:952–953). The basic question is: What are the responsibilities for public management to deal with various accidents, events, and situations? For example, in Korea, more than 10,000 people die from traffic accidents each year. These accidents are seen as crisis involving a threat to personal life and happiness. Traffic accidents are not only the biggest cause of death for travelers but are also one of the major causes of death per se.* However, most traffic accidents are not considered crises in governmental crisis management policy.

Based on Wenger's thesis that there are two dimensions of crises, intensity and scope, Figure 27.1 shows that crisis can be divided into six groups, which are useful in formulating crisis management policy. Figure 27.1 shows three implications for a crisis management policy. First, the crisis must have high intensity for the social community. If the intensity of crisis is not perceived as high, public servants and community members will not need to respond seriously. Government responsibility for planning and preparing for the uncontrollable is necessary to prevent catastrophe; therefore, the intensity of the crisis must be great. Second, although the crisis intensity may be perceived by some to be high, it must be noted that crises within a narrow scope may not be a policy object of crisis management. A crisis of narrow scope may affect an individual, family, informal group, and organization, but the condition is not thought of as a crisis by those outside the scope of the crisis. These smaller groups, however, often do not possess adequate crisis management mechanisms (Wenger 1978:28). So, crises that occur in narrow scopes may be managed by private agents and established government institutions, such as insurance agencies, fire rescue

* Hodgkinson and Stewart (1991:48) have said that traffic accidents are so common that they are not viewed as *disasters* except when a number of individuals die together and media attention is excited. Death or injury in a traffic accident is most certainly a *personal disaster*. The same may be said of fire, which is usually caused by a family member's error or employee's indifference. Solutions to these problems belong to the private sector (automobile insurance, fire insurance), not to the public sector.

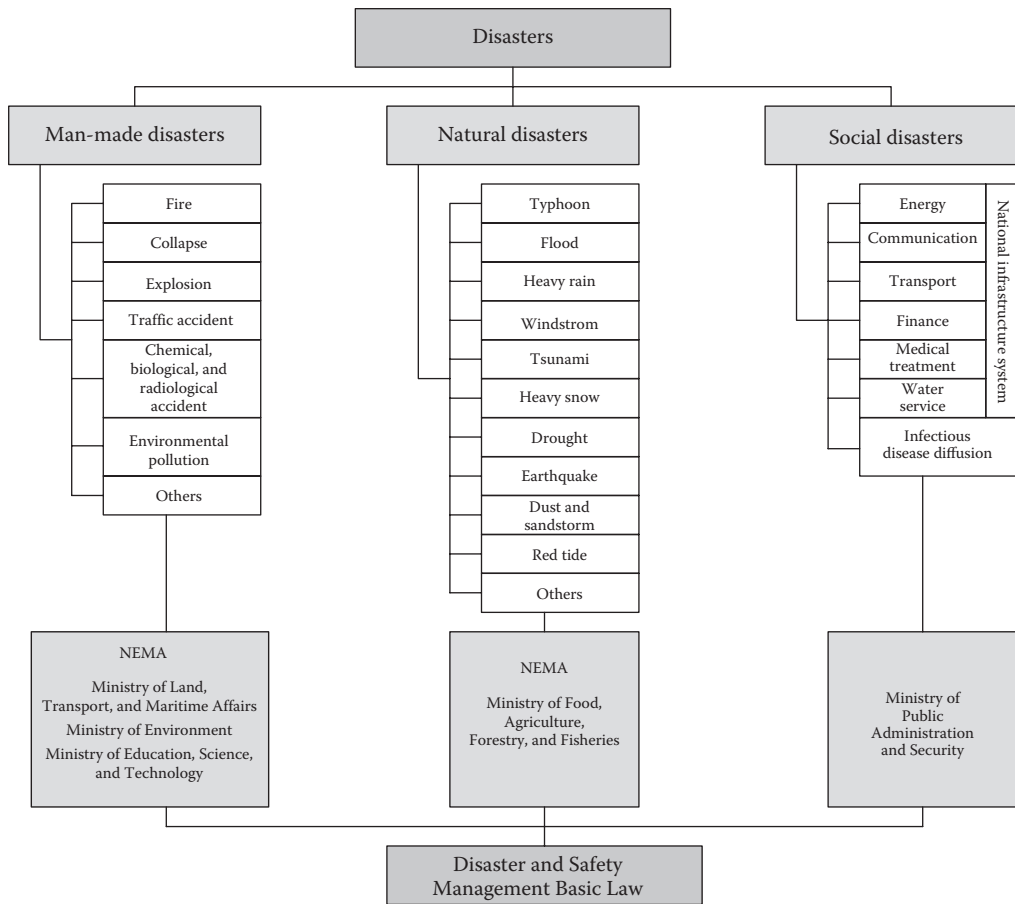


Figure 27.1 The areas of crisis as a policy object.

officials, and police, not by crisis management organizations. Third, crises meriting a policy object for crisis management represent a crisis of relatively high intensity within middle-range or wide scopes, such as the community and society (Table 27.1).*

Among the six groups of crisis scope and intensity, compositions I and VI in Table 27.2 illustrate the areas of crisis deserving of a crisis management policy object. The distinctions in areas and nature of crisis embodied in these six modes help to distinguish the differing roles that governmental agencies have assumed in crisis and emergency management. The type and extent of activity for any governmental agency depends in part upon the crisis areas that are defined in Table 27.2. The types of crises within compositions I and VI are shown in Table 27.3.

Within the category of crisis deserving a policy object, one must raise the question: What is the dividing line between high and low intensity? Or how are we drawing a distinction between

* According to Kunreuther (1973:27), insurance is the normal way for individuals to protect themselves against the risk of loss from natural hazards. Yet the evidence is fairly strong that people do not take out insurance against disasters unless they are required to do so. Most homeowners in the United States are insured against damage from windstorms and hail because these hazards are included in the comprehensive homeowners' policy that property owners are usually required to purchase as a condition for a mortgage.

Table 27.1 Various Types of Crises in Systems

<i>System</i>	<i>Crisis (Disaster)</i>
Political	War, armed strife, coup d'état, terror, subversive activities, hijacking
Economic–technological	Architectural collapses, flammable chemical explosions, radioactive or toxic chemical spills, and progressive environmental pollution
Social	Rioting, disease, violent labor strike
Natural	Flood, typhoon, earthquake, drought, cold-weather damage, storm

Source: Lee, Jae-Eun (1992). A study of the general model for crisis management in policy implementation process. Master's thesis in public administration, Yonsei University, Seoul, Korea, 1992, p. 58.

Table 27.2 Compositions of Crisis Area as a Policy Object

<i>Composition Order</i>	<i>Scope and Intensity</i>
Composition I	Wide scope + high intensity
Composition II	Wide scope + low intensity
Composition III	Middle-range scope + low intensity
Composition IV	Narrow scope + low intensity
Composition V	Narrow scope + high intensity
Composition VI	Middle-range scope + high intensity

Table 27.3 Crisis as a Policy Object

<i>Composition Order</i>	<i>Scope and Intensity</i>	<i>Cases of Crisis</i>
Composition I	Wide and high	War, armed strife, coup d'état, rioting, destruction of ozone layer, subversive activities, hijacking
Composition VI	Middle-range and high	Architectural collapse, gas explosions, terrorism, radioactive contamination, acid rain, hazardous waste spills, emergence of contagion or unidentified epidemic, floods, typhoons, droughts, earthquakes, cold-weather damage, storms, violent protest

the two intensities? The answers to these questions originate from the ambiguities of the social perception of crisis. The essence of a disaster lies in its social, not physical, consequences; no physical agent or event has a social meaning outside of a social context (Wenger 1978:25–26). That is, only when an accident or event negatively affects society may one regard it as a crisis. Then, when the existing governmental, traditional, and social institutions are not equal to the crisis condition, it may well be said that the intensity of an event is great. For example, unless the established organizations for emergency management within a community, such as fire rescue departments or police departments, manage the demands in a crisis situation, a crisis is defined as having a high intensity (Lim 1996:13). So, the existing social system for managing such events is a relative criterion for the distinction between the high and low intensity of a crisis.

Given these studies, the *Sampoong disaster* in Korea can now be examined. The Sampoong disaster is classified as a composition VI event with middle-range scope and high intensity. This chapter documents the crisis and emergency management system and the societal response to this major man-made disaster in Korea.

27.4 Emergency Management in Korea: Managing the Sampoong Disaster

The Sampoong disaster is significant for two reasons: First of all, it is considered the worst crisis in modern Korea. Second, it has been a turning point, changing the emergency management system in Korea. With this event as momentum, public attention to man-made disaster management has been growing significantly.*

What shocked the public is that the earlier disaster could easily have been avoided if proper maintenance and care was taken. The cause of the Sampoong collapse was reported as poor maintenance of the building, therefore making it a man-made disaster.

27.4.1 Sampoong Building

The Sampoong building had two wings, with one housing the department store and the other sports and leisure facilities. The wing that collapsed was the one housing the department store. It was built by Sampoong Construction and Industry Co. and completed in November 1989. An

* An architectural disaster collapse came after the series of similar man-made disasters in the 1990s. On March 28, 1993, a railroad disaster involving the *Mugunghwa* passenger train carrying about 600 passengers derailed due to land erosion north of Kupo Station along the Seoul–Pusan line. Casualties from the accident marked it as the worst recorded railway mishap; 78 people died and 163 were injured. On July 26, 1993, an Asiana 737–500 airliner, en route to Mokpo from Seoul carrying 110 passengers and crew, crashed while trying to land at Mokpo, Korea; 66 of those aboard were killed and 44 others injured. On October 10, 1993, the *Sohae Ferry* with 400 crewmen and passengers aboard sank in a matter of minutes near Wi-do (island) in the West Sea, North Cholla Province. The causes of the *Sohae Ferry* disaster, which claimed the lives of 292, were overloading and improper maintenance. On October 21, 1994, a section of the Seongsu Bridge, one of the busiest bridges that cross the Han River in Seoul, collapsed during morning rush hour. Thirty-two people were killed in that disaster. On October 24, 1994, a fire engulfed a pleasure boat on the Chungju Lake near Chungju, North Chungcheong Province, with 29 killed and 33 injured. On December 8, 1994, in the city, a gas explosion in Ahyeon-Dong, Mapo-gu, Seoul, 12 people were killed. On April 28, 1995, in Taegu, a construction worker accidentally broke a gas main at a subway construction site. An explosion fueled by a city gas leak rocked the entire city killing 101 morning commuters and injured 270 others.

addition to the building was completed in October 1994. The building housed 556 departments with 681 employees. It stood 27.6 m high and sat on a 29,008 m² lot. The four underground floors consisted of a parking lot and an electricity control room. Three of the collapsed building's floors comprised the department stores and the upper two floors physical fitness facilities and restaurants. The department store was operated by Sampoong Construction Co., whose engineering ranks 858th among the nation's construction firms.

27.4.2 Warning Signs of Architectural Collapse

The warning signs that, if heeded, could have prevented the collapse of the Sampoong Department Store came as early as 15 days prior to the accident. At that time, a restaurateur on the fifth floor reported a fissure on the ceiling of the building to management. But management's response was lukewarm, and management took no action. Then, 5 days before, a housewife, who had entered the same restaurant to get something to eat after some routine weekend shopping, was showered with a water leak from the ceiling of the restaurant. Three days before the collapse, a report of a gas leak again went unheeded by the department store management.

On the very day of the collapse, June 29, the signs that should have set off alarm bells appeared before opening hours, in the restaurants on the fifth floor. Around 9:30 a.m., the floor of the restaurant cracked open slightly. An environmental technician reported the incident to the management. Top executives of the department store stopped by an hour later, mumbling something about seeking professional assessment. Between 11:00 and 12:00, neighboring restaurants were experiencing water leaks from ceilings and cracks in the floors. Only at this point did the management close off the fifth floor, while the other floors continued with business as usual. Sometime after 1:00 p.m., a breakdown of air conditioning and gas services as well as a power failure occurred throughout the department store. The management met around 3:00 p.m. for an emergency meeting without notifying the employees and shoppers of the situation. When things were at their worst, the executives of the department management left the building, consequently leaving many employees and shoppers still inside.

27.4.3 Collapse

The Sampoong Department Store, one of the nation's biggest, in Sochodong, southern Seoul, collapsed from the top down at about 5:55 p.m., on June 29, 1995, trapping hundreds of shoppers and store employees in the rubble. It took only 5 s for half of the huge five-story building to fall into the basement, becoming nothing more than a pile of rubble and a tomb for hundreds of shoppers and store employees. Ambulances and fire engines from across Seoul rushed to the scene, but rescue workers were overwhelmed by the number of casualties. The adjacent streets were clogged with rescue vehicles, large personnel cranes, and equipment trucks. Firefighters proceeded to hose down the debris to settle the rising dust and put out fires.

The evening rush hour traffic around the area hindered rescuers' efforts. Private cars and taxis were mobilized to transport the injured to nearby hospitals. Hospitals ran short of blood due to the large number of casualties. People who escaped the collapse were left in shock on the street.

Gas lines in the immediate area were shut off to prevent possible explosions. Luckily, a safety supervisor at the department store found problems in the building structure on the morning of June 29 and closed the main gas valve, preventing an even greater disaster.

27.4.4 Causes

So what really went wrong? First, unsound business practices were rampant in the Korean domestic construction industry. One is the extensive pyramid-style subcontracting system, which ultimately serves to put a squeeze on construction budgets and consequently run the risk of accidents. The construction of Sampoong was atypical in that the structure was built by the store's parent company. As then Justice Minister Woo-Mahn Ahn said, the disaster was thought to have been caused by shoddy construction, and the motive of tight budgeting may still have been the most important factor causing the disaster.

Second, further encouraging the faulty construction was a virtual absence of construction management and supervision by a third party, despite construction legislation requiring a watchdog for all construction projects, public or private.

The third and possibly the most frustrating reason for the disaster was the lack of appropriate governmental supervision of safety. After a couple of gas explosions and bridge collapses, governmental officials were prompted to broaden their safety checks to public works such as subways, gas pipelines, and large-scale government construction projects. However, privately built structures were left out. This had left private owners or management companies responsible for the safety of their own buildings. However, this system, based on self-interest, revealed its all too fatal flaws in the Sampoong case.

Finally, a thorough examination of the department store structure could have brought about reinforcement measures. The department store failed to fulfill its responsibility of supervising its own premises. The extreme case is that during an emergency meeting at 4:00 p.m. Thursday, just 2 h before the collapse of one wing of the two-wing shopping mall, management decided to go ahead with store business, spurning a suggestion to evacuate the shoppers and employees and launch immediate repairs.

Consequently, the weak concrete columns and steel beams of the seemingly sound building failed to support the weight of the structure. This tragic disaster, as was the case with other disasters, was attributed to the lack of conscience, business morality, and unscrupulousness in the construction industry.

27.4.5 Governmental Responses to Disaster

At 5:56 p.m., 1 min after the building collapsed, witnesses and fire officers of the nearby fire department reported the collapse of the Sampoong Department Store to the consolidated alarm office of the fire station in Seoul. By virtue of the emergency communications system shown in Figure 27.2, thousands of police and military troops equipped with excavators, cranes, fire engines, and other rescue equipment rushed to the scene. Most of the manpower and equipment, however, could not be used immediately, as experts warned of the possibility of further collapse of the remaining part of the department store, which already leaned about 5° northward. Steel structures, concrete, and other piles of heavy rubble also prevented rescue teams from getting easy access to those trapped underground in the basement levels.

The Defense Ministry committed more than 1500 military rescuers, four cranes, 32 trucks, and other equipment to the rescue effort, and the US Forces Korea (USFK) sent 40 rescue workers, 6 fire engines, a medical support team, and metal-cutting teams with two large metal cutters to the scene of the disaster Thursday night, shortly after the building collapse.

The disaster headquarters were established at 6:00 p.m. and a field command office at 6:20 p.m. In Table 27.4, the government's main response to the Sampoong disaster is outlined.

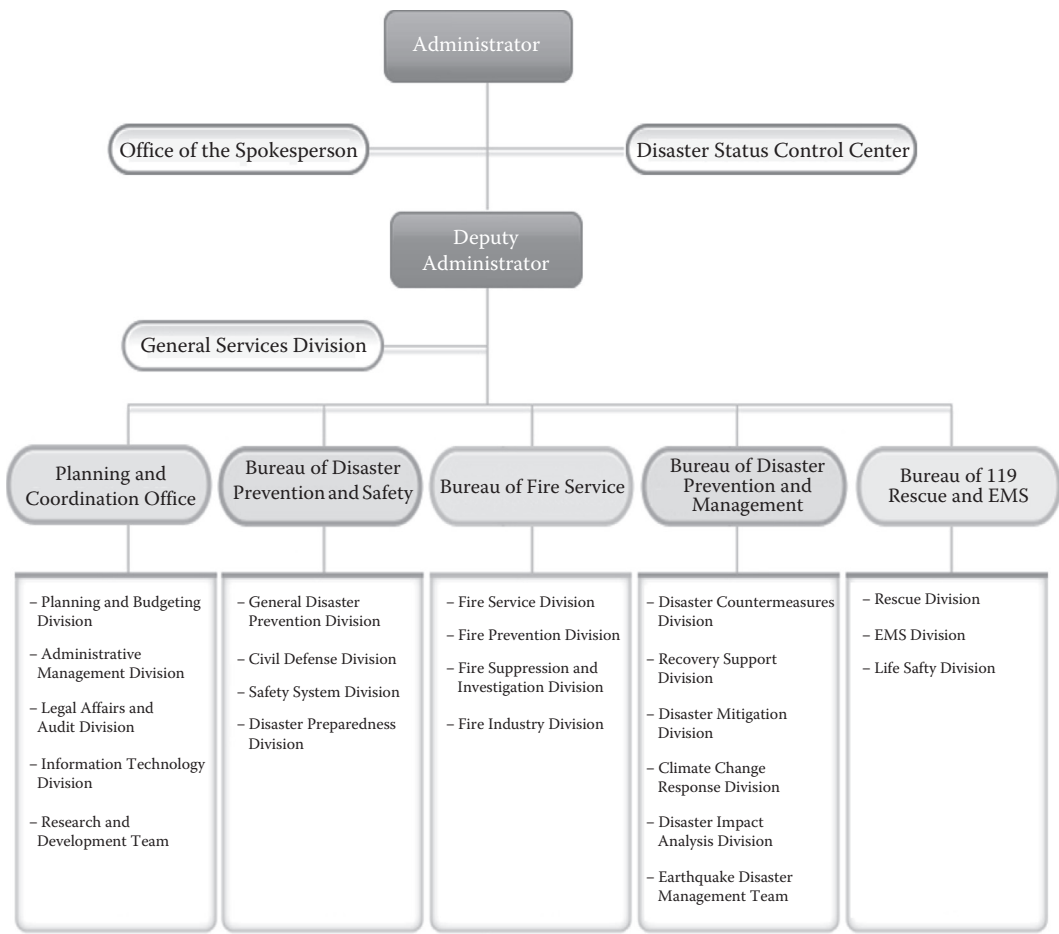


Figure 27.2 The emergency communications system. (From Seoul Fire Defense Headquarters *A Report to the Special Investigation Committee of the National Assembly*, Seoul Fire Defense HQ, Seoul, Korea, 1993.)

At the same time, the Korean National Red Cross (KNRC) sent hundreds of rescue officials and two large vehicles for cooking to the scene along with emergency relief supplies like blankets, bottled water, food, gas masks, and gloves. To meet the increasing demand for blood transfusions for the casualties, the KNRC supplied its stored blood to the hospitals that took in casualties of the disaster. Other citizens and volunteers who made search-and-rescue efforts during the initial stage provided food and water to emergency workers and supported the field emergency operations during the response period.

On Friday, June 30, US high-tech gear arrived at the scene of the collapsed Sampoong Department Store and quickly located at least six survivors in the rubble. A US team that had aided in the rescue at the Oklahoma City federal building arrived at the scene with a system to locate survivors (STOLS) and a seismic radio locator designed to detect any vibration from trapped survivors in the debris. They worked with the STOLS device from 8:00 to 9:00 p.m., but it was not as successful as had been hoped. One member of the STOLS team said that the device was hindered by the many rescue officials and other rescue equipment that created noise at that time.

Table 27.4 A Governmental Control Measure of the Sampoong Disaster

<i>Time Phase</i>	<i>Period</i>	<i>Contents of Control Measure</i>
Initial stage	June 29–30, 1995	Operating the disaster headquarters Establishing the field command office Committing 13,175 men, 1,525 types of equipment to the scene Recovering the victims (dead 66, injured 844, and 79 hospitalized)
Middle stage	July 1–19, 1995	Operating the field headquarters Proclaiming the SDA Supporting the expenditure: W 13,899,000,000 (\$17,373,7500) (national funds 50%, local funds 50%) Committing 77,066 men, 8670 types of equipment to the scene Recovering the victims (dead 459, injured 932)
Late stage	July 20–September 16, 1995	Finishing the rescue operation (withdrawal) Completing removal of debris (34,000 tons)
		Grants for funeral expenses: ₩1,686,550,000 (\$2,108,187,000)
		A special reward for the bereaved families: ₩135,600,000 (\$169,500)
		Reward for victims: ₩144,200,000 (\$142,750)
		Medical treatment cost for the injured: ₩180,000,000 (\$225,000)
		Financial support, 135 cases (enterprise 122, personal 13): ₩8,616,000,000 (\$10,770,000)
		Tax support, 1245 cases: ₩6,868,000,000 (\$8,585,000)

Source: From Lim, S.-T., *A Study of Comprehensive Disaster Management in Korea*, KRILA (Korea Research Institute for Local Administration), Seoul, Korea, 1996.

A special rescue team from a coal mine in Taebaek, Kangwon Province, Korea, arrived to join the rescue operation. In the afternoon, President Kim Young-sam visited the accident site and called on officials to speed up rescue efforts to make sure that anyone alive in the wreckage would be saved.

27.4.6 Rescue Operations and Casualties

On the night of July 1, a total of 24 people, 14 of them women, were rescued after being buried together for about 52 h in the basement of the collapsed Sampoong Department Store. The 24 rescued were among about 130 people pulled out of the rubble alive. They were carried out at intervals of 2–3 min, and it took about 50 min to get them all out. A rescue team found the

Table 27.5 Summary of Victims Condition

Types	Dead		Injured			Missing	
	Identified	Unidentified	Serious	Slight	Returned Home	Men	Women
Victim no.	397	62	187	196	549	41	128
Subtotal	459		932			169	
Total	1391						

Source: From Socho-gu, A report on the collapse of the Sampoong Department Store to the Special Investigation Committee of the National Assembly (Rec. No. 20950180), Sochogu, Seoul, Korea, 1995.

24 survivors on a third basement floor around 11 a.m., when they were climbing down an underground stairway into the remaining section of the building. Workers reached them by cutting through concrete slabs with drills, iron cutters, and hammers.*

On July 19, President Kim Young-sam designated the site of the collapsed Sampoong Department Store and its vicinity (about 67,000 m² of area in and around the accident site) a *special disaster area (SDA)* in accordance with the Disaster Management Act, which was passed in the National Assembly on July 15, 1995. In a special statement, Kim said that the government would provide the special administrative, financial, and tax supports needed for rescue, relief, and restoration of the disaster area. President Kim also vowed that the government would root out corruption in the industry and the source of faulty construction practices.

The data on victims' condition are presented in Table 27.5. The death toll from the collapse reached a total of 459, including shoppers and employees. Some 62 of the 459 bodies remained

* Removal of iron beams and other debris from the five-story department store started July 3, together with the search for survivors after consultation with the bereaved family members. "There is a possibility that there are people still alive trapped in the rubble of the Sampoong Department Store," said an official at the Relief and Rescue Center based at the city hall. Many bereaved family members, consequently, agreed to help with the removal work and the hunt for survivors. One survivor, Myong-sok Choi, was pulled out of the wreckage 8:20 a.m., Sunday, July 9. He was discovered in what had been the first basement. The rescue of the 20-year-old man, who worked as a part-time sales clerk at the store, raised hopes of finding more survivors. He said, "When I knocked on the wall, there was a response. I thought there were still people alive." He said, "There was nothing to drink but a trickle of rainwater." For sustenance, he ate bits of cardboard boxes. At 3:30 p.m., July 11, an 18-year-old female sales assistant, Ji-hwan Yoo, was lifted from the rubble, after lying buried for 12 days, more than 285 h, in a small pocket under the collapsed building. Encouraged by the miraculous discovery of the two survivors, rescue workers stepped up their last-ditch search for more survivors. Survivor-locating devices such as vibration and sonar detectors as well as endoscope cameras were brought in to search for signs of life, and more rescuers and heavy equipment were stepped up. The rescue operation focused on the central basement area of the disaster site of about 1 km², with cranes carefully removing debris and concrete slabs. At 11:20 a.m., July 15, on the second basement level, rescue workers pulled out another survivor from the rubble of the Sampoong Department Store. Sung-hyon Park, 19, miraculously alive after being trapped 377 h and 20 min. Park, an employee in the children's clothing section, said that she had not eaten or drunk anything while she was trapped in a small pocket under the rubble for 15 days and 17 h. In 1969, a coal miner, Chang-son Yang, was trapped in a mine in South Chungcheong, Korea, for 368 h or 15 days and 8 h. Park's survival was 9 h longer than Yang's. After she was pulled out, she said that there were more survivors in the rubble. The rescuers therefore conducted searches near the place where she was found, but they failed to locate more survivors.

Table 27.6 Disaster Management Organizations

<i>Organizations</i>	<i>Characteristics</i>
Civil Defense Bureau (CDB)	Organizing, operating, mobilizing, and training/educating the Civil Defense Corps Unit in provisions against war and various disasters.
Disaster Management Bureau (DMB)	The general management of man-made disasters, including in its responsibilities conflagrations, architectural collapse, and explosions. It mobilizes the manpower, equipment, and various resources.
Hazard Prevention Bureau (HPB)	Managing, measuring, planning for, and researching the prevention of natural hazards, including typhoons, floods, snowstorms, and earthquakes.
Fire Service Bureau (HSB)	Planning, responding, preventing, and extinguishing fires and efforts to rescue and relieve victims.

Source: Modified from Ministry of Home Affairs, *A Disaster Yearbook*, Ministry of Home Affairs, Seoul, Korea, 1996, p. 36.

unidentified, as they were badly mangled and decomposed. Approximately 930 people were injured, and 169 were missing in the collapse (Table 27.5).

27.5 Improving Crisis and Emergency Management Systems in Korea

The practice of crisis and emergency management in Korea has undergone a significant transition since the collapse of the Sampoong Department Store in southern Seoul. The scope of emergency management has expanded from an earlier emphasis on natural hazards to today's all-disaster approach, which addresses natural, man-made, and civil defense disasters. Disasters and crises themselves often serve as the impetus for institution-led change. The Sampoong disaster, for example, prompted the National Assembly to enact the Disaster Management Act. The national government created the Disaster Management Bureau (DMB) to respond to man-made disasters, which often occur in Korea (Sang Lee 1996:124). The Korean disaster management system has been reestablished through the enactment of the Disaster Management Act of 1995 and the full revision of Natural Hazards Management Act of 1995 following a series of catastrophic man-made disasters since 1993 (Seong Lee 1996:x).^{*} In this context, this section examines the emergency management systems of the central and the local Korean governments.

Only the government has the technical capability, the appropriate resources, and the authority to coordinate a range of disaster-related responses. Thus, natural disasters inevitably pose problems that cannot be adequately addressed by private-market activities (Schneider 1995:17). The same may be said of man-made technological disasters. According to the Constitution of the Republic of Korea, the government has the responsibility to manage all the disasters and to

^{*} According to Disaster Management Act, Article 2, *disaster* refers mainly to man-made technological disasters, including fires, architectural collapse, massive explosions, traffic accidents, CBR (chemical, biological, and radiological) accidents, and environmental pollution. It excludes natural hazards.

protect its citizens.* The central government has served as the pivot of emergency management in Korea. First of all, the central safety committee within the office of the prime minister executed a plan in which there were measures for disaster prevention, control, management, coordination, and so on. In its early years, the Civil Defense and Disaster Control Headquarters (CDDCH), within the Ministry of Home Affairs, had failed to provide a coordinated national response to natural and man-made disasters.

27.5.1 Disaster and Emergency Management in Korea

In order to protect the lives and property of the people from the large-scale disasters that have occurred repeatedly every year since the 1990s, the Koreans became aware of the need for systematic disaster management. The government has upgraded management of disasters and safety as one of its own responsibilities and founded the *National Emergency Management Agency* (NEMA) on June 1, 2004, that is specialized in the management of national disasters for the purpose of carrying out the task of the time, *realizing the safe society*, and⁸⁶ “protecting the lives and property of the people.”

NEMA is also the successor of the Civil Defense and Disaster Control Headquarters (CDDCH), which was under the control of the (former)” Ministry of Government Administration and Home Affairs (MOGAHA)” and now the Ministry of Security and Public Administration (MOSPA).

NEMA has five missions:

1. To strengthen policy deliberation and general coordination through the unification of disaster-related working systems.
2. To heighten disaster-prevention awareness and to strengthen preventive investment.
3. To strengthen on-the-spot-action systems such as rescue and relief.
4. To strengthen local self-governing bodies’ disaster management and civil-governmental cooperative systems.
5. To establish a system of preventive activities to make the people more safety conscious. NEMA’s vision is “realizing a comfortable and safe Korea,” and its slogan is “preventing disasters and practicing safety.”

27.5.2 Three Waves of Legislation of Disaster and Emergency Management in Korea

The first wave was at the beginning of 1960s, which was mostly on the infrastructures that ensured the recovery and reconstruction from the Korea War. Laws on road, railway, bridge, and so on were legislated to deal with the crisis in these fields, and good infrastructure was the basis of rapid economic development. Two decades of development changed Korea from war ruins into a new industrial country. This wave mainly happened in the beginning stage of the three-stage development process.

The second wave was from 1990s that the Korean government focused on all kinds of crises and disasters, typhoon and flood, agriculture and fishery, forestry, gas explosion, environmental

* Article 34 of the Constitution stipulates the following: (1) All citizens shall be equally valued as human beings. (2) The state shall have the duty to endeavor to promote social security and welfare. (3) The state shall endeavor to promote the welfare and rights of women. (4) The state shall have the duty to implement policies for enhancing the welfare of senior citizens and the young. (5) Citizens who are incapable of earning a livelihood due to a physical disability, disease, old age, or other reasons shall be protected by the state under the conditions as prescribed by law. (6) The state shall endeavor to prevent disasters and to protect citizens from harm therefrom.

pollution, and industrial disasters, because those natural or man-made disasters occurred repeatedly during the 1990s. The acts on some kinds of disasters composed a crisis management law system that turned Korea into a semi-developed country. This wave mainly appeared in the specialization and integration stage of the three-stage process.

The third wave was from the 2000s, and the main outcomes of this wave were basic laws, such as Fire Service Basic Law and Disaster and Safety Management Basic Law. This wave is in the systemization stage, and the basic laws integrated relative acts into one. The basic law has had much more effect on disaster and emergency management, for example, the Disaster and Safety Management Law can be used for all kinds of man-made disasters. Although parts of the existing laws have been revised several times since they were legislated, it is thought that a more basic law will be legislated in the near future to manage crises and disasters.

27.5.3 Disaster and Safety Management Basic Law

According to the Disaster and Safety Management Basic Law, disasters are those that not only can harm the health and cause death and loss of property of citizens but also cause damage to the country. Disasters are listed as three types: natural disasters, such as typhoon, flood, heavy rain, and strong wind; man-made disasters, such as fire, building collapse, explosion, and traffic accident; and social disasters, mainly national infrastructure system disasters such as energy, communication, traffic, and finance.

27.5.3.1 Disaster Classification System in Korea

All the disasters in Korea are divided into three types: natural disasters, man-made disasters, and social disasters. Natural disasters are divided into four types: (1) wind and flood disasters, (2) agriculture and fishery disasters, (3) forest damage, and (4) biological disasters (like infectious disease). Man-made disasters are divided into seven types: (1) gas explosions; (2) large-scale environmental pollution; (3) collapses of road, bridge, and civil-engineered facilities; (4) industrial disasters; (5) ship and marine accidents; (6) train accidents; and (7) fires. Social disasters include invasion of a hostile army and chemical–biological–radiological warfare (Figure 27.3).

27.5.4 Planning System for Crisis and Emergency Management in Korea

The safety management plan is an important component of crisis and emergency management system in Korea. Safety management plans of Korea are divided into three levels: (1) the national safety management basic plan at national level, (2) safety management plans at metropolis and province level, and (3) safety management plans at city, county, and district level. The planning system is composed of five factors, which are safety management plans (1) at central government level, (2) at provincial level, (3) at city and county level, (4) plus an executive plan, and (5) safety management plans as part of the civil defense plan.

27.5.5 Planning Procedure in Korea

The prime minister's office establishes a basic plan on national safety management that is defined by the presidential decree, which not only establishes a national safety management system but also defines functions of different agencies of central government.

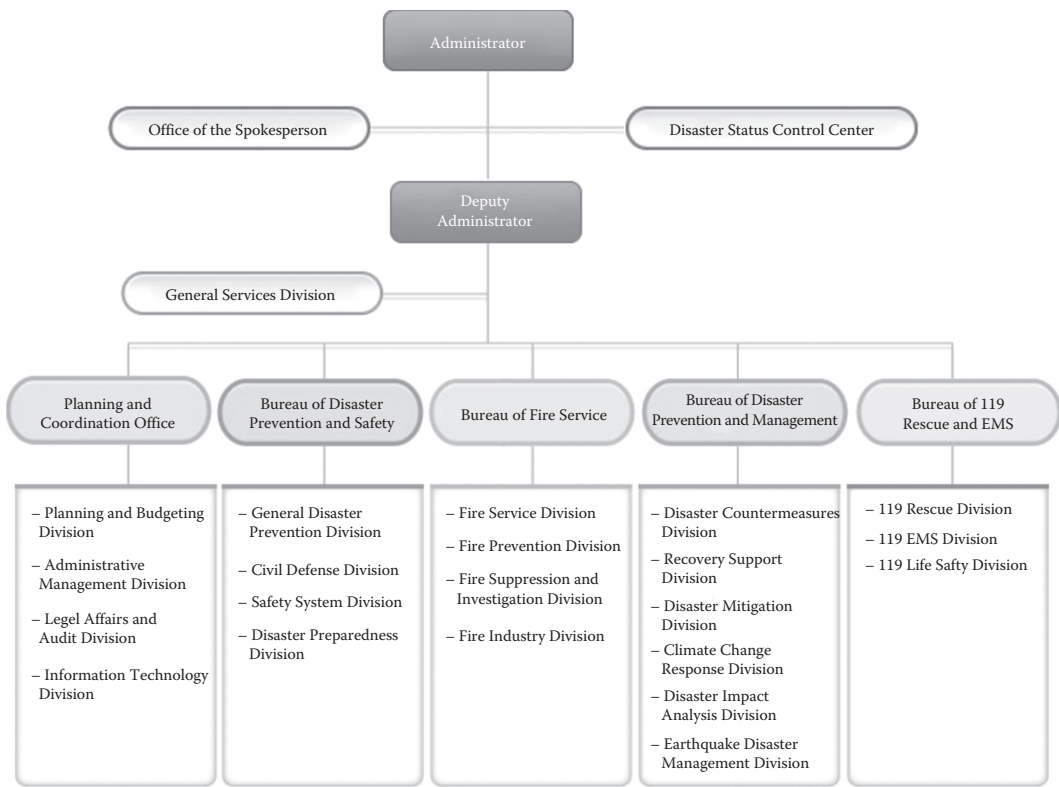


Figure 27.3 Change in disaster management organizations. (Modified by the authors from materials from Ministry of Home Affairs, *A Disaster Yearbook*, Ministry of Home Affairs, Seoul, Korea, 1996, p. 36.)

The ministries of central governments must finish their safety management plans respectively and report them to the prime minister. The heads of metropolises and provinces have to make their safety management plans based on the national basic plan, the resolutions of the minister of public administration and security, and the director of NEMA. The heads of each city, county, and district should make the safety management plans of their respective local autonomous entity.

The relative departments of central governments, metropolises, and provinces make an implementation plan based on the national basic plan and bring them into force once they conform with that of the prime minister. There is a special plan for national infrastructure, which is made by the departments of central government according to their responsibilities. The ministers or heads of central agencies act as the directors of headquarters respectively.

27.5.6 Organization System

According to the basic law, the disaster management agencies that have the responsibility to manage the disasters and future works are divided into two kinds; one is central government and local governments, and the other is local government, public institutes, and administrative organizations of important infrastructure. There is a central committee for safety management at the

national level to deliberate the important policy on safe management and coordinate the agencies' responses for safety management.

The prime minister, as the chairman of the committee, together with the local safety management agency is responsible for responses by the disaster and safe service at local levels. At the national level, it is NEMA that manages the natural disasters and man-made disasters. Through the execution of 12 laws including the Disaster and Safety Management Basic Law, NEMA is taking the lead in the national disaster management work of protecting the lives and property of the people.

When a disaster strikes, it does so in one or more local jurisdictions. As local government has the first line of official public responsibility, it has to develop and maintain a program of emergency management to meet the responsibility of providing protection and safety for the public (McLoughlin 1985:165). Before the collapse of Sampoong Department Store, each office or agency had responded separately to the disasters because of the lack of coordination within the local government. Since the enactment of the Disaster Management Act, emergency management organizations in local government have more authority, responsibility, and ability to act in emergency situations. Thus, it can be said that through the enactment of the Disaster Management Act of 1995, local governments were given a mandate to prevent disasters to the best of their ability or, failing that, to deal effectively with any disaster that should occur.

27.6 Conclusions

Worldwide, disasters are becoming more frequent, more serious, and more deadly. In less-developed countries in particular, growing populations and economic pressures are pushing increasing numbers of people to live in more hazardous locations, usually major urban centers (Durham and Suiter 1991:124). The primary economic policy objective of developing countries, especially Korea, has been to pursue a sustained, high rate of economic growth. In the maze of capitalistic competition, there have been bad practices in individual entrepreneurs' scramble to get ahead. The emphasis on speed has resulted in violations of acceptable or safe standards. Examples of poor workmanship and structural weakness in apartments, hotels, and other buildings spring up by the dozen every month.

The collapse of the Sampoong Department Store in Seoul was just one in a series of disastrous accidents. It was the result of various immoral actions taken by the executives of the company. The disaster of Sampoong might have been prevented if legislation, strict government control, and protection had been implemented prior to this disaster. However, it serves as a major turning point in the prevention of disasters in Korea.

Because of the Sampoong collapse, the Disaster Management Act was instituted. This act enables the central government to take responsibility for emergency rescue operations, medical treatment, relief work, and rehabilitation of the damaged facilities. Korean crisis and emergency management is now in a transitional period because the government learned its lesson the hard way. The Sampoong catastrophe has awakened people to the ugly realities of corrupt business practices and their consequences.

Ultimately, it should be noted that the primary goal of crisis management is to prevent the occurrence of disasters, particularly man-made and social. It is also important to emphasize that although much headway has been made, this progress should not halt. The devastating effects of a few recent incidents illuminate the fact that all Korean citizens have an obligation to themselves and to humanity to push for the further improvement of policies regarding the prevention and management of crises. In short, every single Korean must do everything possible to avoid another Sampoong disaster.

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Chapter 28

Coping with Crisis and Disaster

Hong Kong Disaster Plan and Contingency Plan for Natural Disasters

Ahmed Shafiqul Huque

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28.1 Introduction

Coping with disasters* and crises has always presented formidable challenge for governments. Disaster management is a difficult task for several reasons. A number of public agencies are brought together to deal with emergencies, and they are expected to provide a range of services, such as maintenance of order and security, search and rescue missions, and provision of shelter, comfort, and rehabilitation. In other words, disasters require agencies and officials to perform a multiplicity of diverse tasks and provide critical services at short notice under extremely difficult

* In this chapter, the terms *disaster*, *crisis*, and *emergency* are used interchangeably. Two documents issued by Hong Kong government are titled *Hong Kong Disaster Plan* and *Contingency Plan for Natural Disasters*, but they contain guidelines and procedures for dealing with all types of emergencies.

circumstances. Often, these tasks must be accomplished without the usual support available from administrative agencies in the country.

The incidence of disasters—natural and man-made—continues to increase across the globe, and countries are increasingly being exposed to these phenomena. Disasters are caused by several factors such as natural causes (floods, tornado, or earthquake), failure of technology (an airplane crash or bridge collapse), or human violence (terrorism or act of war) (Eshghi and Larson 2008, p. 63). Almost all countries are vulnerable to at least one or other type of disasters. It is not easy to conceptualize disasters. Quarantelli (1998) described disasters as any natural or man-made event that has a negative effect on life, property, livelihood, or industry that result in permanent changes to human societies, ecosystems, and the environment. Veenema (2003) found that disasters strike in one part of the world or another at the rate of about once every week. The high incidence of disasters, along with other challenges faced by modern states, has led to considerable complexity in withstanding the onslaught of disasters, recovering losses, and restoring normalcy of life. Coping with crises and disasters has emerged almost as a routine task in contemporary societies and requires additional efforts on the part of agencies and managers in the public sector.

Hong Kong's geographical location makes the territory vulnerable to weather-related disasters such as rain and thunderstorm, typhoon, flooding, landslip, and the potential risk of tsunami that result in loss of life and property as well as damage to the environment. Given Hong Kong's geographical and meteorological realities, it is important to develop and implement plans for comprehensive disaster management. Hong Kong experiences a substantial amount of rainfall and is frequently hit by tornadoes and thunderstorms. Three rainstorms caused the loss of 86 lives in 1966 (Security Bureau 2009, p. 50). In June 1972, 147 people were killed and 102 injured during a rainstorm (Geotechnical Engineering Office 1982). Reports from the Geotechnical Engineering Office, Hong Kong Observatory and Security Bureau list numerous cases of heavy rainfall, landslides, and flooding over the years. Hong Kong's small land area, which features hills and slopes, limited road space, and overcrowding of vehicles and the limited capacity of the public transportation system combine to present a formidable challenge to citizens' safety during natural disasters. Additionally, the density of population and high-rise buildings has grave implications for fire safety. In 1996, a fire in a commercial building (Garley Building) killed 41 people and injured 81.

This chapter examines the systems and procedures for dealing with disasters and ensuring the safety of citizens in Hong Kong. The Hong Kong Observatory started issuing rain and thunderstorm warnings in 1967, and the system was revised in 1983 and 1992. The final revision took place in 1998; since then, the observatory provides warnings for thunderstorms, rainstorms, and landslips* in Hong Kong and issues special announcements on flooding in the northern New Territories (Security Bureau 2009, p. 50). The process was guided by the Hong Kong Disaster Plan (HKDP), which was prepared by the Security Branch† of the Hong Kong government and first published in 1994. In subsequent years, the Security Bureau (formerly Security Branch) has refined, updated, and reissued a *contingency plan for natural disasters* (CPND). These documents contain useful information on the forecast and warning of disasters and the strategies devised for coping with them. The ultimate purpose of this chapter is to understand the process of coping with disasters and crises in Hong Kong and draw lessons for organizing such activities.

* The term *landslips* is used to denote *landslides* in Hong Kong government documents, perhaps to include incidents of smaller magnitude.

† The government organization was restructured following the reintegration of Hong Kong with China in 1997, and the title of *branch* was changed to *bureau*.

28.2 Identifying and Managing Disasters

It should be pointed out that different disasters require specific preparation and response because their nature, intensity, and devastation will vary depending on the geographical location of a country and its physical features. Carter identified four prominent characteristics of disasters. They are severe disruptions to normal patterns of life that may also be sudden, unexpected, and widespread; human effects such as loss of life, injury, hardship, and adverse effect on health; effects on social structure such as destruction of or damage to government systems, buildings, communications, and essential services; and community needs such as shelter, food, clothing, medical assistance, and social care. On the basis of these characteristics, a disaster is defined as “an event, natural or man-made, sudden or progressive, which impacts with such severity that the affected community has to respond by taking exceptional measures” (Carter 1991, p. xxiii). Disasters may be localized such as in the case of fire and overcrowding, while in the event of a flood or typhoon, the entire community is exposed to threat. The first type of mishaps can be described as local *tragedies*, which obviously require a different kind of response than the second.

Generally, government agencies are assigned tasks and responsibilities that are routine in nature and assist with the governing of a country. When disaster strikes, the operational units of government have to assume new responsibilities, and their patterns of regular operation may not be adequate to cope with the complex and challenging tasks required under emergency circumstances. Furthermore, managing disasters entail simultaneous operation by a number of agencies from different parts and levels of government. It becomes necessary to secure cooperation from a cluster of diverse agencies and work together toward a specific objective, and this requires extraordinary administrative competence.

Organizations managing disasters are a combination of various units with tasks designed on the basis of certain principles. The need for coordinating the activities of various groups makes the pyramidal structure of organizations inevitable, particularly since there is a limit to the number of people that can be effectively supervised and coordinated in the units. Such methods of allocating work and organizing activities can emerge as a major challenge in the event of disasters, as new and diverse tasks need to be undertaken with very little time for consultation and preparation. In addition, a number of decisions must be made and actions taken without the benefit of following regular administrative procedures. In addition, Davies (2005) believes that responses to disasters should not simply be driven by emergency services, but must involve the community as a whole, and this adds to the complexity of the process.

The impact of a disaster can be contained with a high level of preparedness and an effective plan for dealing with it, although there are diverse views on this issue. On one hand, disasters cannot be prevented; therefore, planning is not of much use in warding them off. On the other hand, numerous deaths and injuries can take place and their causes be attributed to deficiencies in, or lack of, a disaster plan. Ginzberg et al. (1993) reported that the response of the public health service to Hurricane Andrew in the United States in 1992 was effective, and Carney (1993) documented the success of a community in Des Moines, Iowa, in coping with the incidence of floods. Carter observed that plan to deal with disasters could provide a clear and coherent approach that helps coordinated action. Responsibilities need to be allocated clearly, with the agencies and departments involved having a common reference for their role in implementation (Carter 1991, p. 41).

The diverse nature of disasters and management style across countries poses a major challenge to the development of an ideal disaster plan. Considering the circumstances under which plans must be implemented, it is imperative to formulate, legitimize, publicize, and even test the

system before disaster strikes. An effective disaster plan must be backed up by appropriate authority and power to perform emergency tasks. Policy statements and demonstration of support from important and powerful personalities in the government can go a long way in establishing their value and necessity. The community feels comforted if the government indicates their resolve and commitment to protect citizens and their properties as well as provide all possible assistance when disaster strikes.

A disaster plan should clearly describe “the purpose of the document as well as conditions under which it becomes operative” (Foster 1980, p. 217). It entails a sound assessment of the hazards that may affect the community, which points to the need for extensive research and technological support. A number of agencies and organizations could be involved in these tasks. The most likely sources of disaster should be identified and preparations made for tackling them. It is necessary to obtain detailed information about the probable locations and scale of expected damage and casualties “if the demands likely be placed on personnel and equipment are to be predicted and accommodated” (*Ibid*, p. 220). Horizontal management acquires importance in countries with many levels of government. Relationships among the different levels become critical in order to avoid duplication and overlapping of efforts and to secure optimum coordination among the participating agencies. It is also important to “designate a legitimate source of overall control of emergency activities” to indicate “which official, agency, or organization has the authority to make crucial decisions during a crisis” (Parr 1969, pp. 13–14).

Foster suggests that disaster plans “should indicate a detailed listing of all emergency-related personnel, their addresses, and business and private telephone numbers” (1980, p. 224). A system is required to adequately cover and support affected parties, and a warning system should be developed to provide pre-impact response to determine potential loss of life and property. The plan should detail the processes of rescue, evacuation, and recovery. It is important to obtain and transmit accurate information relating to the disaster, and these need to be available to media, community bodies, and the public. Search and rescue operations require specialized equipment and qualified personnel to operate them, as well as maintain order and discipline in the community and provide medical facilities. There must be provisions for making a realistic assessment of the overall situation, protection against continuing threats, and restoration of community services.

Coping with disasters is difficult if responsibilities are not allocated clearly among the participating units of the government, and crucial decisions are delayed due to the lack of authority entrusted to officials at lower levels. Kaplan noted: “Following a natural disaster, the emergency plan should be implemented by territorial departmentalization, led by one specifically appointed business unit” (1996, p. 79) and identified eight key areas in developing an adequate disaster plan. Organization and planning should be followed up by *employee services* to ensure that affected personnel are able to report for duty while arrangements are made to ensure their families’ safety and return to normalcy. Efforts be made to restore services disrupted by disasters as soon as possible, and this can be facilitated by ensuring “the availability of the right type of materials, at the right quantity, at the right place, at the right time” by an *inventory services coordinator*, and an external services organization can coordinate and facilitate “the flow of information with government agencies and media” and assist in “the expeditious and safe restoration of services in the aftermath of a disaster” (Kaplan 1996, pp. 137, 213).

Even with comprehensive plans in place, the style of management and emphasis on different aspects may vary to a considerable extent from the prescribed model. In addition, the implementation of plans is subject to numerous constraints, and it is impossible to create the conditions that are conducive to *perfect implementation* (Hogwood and Gunn 1993, pp. 235–247). Therefore, it

may be useful to consider the specific case of Hong Kong regarding the issue of interorganizational cooperation in implementation. For example, Kaplan's ideas emphasize the importance of developing specific organizational bases for the various aspects of disaster management.

28.3 Hong Kong Disaster Plan and Its Implementation

A number of steps have been taken over the years to improve Hong Kong's disaster management system. A new storm warning system was introduced in 1993 after a public outcry over chaos due to misunderstanding over communications from Education Department officials that classes should be suspended at noon in the schools in May 1992. Although it was reported to be a *marked improvement* over the existing system, leaders of the Hong Kong Confederation of Trade Union claimed that it had "prompted confusion among workers not sure of whether to go home or stay where they were" (*South China Morning Post*, June 17, 1993). In another incident, overcrowding led to the death of several people in a small area in Lan Kwai Fong, where festivities were taking place during New Year's Eve in 1993. Therefore, incremental steps were not considered adequate in dealing with the problem, and the community was dissatisfied over the arrangements for coping with disaster that were in place in Hong Kong. Eventually in 1994, the Security Branch of the Hong Kong government issued a disaster plan for dealing with all kinds of emergencies.

The HKDP outlined an alert and warning system; procedures for managing rescue, recovery, and restoration; and the respective roles and responsibilities of departments and agencies. According to the plan, the Hong Kong Police Force and the Fire Services Department are the first agencies to be called during a disaster. They would confirm the incidence and initiate the alert system by calling the Security Branch duty officer. The latter secures approval from the secretary for security and activates the Government Secretariat Emergency Coordination Center, which coordinates the response to the disaster. Depending on the situation, the responding organizations take immediate actions.

The section on rescue management specifies that the responsibilities rest with the Fire Services Department on land and the Marine Department at sea, while the Hong Kong Police Force carries out a supporting role for both. The document recognizes that it is "necessary to exercise strict control over access to the disaster site, in order to ensure that the emergency services are not deflected from their task of saving lives, protecting property, and safeguarding the disaster site for subsequent expert investigations" (Security Branch 1994, p. 7). The tasks of the Civil Aviation Department (in case of an air crash), the Fire Services Department, and the Hong Kong Police Force in effecting rescue operations are also outlined. In short, the HKDP provides "for on-site command and control, and off-site command and coordination in the event of a disaster" (Ying 1995, p. 115).

The HKDP includes guidelines for the City and New Territories Administration, the Information Services Department, and the Hospital Authority in coordinating rescue efforts, overseeing press activities, and arranging briefings to the media and providing hospital services for victims, respectively. The Government Secretariat Emergency Coordination Center is responsible for obtaining and issuing policy directives on behalf of the governor's security committee, chief secretary,* and secretary for security; advising the governor's security committee on the need for enacting emergency legislation for dealing with disasters; providing a permanent link with the secretary for security through which decisions on policy matters can be made by the departments

* From July 1, 1997, the title of the chief secretary was changed to chief secretary for administration.

concerned; coordinating the acquisition and mobilization of civil and military resources as well as those of outside agencies; liaising with departments for obtaining and collating information on the overall situation as it develops; acting as a link through which urgent public messages can be issued from the government secretariat for publication or broadcast; briefing senior public officials on the situation; and “performing any other duties set out in the Government Secretariat Emergency Coordination Center Guide, the Internal Security Guides, contingency plans, or as may be required by the Governor’s Security Committee, Chief Secretary, and/or Secretary for Security at the time” (Security Branch 1994, p. 9). Liaison officers from various departments perform specific tasks related to their own organizations. For example, “the Transport Department duty officer establishes contact with public transport operators and keeps the Government Secretariat Emergency Coordination Center informed of the situation” (*Ibid*), and other departments contribute their expected role in the rescue process.

The HKDP does not clearly spell out the conditions under which it becomes operative, but vaguely refers to incidents of disaster. There is also no reference to particular types of hazards to which the agencies should respond, but carries the general assumption that specific agencies will be activated as the need arises. The Government Secretariat Emergency Coordination Center is presented as the coordinating body, but its nature of authority has not been specified.

Recovery management constitutes a substantial part of the HKDP. This involves returning the community to an acceptable condition following a disaster. The physical, psychological, and social needs of the community need to be satisfied through accommodation, food, clothing, and relief funds; responding to inquiries from the public; and following up with an inquiry into the causes and effects of the disaster. The relevant district officers* from the City and New Territories Administration set up their own emergency coordination centers to coordinate relief measures to be provided by the Social Welfare Department, the Housing Department, and other agencies. Temporary shelters are to be arranged, and the Social Welfare Department is responsible for providing essential relief items to the victims. The district officer assists the police in dealing with public inquiries at the scene, while the director of Information Services is responsible for disseminating information to the public through the media and government departments concerned. The Social Welfare Department, along with the Housing Department, is responsible for establishing a combined registration center for disaster victims (Security Branch, pp. 11–12). Eventually, restoration management brings the disaster site back to normal as soon as possible.

The HKDP indicates the respective roles and responsibilities of the relevant agencies and also reiterates that government departments should carry out their normal functions as far as possible. Whether it works in practice is a different question. It is a huge undertaking that adds to the burden as public sector organizations are usually weighed down with heavy workload. Military units may be called upon to help, and some nongovernmental organizations (NGOs) are listed for providing assistance with a variety of tasks.

Dissemination of information is crucial in managing disasters, preventing outbreaks of panic, and reducing the impact of hazards. The Information Services Department is assigned the task of coordinating the collection and dissemination of information, with the Government Secretariat Emergency Coordination Center providing the Information Services Department with bulletins and advice for the public. The City and New Territories Administration deals “with technical and operational enquiries from the media and public on site” as well as monitors public reaction to keep the Government Secretariat Emergency Coordination Center informed.

* The district officer is a member of the civil service and is in charge of various administrative districts of Hong Kong.

The Government Secretariat Emergency Coordination Center will coordinate the decision-making process and provide statements and messages to the Information Services Department to broadcast to the public. In general, the HKDP is expected to provide “details to ensure effective and efficient communication, both in respect of interdepartmental and internal departmental communication” (Ying 1995, p. 117).

Appendix A of the *Hong Kong Disaster Plan* specifies the roles of the various government agencies and departments in disaster planning. Appendix B provides a list of NGOs that are expected to assist with dissemination of information and public broadcasts, operation of cargo terminals, public transportation, and power supply. The long list of departments, public agencies, and NGOs has given rise to concerns over the prospect of cooperation and coordination, especially since some of them have no interaction with one another in the course of regular administrative activities. The last page of the document includes a *record of amendments*, although its purpose is not clear in the layout. Table 28.1 lists the functions and responsibilities of the various agencies and organizations involved in the process. It should be noted that the Government Secretariat Emergency Coordination Center and the City and New Territories Administration are closely involved in every step of the rescue, recovery, and rehabilitation process, and therefore are not included in the list separately.

Appendix C contains a directory of contact telephone numbers of agencies involved in responding to disasters, but these are not included in the document available to the public. Even in the updated CPND, the directory of emergency contact telephone, facsimile, and radio telephone numbers provided in the Hong Kong emergency telephone directory remains a restricted document (Security Bureau 2009, p. 6). Several technologically advanced devices are to be used to facilitate conference calls and ensure privacy, while a backup system has been planned in the events of disruptions in communications.

The HKDP strives to cover all aspects of disaster management. Beginning with the recognition of a disaster, there are systematic procedures for notifying relevant agencies, providing accurate information to the victims and the public, searching and rescuing survivors, providing them with the required support and comfort, and rehabilitating them, followed by an investigation to identify the causes of the disaster and develop strategies for future reference. There is a cycle of activities beginning with prevention and moving through the stages of amelioration and rehabilitation, with follow-up action strengthening the preventive aspect. It appears that the HKDP strives to be effective by “bringing together the involved parties, [and] defining their respective functions as well as those of the coordinating departments in conducting and controlling the rescue functions” (Ying 1995, p. 117). The prospects of effective implementation of the HKDP with regard to the organizational arrangements and required pattern of response need careful consideration.

The HKDP has not been completely effective in handling some of the crises and emergencies encountered by Hong Kong over the years. In a 1996 incident, according to the *Hong Kong Standard* (May 1, 1996), factory owners and a church criticized the government for “failing to coordinate its contingency plan when the red rainstorm signal was hoisted.” Flooding contributed to heavy traffic congestion as the warning signal was canceled when staff and visitors were preparing to evacuate. In another case, a fire that killed 40 people in November 1996 could not be contained due to violations of fire safety procedures, the illegal alteration of fire doors and exits, and an inadequate number of ladders (*South China Morning Post*, December 13, 1996). Each case illustrates the inadequacy of emergency management measures and draws attention to the need for constant revision of the plan, particularly the organizational arrangements for enabling responding agencies to work with one another.

Table 28.1 Functions of Various Organizations in Disaster Planning

<i>Functions</i>	<i>Government Department</i>	<i>Others</i>
Preparation	All departments	Community
Information dissemination and alert system	Information Services Department Hong Kong Observatory	Broadcast media and companies providing telecommunication services
Rescue	Hong Kong Police Force Marine Department Fire Services Department Auxiliary Medical Services Civil Aviation Department Government Flying Services Information Services Department Hospital Authority	Nongovernmental organizations
Recovery	Social Welfare Department Civil Engineering Department Drainage Services Department Housing Department Regional Services Department Information Services Department	Companies providing transport-related services
Restoration	Agriculture and Fisheries Department Architectural Services Department Buildings Department Electrical and Mechanical Services Department Government Supplies Department Department of Health Transport Department Hong Kong Police Force Fire Services Department	Companies providing power (electricity and gas), nongovernmental organizations, and the community

28.4 Contingency Plan for Natural Disasters

The nature of crises and disasters calls for constant vigilance and continuous update of plans for coping with them. In September 2007, the Security Bureau issued a CPND and recommended specific actions for responding to warnings and alerts for various types of natural disasters. Following the devastating impact of tsunami in Asia, the updated contingency plan dealt at length on this variant of disaster as well as those that hit Hong Kong on a regular basis (see Security Bureau 2007).

The Emergency Support Unit of the Security Bureau issued the most recent CPND in July 2009. It recognizes the adverse impact of severe weather conditions that cause floods, landslips, and other incidents and presents a summary of the warning and alerting systems and organizational framework for responding to them (Security Bureau 2009, p. 5). The Hong Kong Observatory plays a key role in the process by issuing weather warnings and hourly summaries and, in coordination with other government agencies, seeks to reduce the extent of loss of life and properties. There is a designated list of agencies that are assigned specific tasks in the three phases of rescue, recovery, and restoration in the Emergency Response System (Security Bureau 2009, p. 6). A number of special messages and announcements have been drafted to improve the process of communication with the public as well as other relevant agencies.

While retaining several of the arrangements of the HKDP, the CPND includes a number of specific measures for streamlining the process of coping with disasters. For example, the Home Affairs Department (HAD) deals with public inquiries and the Information Services Department (ISD) assists the media, and the “Police Public Relations Branch handles operational matters such as traffic accidents, congestion, road diversions and road closures” (Security Bureau 2009, p. 6). The assignment of specific responsibilities can improve the management of disasters, but a considerable degree of overlap and duplication cannot be avoided in such circumstances. The CPND sought to overcome this problem by assigning leadership roles to key agencies involved in the process. “In the three phases of the Emergency Response System, namely the rescue, recovery and restoration phase, a bureau or department would be designated, where the circumstances warrant, as the lead coordinator to oversee the corresponding efforts of bureaus and departments and, with the assistance of ISD, provide regular update to keep the public informed of the emergency response action” (Security Bureau 2009, p. 6). The document places emphasis on an effective warning system and details the arrangements for dissemination. It recognizes the diverse nature of natural disasters and seeks to deal with each in the most appropriate way.

The three phases of disaster management are detailed in the CPND. Phase one is devoted to “rescue of life, protection of property and containment of the situation/incident to prevent any further deterioration.” The Fire Services Department and police are in charge of the disaster site and, along with the Home Affairs Department, Information Services Department and others are designated as controlling authorities. The police establishes both inner and outer cordoned zones to demarcate the affected area and control access to the site where disaster has impacted (Security Bureau 2009, p. 17).

The recovery phase aims “to return the community to a condition considered acceptable by the community” that satisfies its physical, psychological, and social needs. The Home Affairs Department is the lead coordinator in the recovery phase and oversees and coordinates relief efforts in collaboration with the Social Welfare Department and Housing Department. As recovery phase ends, the project manager identifies and informs the Home Affairs Department of other agencies “which will take charge of any permanent repair works in the restoration phase and the timeframe for completion” (Security Bureau 2009, pp. 18–19). An entire set of steps has been planned and listed for this phase.

The restoration phase seeks to bring the conditions back to the pre-disaster state and often begins while the rescue and recovery phases are in progress. Agencies involved in this phase are generally involved in construction and public works activities, and normally, the Home Affairs Department, Highways Department, and Housing Department play prominent roles. Off-site departmental district, regional, and coordination centers are established to provide support to their on-site personnel who work together with the Security Bureau duty officer and the Emergency Monitoring and Support Centre (Security Bureau 2009, p. 19) in repairing and restoring damaged infrastructure.

Each agency has its responsibilities clearly stated in the CPND. Agriculture, Fisheries, and Conservation Department is responsible for operating the departmental emergency headquarters and for assessing loss or damage to agriculture and fisheries. Architectural Services Department advises the government on damaged buildings and assists with carrying out repairs. Auxiliary Medical Service provides volunteers for medical assistance, and the Buildings Department uses a unit to deal with reports on “damaged private buildings, building works, landslips and slopes which threaten those buildings” (Security Bureau 2009, pp. 25–26). Civil Aid Service contributes by providing volunteers for search and rescue, crowd control, registration of victims, evacuation, and feeding of disaster victims. Civil Aviation Department broadcasts updated meteorological information, while the Civil Engineering and Development Department offers advice and answers requests for assistance in saving life and property. Drainage Services Department clears and repairs blocked or damaged sewers and drains to ensure satisfactory operation of sewage treatment works and floodwater pumping stations.

Education Bureau decides matters related to student safety and on the closure of schools, and Electrical and Mechanical Services Department supervises restoration of services from utility providers and offers special equipment for search and rescue operations, if necessary. Fire Services Department is responsible for extinguishing fires, protecting life and property, and providing assistance to people in need of immediate attention. Food and Environmental Hygiene Department supplies temporary toilets, clears refuse, and ensures maintenance of hygiene in relief centers. Government Flying Service provides services for casualty evacuation, airlifts relief supplies, and assists with surveillance and reconnaissance. Government Logistics Department is responsible for supplying emergency items and providing land transport support. Department of Health provides a physicist on site if there is a threat of radioactivity from the disaster (Security Bureau 2009, pp. 27–28).

Highways Department clears and repairs blocked or damaged public roads and removes dangerous and fallen boulders, while Home Affairs Department coordinates relief efforts at the district level. Hong Kong Observatory initiates weather-related warnings, and the Hong Kong Police Force performs a key role in coordinating agencies “during rescue, recovery and restoration phases until the site is handed over to its lawful owner(s) or other controlling authority” (Security Bureau 2009, p. 30). Hospital Authority assists with medical services, and Housing Department is responsible for providing temporary accommodation for victims who are rendered homeless by disasters. Information Services Department is in charge of public relations activities and informs the community through press releases. Lands Department deals with the causes of landslips, while Leisure and Cultural Services Department assists with cutting and clearing of dangerous or fallen trees.

Marine Department assists vessels in distress and decides on port closure, and Office of the Telecommunication Authority relays congestion warning to network operators. Security Bureau is the first point of contact for all emergencies, and this agency monitors and supports the overall response of the government to disasters. Social Welfare Department provides food, blankets, and other items, and Transport Department coordinates “public transport through close liaison with the respective transport operators and to develop traffic and transport contingency plans” (Security Bureau 2009, p. 33). Water Supplies Department isolates and repairs water mains damaged by disasters.

While not developing a new plan, the CPND has further refined the disaster management tasks outlined by the HKDP. Organizations have been identified and assigned lead roles in various phases of coping with disasters and responsibilities allocated to make the process more effective. Elaborate details on the direction and methods of communication can contribute to quick and

better-coordinated response to natural disasters that have the potential to inflict severe damage to Hong Kong. The most significant development in the CPND is the effort to associate all the relevant public sector agencies in the rescue, recovery, and restoration process, along with several nongovernmental and private sector organizations. The document attaches considerable importance to training for managing disasters and declares that personnel from the Education Bureau, Development Bureau, Security Bureau, departments in the Transport and Housing Bureau, Fire Services Department, Home Affairs Department, Hong Kong Observatory, Hong Kong Police Force, Information Services Department, Transport Department, and Works Departments in the Development Bureau receive thorough training “on their roles in dealing with emergency situations arising from natural disasters” (Security Bureau 2009, p. 34). The challenge of horizontal management, however, remains a major problem as the prospect of coordinating the personnel and activities from such a variety of agencies could be extremely difficult.

28.5 Disasters and Horizontal Management

Public organizations have a number of unique features that can act as constraints on their performance, particularly in dealing with disasters. They are more difficult to design and restructure, as their activities are overwhelmingly influenced by constitutional considerations. Constant scrutiny by the public, media, and other watchdogs severely restricts the prospect of flexibility, although it could make a difference in mitigating circumstances during emergencies. Generally, public officials find comfort in adhering to prescribed rules and procedures, avoiding risk of being challenged, or venturing into areas that are not covered by established guidelines and regulations.

The evolution of organization theory has been marked by controversies and debates centered around law and/or legal authority, rationality and/or efficiency, psychological and social relations, and politics and/or power relations (Gortner et al. 1987, pp. 55–56). In designing organizations, however, it is often impossible to consider all these aspects, because the latter two areas evolve gradually as the organization acquires maturity. Therefore, public organizations are usually established on the basis of existing law and focus on the rational and efficient accomplishment of tasks. The tasks are determined, categorized, and divided according to specialization in advance so as to make it possible for officials to accomplish them with minimum difficulty. The classical bureaucratic model of organization is still favored by many entrepreneurs, but public organizations, particularly those employing large numbers of people, are conditioned by the psychological, social, and power relations within them.

In situations with a number of agencies needing to come together and perform essential functions at critical moments, agencies may come into conflict with one another due to real and/or perceived differences in orientations, approaches, and attitudes as well as leadership and management styles. The degree of cooperation will depend to a considerable extent on the nature of interorganizational relationships. This idea has become popular among organizational theorists in studying delivery of social services, a task often at the core of disaster management. The idea of an *action set*, in which a group of organizations form a temporary alliance for a limited purpose, reflects this situation (Aldrich 1979, p. 280). Thus, interorganizational relationships “provide a means of adapting to, rather than merely responding to, environmental pressures,” and Hall has accordingly developed a framework for analyzing interorganizational relationships based on general environmental considerations as well as specific situational factors, bases of interaction, resource flows, transaction forms, and outcomes (Hall 1996, pp. 230–252).

Bureaucratic structure and authority relationships add to the complexity of disaster management. Public sector managers are constantly searching for procedures to regularize activities, and this can be accomplished through an established structure indicating the flow of authority, command, and communications. As disaster management calls for a breakdown of interagency barriers and coordination of activities by several entities, authority relations have to be established to obtain compliance and cooperation. In planning disaster management, special bodies may be provided for, with explicit authority to direct activities. Turner suggests that “it is important to be able to rely on people and organizations with good local knowledge, and an intimate knowledge which permits them to deal swiftly and flexibly with unique local uncertainties” (1995, p. 535). NGOs can contribute by filling this gap in knowledge as well as providing expertise from their ranks. This can be facilitated by giving the bulk of responsibility to primary agencies, with support from those designated as secondary agencies. The specific activities of particular departments will assist in this designation. For instance, the Fire Services Department could be the primary agency for dealing with fire-related disasters, while the hospital and housing services could provide secondary support.

In recent years, the concept of horizontal management has received increasing attention. Many programs of government have little prospect of success because of their interdependent nature, and “key policy objectives cannot be achieved without several agencies, governments, and external partners working together,” and this indicates that “critical management and policy issues have become horizontal rather than vertical” (Bakvis and Juillet 2004, p. 5). The situation is similar to the relationship of various agencies that are engaged in dealing with disasters in Hong Kong. Each has its unique organizational structure, chain of command, and coordination mechanisms, yet at times of crises, a new framework takes over, forging new relationships and following regulations determined for emergencies.

28.6 HKDP and CPND: Assessment of Progress

The HKDP and CPND provide detailed descriptions of the functions and responsibilities of various agencies in case of disasters. They seem to assume that disasters can be tackled with a number of sequential steps, that is, a series of activities for detecting a disaster, rescuing the victims, and recovering and rehabilitating the survivors. This gives the impression that disasters can be completely and competently dealt with by following a set of prescribed steps. A similar clinical approach dominates thinking on the respective roles and responsibilities of the agencies involved in the process. Responsibilities have been assigned on the basis of the specified role of the agencies. Hence, for example, the Drainage Services Department is responsible for clearing and repairing blocked and damaged sewers and storm drains, while the Highways Department is “responsible for clearing and repairing blocked or damaged public roads, removing dangerous and fallen boulders and dealing with landslides on Government land, answering requests for assistance in the saving of lives, protection of property, and miscellaneous calls for action or assistance” (Security Branch 1994, pp. 20–21). All agencies that could conceivably be of some use during a disaster have been listed, and their functions briefly described.

The framework for coordinating these activities was weak in the HKDP, which appeared to be confident of the existence of an effective communication system among the agencies involved in the process. The CPND, however, did take this problem into consideration and sought to develop ways and means for integrating the efforts of agencies across the government structure. Obviously, the successful implementation of the plan will depend on smooth communication

and cooperation among the actors and agencies, but it is also necessary to recognize the potential conflicts and rivalry as well as jurisdictional disputes that are common in modern organizations.

The emphasis on media briefing and public relations activities has emerged as a key area of attention in coping with disasters. Keeping the public and media informed of disasters and actions to deal with them constitutes part of the management process. But the HKDP appears to have placed too much emphasis on this aspect, while the task of saving lives and property through coordinated efforts has received inadequate attention. The CPND, too, places this activity among the most important tasks in alerting, informing, and mitigating problems caused by disasters, but attaches equal importance to rescue of life and property in managing disasters.

An overview of the HKDP conveys the impression that disasters and the subsequent task of management will follow a specific pattern of sequences. It is important to realize that one of the key features of disasters is that they are unpredictable in terms of the time, place, or speed with which they will strike. Disaster plans should thus be more flexible to help decide on the nature and sequence of steps that should be taken immediately and regarding the organization of the subsequent activities. For example, there may be a need to initiate recovery even before the disaster has been controlled, but the HKDP only states that recovery operations should be conducted “after a disaster has been controlled” (Security Branch 1994, p. 11).

A number of NGOs are listed in the HKDP for providing assistance in disaster management, including several commercial organizations that provide services in the communications sector through radio and television broadcasts, telecommunications services, and management of marine terminals. The others are involved in providing transportation services and public utilities. While these commercial organizations certainly have a useful role to play, a vast number of NGOs specializing in rescue and recovery have been left out. The responsibilities entrusted to the Social Welfare Department could be shared and performed by a number of NGOs that are engaged in the provision of care, relief, and assistance to victims. Moreover, rehabilitation of disaster victims is often a huge responsibility, which few governments are able to handle on their own. The CPND has expanded the list of NGOs and private sector organizations considerably to include providers of telecommunication and transport services, utility companies, and airline companies so that consumers of services can receive updated information on the crises.

From a review of the HKDP and CPND, it is obvious that efforts have been undertaken to improve the capability for dealing with disasters, and there has been progress in this area. For example, school principals were invited to an exhibition and seminar at the Royal Observatory* to ensure that they were aware of their duties and responsibilities during typhoons and rainstorms (*Hong Kong Standard*, October 14, 1993). A typhoon contingency plan has been established for directing traffic in the event of bad weather occurring at the bridge connecting the new airport with the city (*South China Morning Post*, May 12, 1995). While attention to such details is commendable, overall organizational requirements should also be addressed.

28.7 Concluding Observations

Both HKDP and CPND demonstrate the difficulties in formulating effective disaster plans and implementing them. The normal structure of organizations does not allow for flexibility in dealing with emergency matters. The need to take action based on needs of the moment is one area that

* The Royal Hong Kong Observatory was renamed Hong Kong Observatory after the reversal of sovereignty to the People's Republic of China in 1997.

has emerged as a challenge to traditional organizational arrangements, where regularity of procedures serves a useful purpose. Disasters give rise to the need for dealing with problems as soon as they arise and provide opportunities for public sector managers to utilize innovative measures to reduce suffering and deal with urgent matters. Kiel advocates dynamism in organizations that face complex tasks: “Surprises are expected as work processes are transformed but they are seen as part of the risk, uncertainty, and reward of creation and innovation” (1994, pp. 14–16).

Authority should be clearly defined; in managing disasters, it is not desirable to bring together organizations that may be competing with one another for governmental funding or power. The situation also carries the danger of jurisdictional conflict and disagreement over the chain of command. It is thus advisable to establish a clear structure of authority to allow agencies and officials to work under a common organizational framework. Furthermore, coping with disasters can be made easier by engaging the services of organizations in the public, private, and not-for-profit sectors. In case of emergencies, it may help to grant exemptions from some of the requirements of openness, access to information and officials, and strict vigilance in order to allow the agencies more time, freedom, and flexibility to complete the immediate task of disaster management.

The government of Hong Kong has established a framework for coping with crises and disasters. The HKDP and CPND reflect the recognition of the fact that interorganizational cooperation and collaboration are extremely important in dealing with emergencies. However, it is impossible to plan for dealing with conflicts, breakdown in communications, and unforeseen contingencies when disaster strikes. The Security Bureau has the responsibility to coordinate annual updating in consultation with other stakeholders and by incorporating recommendations emerging out of various exercises undertaken on training, equipment, and procedures (Security Bureau 2009, p. 36). All disaster plans need to be continuously reviewed and arrangements updated for dealing with disasters through swift and correctly structured responses that combine the contributions from public and nongovernmental organizations, the scientific community, civil society, and the community.

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Chapter 29

Integrating Public Administration, Science, and Community Action

A Case of Early-Warning Success in Qinglong County for the Magnitude 7.8 Tangshan Earthquake

Jeanne-Marie Col and Jean J. Chu

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29.1 Introduction

Public administrators (PAs) of Qinglong County were able to combine scientific information, public education, extensive preparation, and speedy countywide communications to prevent human tragedy during the Great Tangshan Earthquake (GTE) of 1976. Many of the 470,000 residents of Qinglong County evacuated from their homes just before the magnitude (M) 7.8 Tangshan earthquake (EQ) hit (Li and Mervis, 1996; Qian, 1986, 1989; United Nations, 1996; Wang, 1991a,b). No one in that county died from the destruction caused by GTE. In the counties surrounding Qinglong, however, nearly a quarter of a million people were crushed to death (Chen et al., 1988; Qian, 1986, 1989; Wang, 1998).

The remarkable experience of Qinglong County, unknown to the world and China for over 20 years, was discovered through a cooperative effort between the United Nations (UN) and the government of China in the last few years. An examination of the devastation of and response to the GTE (Qian, 1986, 1989) led to the discovery that one county in the area had successfully prepared for and mitigated the impact of the EQ. Qinglong County utilized its extensive scientific citizen-based precursor-monitoring system, along with exemplary administrative procedures and community spirit, to prepare for the possibility of a major EQ. Qinglong County established an EQ office, organized procedures for preparation and response, trained officials, set up a precursor-monitoring network that involved communities and neighbors, and, in July 1976, activated their county EQ plan to maximize citizen safety. In 1995, UN and Chinese government officials visited the county, found documents that confirmed the historic action, and interviewed officials and villagers who explained the July 1976 events.

The Qinglong County experience shows how collaboration and coordination among PAs, citizens, and scientists led to the identification of natural disaster risk and effective mitigation. Specifically, (1) PAs not only had sound public policy but also followed the policy guidelines; (2) citizens were not only knowledgeable but also felt empowered to act; and (3) scientists, cooperating with PAs and citizens, collected, shared, and disseminated their multidisciplinary data to make joint predictions. When PAs, citizens, and scientists all work together, they strengthen the ability of their communities to survive disastrous EQs and other large and destructive natural events.

The successful early-warning experience of Qinglong County for the twentieth century's most destructive natural disaster in terms of loss of life provides useful clues as to how large communities can reduce the impact of catastrophic natural disasters. This chapter analyzes the

lessons learned from data gathered over the last few years, which are presented in the case study summary and the events chronology of Appendix 29.A.

29.2 Case Study Summary

More than 20 years ago, on July 28, 1976, an M7.8 EQ destroyed the city of Tangshan in Hebei Province, China, killing 240,000 people. Two weeks prior to this large EQ, Chunqing Wang, the official in charge of EQ disaster management for Qinglong County (located 115 km from the city of Tangshan), had attended a regional conference organized by the State Seismological Bureau (SSB in 1976; now China Seismological Bureau [CSB] as of 1998). During that five-day conference that began on July 14, 1976, the Qinglong official listened carefully to the speakers at the seminars, panel discussions, and exhibitions. He took detailed notes on techniques of EQ monitoring by the lay public and precautionary work for large EQs.

On the evening of July 16, 1976, scientist Chengmin Wang of the SSB's Analysis and Prediction Department, speaking to a session of 60 attendees, explained that professional EQ monitoring groups and lay detection centers had reported abnormal signals for the Beijing–Tianjin–Tangshan–Bohai–Zhangjiakou region relating to a possible EQ. The analysis of scientific data acquired by seven major techniques, including crustal stress and electrical measurements, indicated that there was a good possibility that this region would be struck by a significant EQ between July 22 and August 5, 1976. Session attendees listened to preliminary cautionary advice and were encouraged to examine readings of county-level EQ precursor-monitoring equipment managed by the lay public. Furthermore, the officials were encouraged to enhance EQ preparation measures such as examining buildings in critical condition, intensifying public education, and promoting general awareness of possible approaching EQs.

Qinglong official Chunqing Wang returned to his county. He reported on the Tangshan conference, particularly on the talk given by scientist Chengmin Wang of the SSB, and included updated information from the county's lay-monitoring stations. The county committee took the report very seriously. More than 800 officials of Qinglong County's administrative system listened to Chunqing Wang's report. A flood was also predicted at the time. It was decided that the associate secretaries of each community in the county should return, with a county-level official, to their communities immediately, without seeing their families first, to teach the people about EQ and flood preparation. In a countywide telephone conference on July 24, 1976, county secretary Guangqi Ran discussed EQ and flood preparations.

During the days of July 25 and 26, 1976, each community in Qinglong County held an emergency meeting to prepare and instruct villagers in disaster damage reduction. Examinations of buildings in critical condition were made. Special attention was given to prepare reservoirs. Most villages had overnight watch guards on duty. County and village broadcasts instructed people not to close their doors and windows at night so that they could leave their houses immediately as soon as they felt shaking at the beginning of an EQ. They were also told to avoid being close to tall buildings and power lines. On July 27, 1976, a leading county official gave a major talk at the county's agricultural meeting on the EQ situation and on mitigation measures for the area. At 3:42 a.m. on July 28, 1976, the GTE struck.

More than 180,000 buildings in the county were destroyed by the GTE; over 7,000 of these totally collapsed. However, only one person died, and he died of a heart attack. Meanwhile, in the

city of Tangshan and in all of its other surrounding counties, at least 240,000 people were crushed to death and 600,000 were seriously injured.

Five hours after the EQ, Qinglong County dispatched the first medical team to the disaster zone. Within a few more hours, the county organized and sent relief teams to Tangshan to help with rescue work and the transport of the injured.

Dr. Wu Dong of Qinglong's Dazhangzi Hospital happened to travel to Tangshan City on the day of July 27, 1976. That night, lodging in his relatives' house, Dr. Wu told them that Qinglong County was preparing for the possibility of an EQ, kept his clothes by his bedside, and deliberately opened the windows and doors. When the EQ struck, he left the building after arousing his relatives' family of four. Except for one injury from a falling object, the whole family escaped unhurt, although they were only a few kilometers away from the M7.8 EQ epicenter in the heart of Tangshan City. Families in surrounding houses suffered enormous numbers of deaths and casualties.

The difference between preparedness and lack of preparedness in the GTE is measured in life and death. The official early-warning document alerting Qinglong County residents of a possible large EQ was issued by the county's top administrators four days before the GTE (Figure 29.1) (United Nations, 1996; UNGP-IPASD website). This early-warning document came to light

Qinglong County Administrators Issue Early Warning Four Days Before Earthquake

Meeting of the Chinese Communist Party (CCP) Committee of Qinglong County

Attending members:	Zhang Pingyi, Yu Shen, Chen Yongfu, and Ma Gang
Other attendee(s):	Sun You
Chairperson:	Zhang Pingyi
Meeting date and time:	July 24, 1976; 20:30 p.m. (8:30 p.m.)
Minutes by:	Chai Wanhui
Meeting place:	Small conference room at the County Committee

Meeting notes:

Wang Chunqing, of the Science Committee, reports on the main points of the earthquake conference.

There may be, from July 22 to August 5, a magnitude 5 earthquake, in Beijing-Tianjin-Tangshan-Bohai-Zhangjiakou region and from the second half of this year to the beginning of next year, a magnitude 8–9 earthquake may occur.

Our county has a total of 16 monitoring sites, of which 6 sites are equipped with instruments.

The Earthquake Office should write up information on earthquakes and send it to the broadcasting station for dissemination. The Office should emphasize that there may soon be an earthquake, and that its effects can be mitigated.

Pay attention to the following tasks:

Auditoriums, movie theatres, and other places where people gather, should receive special attention

Pass down instructions that each monitoring station should report relevant observations, in a timely manner; people on duty must be on alert. Pay attention to safety measures at schools.

Assign people to special duty at the monitoring sites, for this period of time; the county Earthquake Office should receive daily reports from these sites.

1. Strengthen leadership at all levels to complete the tasks ahead.
2. Promote dissemination of information and education on earthquakes.
3. Strengthen work at the monitoring sites; improve timely communication and reports.

Earthquake equipment should be placed in suitable air-raid resistant shelters.

Earthquake Office location: for now in the previous office space of the Science Committee. Reestablish telephone communications, with overnight duty personnel.

Figure 29.1 Early-warning document sent out on July 24, 1976, by Qinglong County PAs. On a countywide telephone conference on July 24, 1976, county secretary Guangqi Ran discussed EQ and flood preparations (United Nations, 1996; UNGP-IPASD website: <http://www.globalwatch.org/ungp/>).

during a UN research mission to Qinglong County in September 1995 to verify the facts surrounding the county's historic actions. The UN has subsequently compiled, based on numerous documentation obtained during its research effort, a detailed reconstruction of the Qinglong County experience during the 1976 Tangshan EQ (United Nations, 1996). This account details a dramatic example of a *best practice in public administration* and is attached as Appendix 29.A.

29.3 Earthquake Early Warning: The Qinglong County Experience

The discovery of the early-warning success of Qinglong County galvanized the UN to establish a global program for the Integration of Public Administration and the Science of Disasters (UNGP-IPASD) (Appendix 29.B). Since 1996, this UN Global Programme has researched several Chinese early-warning successes for large EQs (M7.3 Haicheng in 1975 and M7.3 Menglian in 1995 [Li and Mervis, 1996]; M6.3–M6.6 Jiashi in 1997 [Li and Kerr, 1997]), all of which share common elements of success. The experience of Qinglong County, however, is especially useful, for it is in the marked contrast of the Qinglong County experience to that of its surrounding neighbors that we discover clues on how modern urban communities can better protect themselves against large and sudden disasters such as EQs. Figure 29.2 illustrates some basic concepts that arise from these clues, with expanding details in the following text.

29.3.1 Public Administrators Take Initiative

What brought about the proactive strategies of the Qinglong County administrators for the catastrophic Tangshan EQ? The events analysis (Appendix 29.A) points out that the county benefited

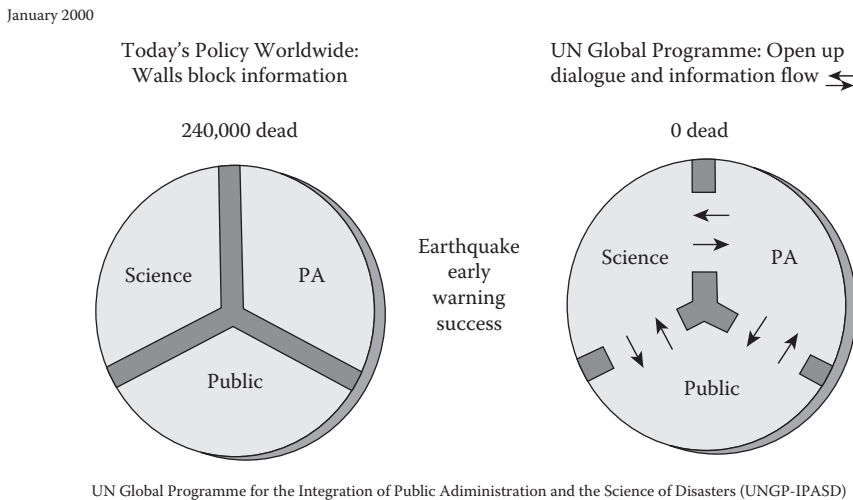


Figure 29.2 Past success offers model for future quake early warning: scientists, PAs, and lay public shared information in early-warning success for Qinglong County, China, during the 1976 M7.8 Tangshan EQ. While there were 240,000 deaths in the surrounding region, no one died from the destruction of 180,000 buildings in Qinglong County, located 115 km from the M7.8 epicenter (From UN Global Programme for the Integration of Public Administration and the Science of Disasters [UNGP-IPASD] <http://www.globalwatch.org/ungp/>).

from a unique combination of good public policy, a countywide public-awareness campaign, establishment of responsible offices, leaders who trained themselves to be both sensitive and efficient, deployment of EQ precursor equipment, and training of citizen monitors. Not one of these elements, in isolation, could have led to the complete success of Qinglong County. The key elements of *science policy*, citizen awareness, public administration alert, and citizen participation in scientific monitoring combined to create a compelling dynamism that moved the county along the continuum of mitigation success.

29.3.1.1 *Science Policy*

The national State Council policy Document 69 (Appendix 29.D) announced to seven municipalities and provinces in Northeast China that a major EQ was likely and that preparation and mitigation were advisable. This policy document outlined actions to be taken by PAs and citizens in response to an intermediate-term warning of anticipated EQ activity as outlined by national-level scientists, based on precursor activity measured through professional and lay monitoring. The policy document warned of the likelihood of an M6 EQ and the possibility of an M7–M8 EQ.

29.3.1.2 *Implementation: Medium-Term Preparedness*

The Qinglong County PAs implemented this national policy in the cities and rural areas of the county. Like many similar jurisdictions, the public officials set up an EQ office for EQ preparedness activities, including precursor monitoring, public education, and strengthening of physical structures such as buildings and water reservoirs.

29.3.1.3 *Preparation for Decision Making in an Emergency Situation*

The head of the Qinglong County Communist Party leadership strengthened his ability to interpret data for declaring EQ alerts, without knowing if he would ever need to use this skill. Lacking access to sophisticated geological materials in the county, the head of Qinglong traveled to Beijing where he bought an academic book on EQ dynamics. His reading of this book helped him to understand the relevance of various precursor events, thus improving his ability to interpret data related to EQs.

29.3.1.4 *Delegation, Initiative, and Communications for Speedy Action*

When Qinglong County established its EQ office in June 1976, the leadership appointed a 21-year-old recent graduate as head, delegating to him responsibility for preparatory activities. Based on the suggestions of Document 69, the young administrator increased the number of precursor-monitoring stations from 6 to 16, with 9 of these lay-monitoring stations at schools. Further, he intensified public education, distributing thousands of copies of booklets and posters and presenting slide shows and movies in villages, towns, and cities.

When he attended a meeting in Chengde in July 1976, he heard about a larger, regional meeting about to take place in Tangshan and proceeded to Tangshan immediately. At the

Tangshan meeting, he learned that some precursor data indicated an M5–M6 EQ soon and an M7–M8 within 1 or 2 years (major points of the scientific presentation in Appendix 29.A for July 16, 1976).

On returning to Qinglong County, he discovered that the latest county-based precursor data indicated a possible imminent EQ. Informally, he checked with EQ precursor-monitoring stations in neighboring counties and learned that they were also recording significant anomalies. He quickly prepared a report to the county's science committee. The deputy director of the science committee, who had been empowered by his director to take action when the director was away, realized the relevance and importance of the report and arranged for a meeting with the county's top leadership.

29.3.1.5 Teamwork and Responsibility for Action and Inaction

Realizing the relevance of the data and the importance of rapid and comprehensive mobilization, the county head decided that the report should be made not only to him but also to the entire Chinese Communist Party (CCP) standing committee of Qinglong County. This act of inclusion brought the main implementation team into the decision-making situation, thereby facilitating timely and effective teamwork. When the head of the EQ office reported on the strong possibility of an M5 EQ between July 22 and August 5, the county CCP adopted and promulgated an action plan (details in Appendix 29.A for July 24, 1976). Although the CCP realized that their county's plan might be considered controversial, they concluded that the national State Council Document 69 contained sufficient instruction to cover their action plan. Thus, Qinglong County issued an EQ alert on July 24, 1976 at 20:30 p.m. (Figure 29.1). Immediately, institutions were notified by telephone and the EQ office worked 24 h nonstop on detailed instructions to county officials and the general public on the EQ situation and preparation measures. The county officials used an already-planned conference on agricultural issues to publicize the urgent EQ situation. The county officials emphasized that every official would be responsible for preparing people in their areas and held accountable for their actions or inactions (details in Appendix 29.A for July 24, 1976).

29.3.1.6 Developing Shared Perception of Risk

Meetings were held at town and village levels, as well as in all institutions. The head of the county CCP took up residence in a makeshift tent made of poles and a plastic sheet in order to communicate the seriousness of the situation. The associate head of the CCP visited 23 towns, examining EQ preparations. County engineers and other officials maintained a 24 h watch at *lifeline* services, such as reservoirs and power generation sites. The EQ alert and follow-up actions created a shared perception of the emergency (Comfort, 1999).

29.3.2 Citizens Self-Mobilize

Citizens in the towns and villages of Qinglong County were active participants in the preparatory and mitigation activities for the possible EQ in 1976. While it is normal for citizens to be motivated to help neighbors and victims in the aftermath of a major disaster, it is unusual for citizens to participate directly in preparatory activities. Some recent and successful examples include evacuations from volcanoes that are beginning to erupt (Mount Pinatubo in 1991) and

from coastal areas that are apparently in the path of typhoons (Hurricane Floyd in 1999). Even with these more visible signs of approaching disaster, observers often note considerable panic among some citizens. But in the case of Qinglong County in 1976, while precursors for the approaching disaster were more subtle, local citizens enthusiastically engaged in preparations with little sign of panic. What explains this quiet vigilance and determination?

29.3.2.1 Community Awareness through Widespread and Intensive Public Campaign

From 1974, when the county was first notified about the possibility of EQ(s) over the next few years, the citizens of Qinglong County received pamphlets, watched movies, observed posters, participated in drills, and held community discussions about EQ dynamics. People in the cities, towns, and rural areas learned about ways to watch for EQ precursors and accepted the responsibility and challenge to heighten their awareness of their environment over the coming years. They created measured response plans geared to prepare the community for possible disaster(s) while minimizing the economic impact of such preparations.

29.3.2.2 Lay Monitoring of Earthquake Precursors by Ordinary Citizens

When the Qinglong County EQ office promoted the monitoring of EQ precursors, many institutions became involved. Employees in factories and mines were trained to monitor for EQ precursors using instrument readings or observational data. Likewise, students in schools became involved in operating simple scientific equipment and in interviewing neighbors on observable EQ-related phenomena.

29.3.2.3 Response to Earthquake Alert on July 24, 1976

Local residents remained calm and focused as they organized themselves to carry on their daily lives under the EQ alert:

Schools moved furniture outside and held classes in the open air.

Merchants quickly constructed shelving outdoors under plastic sheets and continued selling their goods.

Where land was available, people built makeshift tents and camped outdoors.

In the more densely populated areas, people practiced exiting their homes and offices quickly and slept near exits during the night.

Citizen assemblies to share EQ preparedness strategies were held in all institutions and communities.

During the days before the EQ, communities established patrols to monitor preparatory activities.

29.3.2.4 Confirmation of Sense Data Observations

Local people in their communities combined the official EQ warning with sense data perceived in their local neighborhoods, to conclude that the warning was legitimate and should be heeded. In the cities, towns, and villages, people noticed changes in water, weather, and animal behavior.

Despite the lack of foreshocks, every single person in Qinglong County was prepared for the EQ and escaped death from the ensuing destruction. During the preparatory period, people had secured their families and their livestock. Even their animals escaped death from the EQ.

Official county documents and personal written testimonies (translated from Chinese into English) describe the preparations at county, town, and village levels. Based at 16 monitoring stations, the county's lay methods of detecting precursors included anomalies in the level, color, temperature, chemistry, and quality of the water, release of gases, strange animal behavior, and changing weather. Depending on data from a wide variety of methods, the county administrator combined information from several methods, all indicating unusual tendencies. In each and every neighborhood and village, all county residents had taken precautions against a possible EQ.

29.3.3 Scientists Share Information

There were more than seven methods used by professional earth scientists in China to monitor for EQ precursors at the time (Chen et al., 1988; Mei, 1982; Qian, 1989; Wang, 1991a,b). At the SSB Conference held in Tangshan 2 weeks before the great EQ, a government scientist informally shared with the administrators attending the meeting the most recent update on the regional EQ situation based on information from professional and lay observers (Li and Mervis, 1996). It was at this session that PA Wang Chunqing noted the work of two methods in particular—crustal stress and geoelectric (United Nations, 1996). Chu et al. (1996) discuss geoelectric, geologic, seismic, meteorologic, and hydrologic data related to the 1976 Tangshan EQ. The crustal stress method is introduced here.

In the 1960s, Chinese earth scientists developed a method to monitor variations in crustal stress over time (Huang et al., 1982, 1991). This method was based on a concept proposed by Swedish scientist Hast (1958). The physical principle underlying the method is inverse magnetostriction: the dependence of magnetization (susceptibility or remanence) on applied stress (Sheriff, 1984), or, equivalently, changes in magnetization caused by an application of mechanical stress (Chikazumi and Charap, 1964; Tremolet de Lacheisserie, 1993). Many ferromagnetic materials have magnetic properties that are highly sensitive to applied stress; in fact, stress may be ranked with field strength and temperature as a primary factor affecting magnetic change (Tremolet de Lacheisserie, 1993). Chinese EQ scientists use ferromagnetic sensors to measure changes in crustal stress via changes in magnetization.

By 1972, the Seismogeological Brigade (Beijing Sanhe team) of the SSB had established a national network of more than 100 professional crustal stress-monitoring stations, of which 24 were located in North China. Each station was equipped with three crustal stress sensors oriented horizontally in three different directions (Huang et al., 1982). The depth of placement of these three sensors was no less than 20 m, to avoid the effects of seasonal changes in temperature, and no greater than 100 m owing to technical costs; the average depth was 50–60 m. Crustal stress measurements were taken every 2 h, and the averages of the 12 readings per day per sensor were transmitted daily, by telephone or telegraph, for official record at the Office of Analysis and Prediction of the Seismogeological Brigade in Beijing. For further details on the crustal stress method, see Huang et al. (1982, 1991).

Crustal stress data taken before, during, and after the 1976 Great Tangshan EQ came from stations that were separated by distances of as much as 1000 km. The early-warning document of July 24, 1976, cites the period of July 22–August 5, 1976, for a possible EQ in the Tangshan

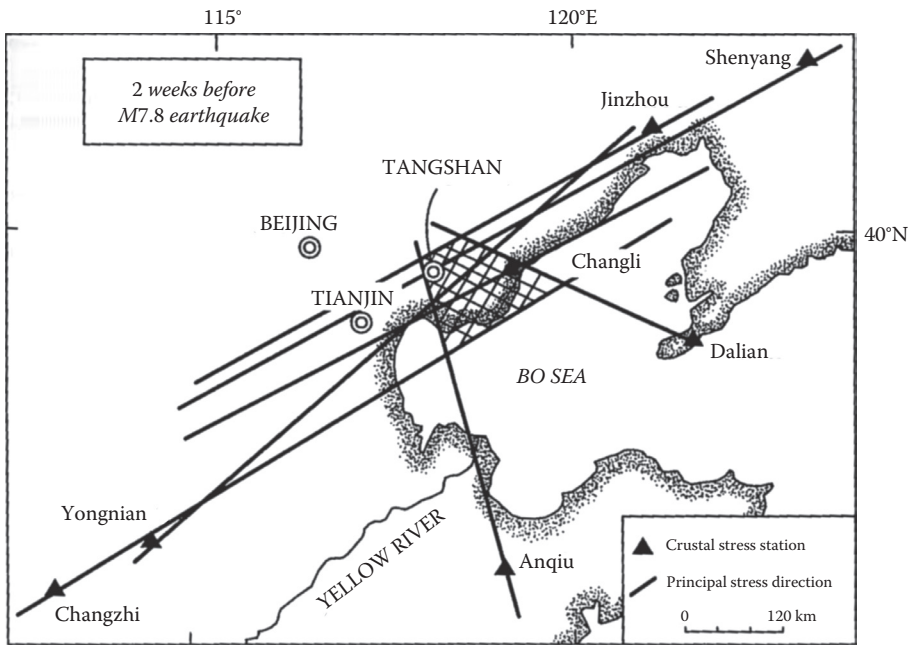


Figure 29.3 Map of crustal stress lines that intersect in the Tangshan region. A similar map was submitted to the SSB by the crustal stress team 2 weeks before the Tangshan EQ devastated the city.

region. These dates, carefully noted by PA Wang Chunqing, were given at the SSB Tangshan Conference during an informal science lecture 12 days before the GTE (United Nations, 1996). Set by the Beijing Sanhe team, these dates were established using imminent precursory signals from a total of 16 crustal stress stations in the North China region.

Imminent signals from 12 crustal stress stations in the North China network were used to compile the map of Figure 29.3. This figure shows the principal stress (σ_1) directions (straight lines) of those stations with accelerated changes in anomalous stress just before the July 28, 1976, M7.8 Tangshan EQ (Huang et al., 1982).

Note that the intersection of these lines includes the city of Tangshan and much of the eventual rupture region (crosshatched area) (Chen et al., 1988; Chu et al., 1996). It is indeed by the intersection of such lines that the crustal stress method is able to locate where an EQ may eventually strike. A map similar to Figure 29.3, based on precursory signals from seven stations, located Haicheng as a site for a possible EQ several weeks before the 1975 M7.3 Haicheng EQ (Huang et al., 1991).

Though the crustal stress team was successful in determining the location and timing of the 1975 Haicheng and 1976 Tangshan EQs, the lack of familiarity with some important aspects of precursory signals (e.g., amplitude vs. length of time of signal) resulted in EQ predictions of M5.

Through its 30 years of applied research, over 175 EQ predictions have been officially recorded using the crustal stress method. The accuracy of these predictions has been evaluated using Evaluation for Short-Term and Annual Prediction of Earthquakes (ESTAPE) (Appendix 29.C).

29.4 Present Global Situation and Sustainable Human Development

The present world view assumes that scientists are responsible for disaster forecasting and that the role of PAs is to take the conclusion of scientists and then mobilize their communities appropriately. Everything is compartmentalized and there is no flow of information until a firm assessment is made. This sequence of actions would be fine if disaster prediction were a mature science and predictions were 100% accurate. However, as is generally known, even the prediction of weather is not totally accurate, and the prediction of EQs lags most seriously behind. In fact, it is generally believed that EQ prediction is not possible, at least in the near future (*Economist*, 1997).

Meanwhile, what can communities do to protect themselves from the tragic consequences of EQs? While it may be a long time yet before the regularities common to each EQ are discovered and universally accepted, the experience of Qinglong County provides us with directions of action that can strengthen the mitigation capacity of today's ever expanding urban settlements.

It is clear from the previous description and in the chronology of events outlined in Appendix 29.A that the open flow and exchange of disaster-related knowledge and information through all levels of society promotes disaster mitigation. Of equal importance is the active participation of every sector of society in preparing communities for possible natural hazards. Table 29.1 analyzes in tabular form the actions various sectors of society can choose to take to bring about the consequent protection against natural disasters.

Key elements for success lie in the attitude and level of participation of community members to protect their community against the impact of natural disasters. For such disasters, the degree of environmental and social awareness and willingness of individuals to participate and communicate can make the difference between tragedy and survival. From the natural disaster mitigation perspective, communities are composed of three broad categories of individuals: citizens, PAs, and scientists. For each category, there can be a continuum of involvement. Indeed, this continuum represents a differentiation among levels of participation, from passive to active (Almond and Verba, 1989):

1. Where community members are mostly passive and only occasionally read about disasters and what to do to keep safe for such events, they are ill-prepared to take action against the evolving natural phenomenon and are subject to rumors and panic.
2. Partial citizen action involves those who read about natural disasters and respond to warnings. Such citizens are aware that natural disasters can be anticipated and even forecasted. Indeed, these individuals are aware of the community's interest in being protected and expect the government to warn them of danger from natural disasters.
3. At the most active end of the continuum is the *participant* who is attuned to risk and vulnerability to natural disasters and also participates in disaster mitigation activities. In the case of EQ prediction, the participant may even be a *lay monitor*; that is, he or she may be responsible for recording the readings of one or more instruments that are designed to record evidence of EQ precursors. The *participant* political culture characterizes the people of Qinglong County, where they participated in lay monitoring, were sensitized to noticing local microprecursors, and launched preparatory mitigation activities upon their own confirmation of the early warning.

Table 29.1 Citizens, PAs, and Scientists Mitigate Natural Disasters for Sustainable Human Development

When citizens, administrators, and scientists share perspectives with each other, they establish basis for taking joint action and create action networks throughout their communities. Intensified action enhances not only self-reliance, well-being, and orientation to the future, but also community's survival and development.

<i>Attitude / Consequent Level of Participation</i>	<i>Citizens</i>	<i>Public Administrators</i>	<i>Scientists</i>	<i>Natural Disaster Outcomes</i>
Unaware / little or no participation	It will not happen here and not to me, my family and my community; citizens ignore disaster warnings, or they panic	Doing just enough work to hold the job; too busy with immediate priorities every day to consider the likelihood of natural disasters	Studying phenomena without considering their possible relationship to natural disasters and people	Total tragedy
Educated / moderate level of participation	It might happen; but when it does, someone else will take care of necessary preparations / relief	Gathering and cataloging of information; developing natural disaster management plans; gathering statistics on the community, its vulnerabilities and its disaster relief needs; lack of standards for evaluating accuracy of predictions; who can take responsibility for deciding accuracy or usefulness of predictions	Noticing and recording correlation between natural phenomena and disasters; scientists can predict disasters with a degree of probability, but administrators and the public usually demand absolute accuracy	Tragedy, massive relief; major impact on social and economic development

<p>Aware and alert / high level of participation</p>	<p>Citizens accept possibility of natural disaster occurrences; citizens educate themselves and prepare community-based plans; citizens organize regular drills; they circulate posters, pamphlets, school materials, videos, etc.; citizens participate in lay monitoring of disaster precursors; school children participate in lay monitoring as part of science curriculum and community work; citizens become aware of their immediate natural environment and its subtle shifts</p>	<p>Organizing practice drills; establishing real-time information sharing; promoting disaster-related public education; involving mass media in dissemination of disaster-related information; reaching out to community groups, private sector, NGOs, etc. for integrated public education, disaster preparedness and response Public administrators understand some basic dynamics of the Earth</p>	<p>Scientists share and discuss recorded precursor signals with scientists of other disciplines, among lay persons, and citizens and especially among public administrators, who can translate scientific observations into programmes and actions likely to protect communities from natural disasters; scientists share their observations in ways that are comprehensible to administrators and the public</p>	<p>Early warning success; evacuations of communities where necessary, safeguarding lives and property; minimize deaths and relief costs; more resources still available for sustainable human development</p>
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Although these levels of involvement represent three points on an *activism* continuum, the categories are not static. People can learn to be more active through experience of natural disasters and through focused learning, for example, public disaster education campaigns during a warning (prepare) or an alert (evacuate or take cover) period. The occurrence of dramatic natural disasters can make a lasting impression on community members. If such experiences are also shared via media with others in regions of potential danger, even more people can be educated to safeguard themselves during a destructive EQ. With the sharing of experiences and perspectives, learning can be not only comprehensive and coordinated but also effective.

Natural disasters also present opportunities for PAs to be more or less active on behalf of their communities. At their most passive, officials provide assistance to victims: food, shelter, loans, raw materials, etc. A moderate level of activity would involve developing a disaster management plan and gathering various statistics on the community and its disaster relief needs. A high level of activity would involve disaster education programs for the public, upgrading and enforcing building codes (Shaking, 1995; Survivors, 1999), practice drills to simulate natural disaster situations, and investment to install precursor-monitoring equipment and to organize some staff and/or citizens to record the readings of these instruments.

Among scientists, the various levels of activity can be described as, first, studying phenomena without considering the possible consequences for natural disasters. On a higher level, a scientist can notice and record correlation between natural disasters and certain natural phenomena. Most actively, a scientist can discuss the phenomena with scientists of other disciplines, among lay persons and citizens, and especially among PAs who can translate scientific observations into programs and actions likely to protect communities from natural disasters.

For each category—administrator, scientist, and citizen—there are degrees of commitment and activity. When they explain their specialties and perspectives to each other, they establish a basis for taking joint action. When all three types of people are participating actively, strong synergies can grow among the three types and can weave action networks throughout their communities. Participants sensitize their partners to the nuances of their own specialties. Public officials come to understand some dynamics of the earth. Scientists discover actions relevant to various population groups. Citizens become more aware of their immediate natural environments and its subtle shifts. When all three groups intensify their activities, the pulse of the community quickens and the sense of self-reliance, well-being, and future orientation are all enhanced. Indeed, the chances of community survival and even thriving are enhanced when the categories of individuals are in tune with each other and also with shifts in the natural environment.

29.5 Analysis

29.5.1 *From Social Dilemma to Social Change*

The world is in a quandary where EQ disasters are concerned. There is no consensus among scientists that EQ prediction is possible. PAs demand that scientists give them a clear signal when a disaster will happen, a demand that scientists cannot fulfill (Normile, 1996). The public expects that scientists will tell community officials when a disaster will hit and these same officials will then act to protect their respective communities. Reality tells us otherwise, as things are not so simple and straightforward.

EQ tragedies such as Tangshan in 1976, Kobe in 1995, and Turkey and Taiwan in 1999 point to a social dilemma that, until recognized for its immense danger and addressed, will continue to produce huge human and economic tolls in our megacities. The social message of the Tangshan tragedy and the Qinglong County success is that where large metropolises are concerned, there will hardly ever be consensus among scientists and/or PAs to mobilize for devastating EQs.

The challenge that humanity now faces is to rethink, along the lines of the Qinglong County experience, how we can reorganize ourselves and our communities, in light of Table 29.1, to strengthen our disaster mitigation capacities. By educating ourselves and creating new avenues of information sharing and networking for disaster mitigation, we may find that, as Qinglong County did, the economic, social, and psychological concerns usually associated with disaster preparedness are minimized and even transformed.

29.5.2 Multidisciplinary Approach

The prediction of EQs is a multifaceted process. For three decades, Chinese EQ scientists have based their prediction work on intense monitoring and analysis with a spectrum of multidisciplinary methods (Chu et al., 1996). They have found that, while no single method records precursory signals for all events, a multidisciplinary approach will often yield some precursory signals for most, especially large, EQs. The interlinking of professional and lay observation methodologies has also helped to define the location and timing of EQs.

29.5.3 Shared Risk and Shared Responsibility

Given the uncertainties associated with EQ prediction, anticipation and preparation for an EQ are possible provided that information on the potential disaster is shared with the public at large, preferably through PAs with training in disaster management. Successful warning for EQs will become possible when information from EQ scientists is openly communicated to local PAs who then, understanding and accepting the uncertainties involved, can choose to act upon the information and to educate and empower their local communities to mitigate the potential disaster. The ultimate decision for taking any action based on available information rests first with the PAs and then with each individual. Hence, the consequences of such action involve responsibility at the most fundamental level, that is, shared risk and shared responsibility taken on by the community's citizens. Successful early warning can best be achieved through avenues of disaster-related communications that are open and transparent.

29.5.4 Concept of Probability

One difficulty of using EQ prediction information within a community involves the need to widely cultivate an appreciation for the concept of probability. Both PAs and citizens need to understand that, like hurricanes and typhoons, EQs occur occasionally. It is difficult to predict the three main aspects of EQs—time, location, and magnitude. Various cultures have differing tolerances for uncertainty (Hofstede, 1984). But just as communities can prepare for the possibility of hurricanes, they can prepare for the possibility of EQs. In line with the concept of probability, a community can plan a range of preparedness responses taking into account the likelihood of the EQ's occurrence as well as the economic impact of a particular

preparedness activity. For example, if individual householders know that an EQ is probable over the next 2 weeks and they have direct access to their gas lines, they can choose to shut off their lines when they retire to bed, thus reducing their injury from fires that are often associated with EQs. Acceptance of uncertainty makes possible the planning of *measured* responses. Willingness to work with uncertainties allows communities to prepare for potential disaster with the minimum of psychological, social, and economic impact on the community's daily routine. As difficult as it is psychologically to prepare for an EQ, the possibility of EQs requires calm preparation.

29.5.5 Multiple Communication Pathways

Although engineering solutions are practical in countries that can afford to construct very strong and resilient buildings, highways, and bridges, poorer countries need to include evacuation measures within their range of options. These evacuation measures can be set to correspond to a variety of EQ strengths, with procedures for activating each degree of response before the EQ hits. Speed, accuracy, efficiency, and complex coordination are often required, especially to prevent EQs from developing secondary and tertiary impacts, such as gas leaks and fires. Optimally, all levels of governments, scientific institutes, nongovernmental organizations (NGOs), and relevant private-sector units would be networked together, sharing data and information accurately and with minimum delay. Unfortunately, agencies seldom have multiple communication pathways, and those that do exist are generally fragile rather than robust. The few scientists in each disaster-prone country, challenged by the difficult demands of PAs and citizens to issue accurate predictions (Normile, 1996), are usually unable to serve their publics as they face heavy consequences and responsibility from any decision that they make regarding EQ prediction/early warning.

29.6 Conclusion

Just as microfinance is important to the economic health of a developing community, so is micropreparedness essential in the reduction of natural disasters. As each individual actively prepares, the family, community, and urban metropolis become better protected against the devastation of natural disasters. The Qinglong County experience shows us that tragedies even from great EQ disasters can be successfully prepared for. The main ingredient is awareness that (1) large EQs are preceded by numerous precursors; (2) there are a variety of disaster mitigation methodologies available to monitor for changes in the natural environment related to EQs; and (3) while today's urban metropolises are physically more than ever vulnerable to the devastation of natural events, it is through the networking of all levels of society and the open communication of disaster information that these megacommunities will achieve EQ early-warning successes.

29.A Appendix: Qinglong County and the 1976 Tangshan EQ: A Model Integrating Public Administration and the Science of Disasters

<i>Events Analysis</i>				
	<i>When</i>	<i>Who</i>	<i>What</i>	<i>Impact</i>
<p><i>Public Administration Lessons</i></p> <p><i>Policy statements are essential.</i></p> <p>National EQ policy statement sets operational framework for later specific EQ disaster mitigation measures.</p>	June 29, 1974.	State Council, People's Republic of China.	State Council orders Document No. 69 sent to seven municipalities and provinces: Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia, Liaoning, and Shandong. Document No. 69 alerts public officials to the serious EQ situation, informs them of risk, and advises region to prepare for EQs of magnitude greater than six ($M > 6$); M7–M8 also possible.	Document No. 69 alerts northeast China to the possibility of large EQs within 2 years. Scientific information is shared openly with leading PAs in the seven risk areas of North China and the Bohai Sea. EQ management offices are established and top priority is placed on EQ preparedness. Cooperation between professional and lay detection teams is emphasized, and detection networks at regional, county, and village levels are set up and strengthened. Public education and EQ monitoring programs are intensified.
<p>Counties intensify efforts in EQ preparedness—detection of precursors. Public education and review of infrastructure.</p>	From 1974.	Counties in the region affected by Document No. 60.	EQ preparedness program is implemented, including monitoring, public education, and strengthening of structures. Lay monitoring in factories, mines, and schools is encouraged. EQ office for EQ preparedness activities set up in most counties by 1976.	Public learns about EQs, the lay detection of precursors (anomalies in water level, color, temperature, chemistry, and quality; release of gases; animal behavior; weather changes); methods of preparing for disasters; and the need for heightened awareness.

(continued)

Events Analysis				
	When	Who	What	Impact
<i>Public Administration Lessons</i>				
Experience, interest, and responsibility spur top PA to strengthen scientific background.	From 1974.	Ran Cuangqi, head of CCP in Qinglong County.	Alerted by Document No. 69 and recalling the experience of the 1966 M7.3 Xingtai EQ, Ran decides to learn about EQs from the county's science committee office and from textbook by Chinese geologist. Li Siguang (in English J. S. Lee).	Through gradual self-training, the head of Qinglong County strengthens his disaster decision-making ability.
Energetic administrator increases county's EQ awareness and preparedness.	From November 1975.	Wang Chungqing, a 21-year-old Qinglong County administrator.	Placed in charge of Qinglong County's science committee's EQ disaster management program. Appointed in June 1976 as head of county's newly established EQ office.	Increases the county's EQ monitoring stations (sites) from 6 to 16 (9 of these lay-monitoring sites are at schools). Intensifies public education, distributing thousands of copies of booklets and posters; presenting slide shows and movies in villages, towns, and city; and including short EQ preparedness film before every cinema presentation, with materials provided by the SSB.
Delegation of authority creates greater efficiency.	Just before July 8, 1976.	Wang Jinzhi, head of Qinglong County's science committee, before leaving town for a meeting.	Gives his deputy Zhang Hongjiu instruction to process urgent matters without waiting for his return.	County officials are able to take action quickly.

Open channels increase information sharing.	July 8, 1976.	Wang Chungqing.	Attends Chengde District meeting on EQs.	Learns of the larger, regional meeting on EQs in Tangshan and proceeds there by July 14, 1976.
Administrators are trained to educate the public.	July 14–19.	SSB.	SSB holds regional conference in Tangshan City.	Trains administrators to educate public on measures for EQ preparedness.
Conference organizers quietly supportive of unplanned scientific presentation.	July 16 and 18.	Wang Chengmin. Head of Beijing–Tianjin section of the SSB Analysis and Prediction Department.	During Tangshan conference, holds two informal evening meetings (with only 2 h prior notice) on intermediate- and short-term predictions of EQ.	Shows and discusses data to precursory signals, allowing participants to draw their own conclusions and to integrate these conclusions with past plus recent data and empirical trends.
Local administrators share EQ information development of interdisciplinary network of professionals who are knowledgeable about EQ preparedness and mitigation.	July 16, 1976.	Wang Chungqing, administrator, attends scientist Wang Chengmin's presentation.	Takes detailed notes on presentation by Wang Chengmin.	Major points of scientific presentation are as follows: <ol style="list-style-type: none"> 1. Many EQs of $M > 7$ have recently occurred throughout the world. 2. Professional EQ monitoring teams and lay detection centers are porting abnormal signals for Beijing–Tianjin–Tangshan–Bohai–Zhangjiakou region, which may relate to a possible EQ.

(continued)

Events Analysis				
	When	Who	What	Impact
Public Administration Lessons				3. Analysis of scientific data acquired by seven major techniques, including stress and electrical measurements, indicates there is a good possibility that this region will be struck by a significant EQ. Data include (1) the Sanhe monitoring team's prediction of an EQ of M5, between July 22 and August 5, 1976; (2) synthesis of data from several field teams regarding dates, locations, and assessments of the situation, plus comments on various EQs in northeast China and in Inner Mongolia: <i>From all the data and trends, we conclude that this area, within 1–2 years, may have an M8 EQ; the area should therefore actively prepare, widely circulate this EQ knowledge (especially to big factories and mines), and make plans and proper measures for EQ preparation.</i>
Report recent developments in a timely manner to county officials.	Conference ends on July 19 and returns to county headquarters on July 21.	Wang Chungqing.	Returns to Qinglong County and report immediately to Zhang Hongjiu. Deputy head of the science committee on EQ situation.	Zhang Hongjiu takes information very seriously and recommends countywide preparations and education. They go together to report to Yu Shen, the county's associate director in charge of supervising the county's science committee.

<p>Busy senior officials recognize significance of information reported by junior official: increasing leadership awareness of EQ risk.</p>	<p>July 21.</p>	<p>Wang Chunqing and Zhang Hongjiu.</p>	<p>Together, they report to Yu Shen.</p>	<p>Tell Yu Shen of the danger of impending disasters (predicted EQ and possible flood). Yu Shen recommends they make appointment to report to leadership as soon as possible. He instructs Wang Chunqing or contact Ma Gang, county office administrator, to arrange appointment with Ran Guangqi, head of CCP in Qinglong County.</p>
<p>Science and administrative tasks are coordinated and integrated.</p>	<p>July 21–24.</p>	<p>Wang Chunqing.</p>	<p>Participates in alerting top county administrators of EQ situation, while also checking (over a 3-day period) with county's 16 lay-monitoring sites for latest readings. (All 16 sites are linked by telephone to county's EQ office.)</p>	<ol style="list-style-type: none"> 1. Meets with Ma Gang on July 22, 1976, who recognizes significance of EQ situation and urgency of notifying county head Ran Guangqi. 2. Contacts lay-monitoring sites for record updates to assess immediate BQ situation in county; unusual changes noted at four sites. Integrates lay-monitoring findings into report to county leadership.
<p>Topmost official takes report seriously; crystallization of priority on EQ risk.</p>	<p>July 23.</p>	<p>Ran Guangqi. Head of CCP in Qinglong County.</p>	<p>Says the report should be made not only to him but also to the entire CCP standing committee of Qinglong County.</p>	<p>Calls special meeting of the CCP standing committee to meet at 8: 30 p.m. on July 24 to hear Wang Chunqing report on EQ situation (even though the CCP and government officials were busy preparing for a major agricultural conference).</p>

(continued)

<i>Events Analysis</i>				
<i>Public Administration Lessons</i>	<i>When</i>	<i>Who</i>	<i>What</i>	<i>Impact</i>
Develop communicative and informative mechanism to support mutual activities: incoming information flows both vertically and horizontally into EQ office; protocols for speedy communication are set. <i>Integrated past and current. EQ and flood, data in decision making. Senior officials take report by junior and focused attention on EQ by strengthening the power of</i>	July 24, 1976.	Zhang Pingyi, Yu Shen, Chen Yongfu, and Ma Gang (also Sun You): <i>at the CCP standing committee meeting, there is a difference of opinion concerning the appropriate response to the EQ situation, the possibility of creating panic and loss of credibility, and the degree of popular knowledge and/or presence of superstitions about EQs. Ran Guangqi (absent at another meeting, but kept fully informed)</i>	Wang Chungqing reports on EQ situation: notes strong possibility of EQ M5 between July 22 and August 5 in Beijing–Tianjin–Tangshan–Bohai–Zhangjiakou area and M8 likely from the second half of 1976 to the beginning of the following year. (Of the county's 16 monitoring stations, 6 have monitoring equipment installed.)	Action plan includes the following: <ol style="list-style-type: none"> 1. Strengthen leadership at all levels. 2. Establish EQ command office: head, Ran Guangqi; executive head, Yu Shen; associate head, Wang Chungqing; staffed for a 24 h communication; location, for now, in science committee's office area. 3. Strengthen monitoring stations, by assigning people to special 24 h duty and by scheduling daily reports to EQ office. 4. Place EQ equipment in air-raid resistant structures (built for air defense). 5. Promote education on EQ detection and preparation. 6. Instruct EQ office to write up EQ preparation measures for county officials and the general public. Disseminate information countywide by telephone and by public address system.

<p><i>responsible officials to act without delay or further reference to the top leaders.</i></p>		<p><i>and Yu Shen, both of whom hold important posts, assert the wisdom of community preparation in view of Document No. 69 and information from the Tangshan conference.</i></p>		<p>7. Emphasize that there may soon be an EQ and that its effects can be mitigated. Give special attention to auditoriums, cinemas, and theaters. Strengthen school safety measures.</p> <p>8. Instruct officials, civil workers, and citizens to be on alert. (Key officials go without sleep for 3 days.)</p>
<p>County alerts government officials at town and village levels.</p>	<p>July 24, 1976.</p>	<p>Ran Guangqi, head of Qinglong County CCP.</p>	<p>Immediately after meeting, notifies by telephone conference the leading officials of all 43 towns in Qinglong County of possible disaster(s). <i>The county is composed of towns and surrounding villages, known, respectively, in 1976 as communes and brigades.</i></p>	<p>Discusses and arranges preparations for EQ (and flood). Likens urgent disaster situation to that of fire alarm. Emphasizes that every official is responsible for preparing people in their areas and is accountable for their actions or inactions.</p>
<p>Communication channel between counties is utilized; communication network activated.</p>	<p>From July 24 onward.</p>	<p>Wang Chungqing.</p>	<p>Contacts surrounding counties.</p>	<p>Requests information on any anomalies recorded in neighboring counties, in accordance with periodic practice.</p>

(continued)

Events Analysis				
	When	Who	What	Impact
<i>Public Administration Lessons</i>	Through night of July 24 and the day of July 25.	Wang Chungqing and staff.	Work 24 h nonstop, on detailed instructions to county officials and general public on the EQ situation and preparation measures.	<p>Activate countywide information network; public informed of EQ risk and of potential losses. Preparation measures include the following:</p> <ol style="list-style-type: none"> 1. Broadcast lectures on EQs. 2. Alert EQ monitoring stations to pay particular attention, with overnight watch duty, between July and August 5, 1976. 3. Assign officers to EQ preparation work on county, district, town, and village levels. 4. Inform by telephone the 22 factories, mines, schools, post offices, reservoirs, cinemas, auditoriums, etc., to prepare for a possible EQ.
County officials show flexibility by using an already-planned conference on another topic as the occasion to publicize the urgent EQ situation; adoption of	Morning of July 25.	County leadership has Wang Jinzhi report on EQ situation at county-level agricultural meeting of more than 800 county and town officials.	Use event of agricultural meeting to discuss impending EQ (and flood) situation.	<p>At the agricultural meeting, a decision was made to send two officials (one county level and one local community) to each town, with the following instruction:</p> <ol style="list-style-type: none"> 1. Everyone must be informed by the end of July 26! 2. Officials must travel straight to the office and begin work, without stopping at home or for personal business (anyone negligent will be held accountable).

<p>adaptive organizational behavior.</p>		<p>County has 43 towns, each composed of a cluster of contiguous villages (a total of 404 organized villages and 27,000 native places where government supervision is less).</p>		<ol style="list-style-type: none"> 3. Immediately begin EQ and flood preparations and public education campaign. 4. Each town and each village should have an EQ command office to transmit information down and across to neighboring towns and cities. 5. Set up 24 h communications; reports, patrols, and links with nearby counties, to know every detail of trends in surrounding areas. 6. Use various means for education of people: broadcasting, workshops, telephone calls to village offices, blackboards, night schools, and neighbors informing neighbors. 7. Keep windows and doors open; neither cook nor eat inside. 8. Where feasible, stay in sheds in the fields.
<p>County government reaches out to the entire population and alerts the community.</p>	<p>Evening of July 25.</p>	<p>Broadcast Bureau.</p>	<p>Begins broadcasting EQ information three times a day using public announcement system that reaches all rural, residential, and business areas in the county.</p>	<p>The population is alerted to the most recent EQ situation, on the dangers of EQs, and of how to make themselves safer before, during, and after an EQ.</p>
<p>Shared perception of emergency.</p>	<p>From July 25.</p>	<p>Towns and villages.</p>	<p>Emergency meetings at town and village levels.</p>	<p>The ability to spread the word is enhanced through this community-based network.</p>

(continued)

<i>Events Analysis</i>				
	<i>When</i>	<i>Who</i>	<i>What</i>	<i>Impact</i>
<i>Public Administration Lessons</i>				
Leading PA sets example.	From July 25.	Ran Guangqi, head of Qinglong County.	Up residence in makeshift tent made of poles and a plastic sheet.	Encourages all county officials and residents to heed warnings to stay away from buildings.
Officials do not rest during the emergency preparations, working day and night; intensify investment of resources in preparedness.	July 24–27.	Secretary of Dazhangzi Town (also a member of the Qinglong County's CCP standing committee).	Personally participates in town's EQ preparation activities: remains at town's reservoir for 7 days, does not sleep for 3 days, eats only rice with salt.	Instructs villages to set up own EQ offices with 24 h monitoring. (pre-EQ situation: hot weather, rains, humidity, awareness of 1975 M7.3 Haicheng EQ.) Emergency broadcast on night of July 27 requests village officials to examine all buildings; every home is to have one person on watch (in shifts) throughout the night.
Top official integrates past and current information and goes to the people to assess EQ preparations.	From July 25.	Zhang Pingyi, associate head of CCP in Qinglong County.	Visits 23 towns, examining EQ preparations.	Emphasizes EQ preparation, because he remembers in a previous provincial meeting the discussion of large disasters caused by EQs in Japan.
Responsible officials work day and night; intensive engagement in preparedness efforts.	From July 25.	County engineer.	Sleeps outside for a month; maintains 24 h watch before, during, and after EQ mainshock and aftershocks.	Stays on alert to shut off power as soon as an EQ occurs; equipment guarded 24 h a day.

Village 1	From July 25.	Xia Dahudian. Village CCP and civil defense members are most responsible for carrying out EQ preparations. Xia Dahudian village of Qinglong County is 90 km from Tangshan.	<p>Public behavior changes in response to reliable data concerning EQ risk (scientific data from county level seen within context of earlier observations at grassroots level). Villagers see county prediction as providing a framework for understanding already perceived sensory data.</p>	<p>Results</p> <ol style="list-style-type: none"> 1. Most villagers believe the EQ broadcast because county officials base their report on data from scientists. 2. EQ warning corroborates lay-monitoring evidence from two local sites; strange animal behavior and changes in water level, color, chemistry, and gas release observed. <i>Note: From July 20, 1976, villagers noticed domestic animals behaving very strangely: pigs ran in circles and would not stay in pens, chickens refused to stay in chicken coops, and yellow weasels left their hiding places and ran around unafraid of the villagers.</i> 3. Village patrols (twice daily) are set up to prevent people from sneaking back into their houses (able-bodied people are fined if caught inside houses). 4. Villagers learn lay techniques to sense EQs, for example, overturning empty glass bottles and balance in metal wash basin, so as to hear the bottle tip over in an EQ.
			<p>Actions</p> <ol style="list-style-type: none"> 1. Broadcast EQ situation through loudspeaker at every home, factory, harvest field, and street corner. 2. Alert people to build sheds in fields, move from homes into sheds, and avoid structures including walls and power lines. 3. Carry elderly out to sheds. <i>Note: By evening of July 26, 1976, everyone is relocated to sheds.</i> 	

(continued)

Events Analysis					
	When	Who	What	Impact	
<i>Public Administration Lessons</i>					
<i>Village 2</i>					
Grass roots respond to report by county officials. <i>Note: Every family is taught to take responsibility for themselves.</i>	From July 25.	Xia Baoyuhuai. Village CCP and civil defense members are most responsible for carrying out EQ preparations. <i>Xia Baoyuhuai village of Qinglong County is 75 km from Tangshan.</i>	<p>Actions</p> <ol style="list-style-type: none"> Emergency meeting of leading officials and heads of production teams. Mass meetings of more than 300 people to inform villagers of possible EQ and preparatory strategies. Build sheds for shelter of people leaving homes; by late July 26, everyone is out of homes and buildings. Intensify watch for precursors. 	<p>Results</p> <ol style="list-style-type: none"> People note that chickens are flying high and pigs are running into walls; well water is muddy and colder than normal on July 26–27; at a hot spring nearby, used for washing clothes and usually 40°C, water becomes cold 4–5 days before EQ; weather is extremely hot and humid, starting July 18. Elementary school students put bottles upside down to sense earth shaking. Every family assigns one person to NOT sleep (in shifts); families are instructed to take responsibility for their own survival and safety. 	
<i>Village 3</i>					
Delegation and division of labor; diligence is maintained.	From July 25.	Wen Quan. Village CCP and civil defense members are most responsible for carrying out EQ preparations. <i>Wen Quan village</i>	<p>Actions</p> <ol style="list-style-type: none"> Divide tasks into building sheds, having people leave their buildings, and public education. 	<p>Results</p> <ol style="list-style-type: none"> Build tents and sheds from locally available materials. Villagers observe large numbers of yellow weasels; nocturnal animals normally hide and are afraid of people; residents had not realized the 	

			<i>in Qinglong County is 70 km from Tangshan.</i>		significance of this and other strange animal behavior (observed 10–20 days before the EQ) until <i>county EQ announcement</i> .
Intensify EQ alert.	July 25–26.	Town officials.		Broadcast information widely into all levels to intensify EQ monitoring and preparation.	Heightened awareness that EQ could <i>happen any day now!</i> Widespread dissemination of information on precursors.
<i>Day before the EQ</i>					
Educate lay public both in Qinglong City and throughout the county.	July 27.	Wang Jinzhi, head of the county's science committee.		At the request of county leaders, gives special talk on EQ situation and mitigation measures to more than 800 officials attending the agricultural meeting.	Attendees are informed on the EQ situation, advised to keep doors and windows open, and instructed on how to get out and run away from buildings should an EQ strikes.
School children participate in EQ science and public administration preparedness. <i>Students are a major resource in preparedness activities.</i>	From July 24 to 27.	Local middle school in Qinglong City: three physics teachers and small study group of students. This school lay-monitoring site, one of nine in the county, was set up in December.		Collect data from local people and record precursors; students note changes in water and that normally nocturnal yellow weasels are running around in large numbers and in broad daylight (with an especially large increase noted on July 27, 1976).	Symposium planned for July 28 is moved to July 27 at the insistence of students who see large increase of yellow weasels running around in daylight. By the evening of July 27, school buildings are declared off limits and students are not allowed to be inside school buildings.

(continued)

Events Analysis				
	When	Who	What	Impact
<i>Public Administration Lessons</i>	July 27.	Dong Wu, a doctor at the hospital in Qinglong County.	Goes to Tangshan on night of July 27 and stays with relatives.	Informs his relatives that Qinglong County is prepared for an EQ and warns them to also prepare: they listen in disbelief and tell him not to tell others in order to avoid panic; he puts his clothes by his bedside to leave house quickly should EQ begin. Relatives accept his advice to leave doors and windows open, sleep lightly, and stand an empty bottle upside down on the edge of the table.
<i>Day before the EQ</i>				
Witnesses' accounts of EQ warning data and actual experiences.	July 28 (just before EQ).	Residents of Qinglong County.	Precursors appear immediately before EQ.	<ol style="list-style-type: none"> 1. Eye witnesses from villages of Xia Dahudian and Xia Baoyuhuai report: "Sky brightens momentarily with white light in direction of Tangshan City; ominous rumbling heard; ground vibrations begin." 2. Dr. Dong Wu in Tangshan sees flash of white light and hears sound of ominous rumbling.
Lack of communication between PAS and scientists leads to an unprepared	July 28, 1976, at 3:42 a.m.	M7.8 Tangshan EQ.	The Great Tangshan EQ (GTE); intensity XI (11) in area with maximum damage; trees lining the EQ fault surface rupture are burnt on the side closest to the fault.	<ol style="list-style-type: none"> 1. 242,469 people die, almost 1/4 of Tangshan's 1 million population. 2. 600,000 were seriously injured. 3. 7,000 families were completely obliterated.

<p>public; great human suffering results.</p>	<p>July 28, 3:42 a.m.</p>	<p>Qinglong County.</p>	<p>County residents are aware and prepared by the time GTE strikes. (Note: Qinglong County is located 115 km from Tangshan.)</p>	<p>4. 10,000 Tangshan residents lost their spouses. 5. 2,652 children became orphans. 6. 3,800 people were left as paraplegics or amputees. <i>On July 28, 1976, at 3:42 a.m., an EQ of M7.8 occurred in Tangshan in the northeastern part of China. The hypocenter was directly under the city of Tangshan at a depth of 11 km. The seismic intensity at the epicenter measured XI. People were fast asleep when the EQ struck. Lightning flashed across the sky and the earth rumbled ominously seconds before the earth began to shake. In a matter of seconds, an industrial city of a million people was reduced to rubble. About 240,000 people perished, and some 7,000 families were completely obliterated. This catastrophe not only shook China but stunned the world.</i></p>
<p>Knowledge and preparation reduce loss of life; officials can empower the public to save their own lives.</p>	<p>July 28, 3:42 a.m.</p>	<p>Qinglong County.</p>	<p>County residents are aware and prepared by the time GTE strikes. (Note: Qinglong County is located 115 km from Tangshan.)</p>	<p>1. Only one death (due to heart condition) occurred. 2. Animals are safe. 3. County sustains maximum damage of intensity 8. Residents at Wen Quan village hear and experience the destructive power of the EQ, as large sections of the 1,000-year-old Great Wall split and crash down from nearby hilltops.</p>

(continued)

<i>Events Analysis</i>				
	<i>When</i>	<i>Who</i>	<i>What</i>	<i>Impact</i>
<i>Public Administration Lessons</i>				<ol style="list-style-type: none"> 4. 7,000 buildings collapse totally. 5. 180,000 buildings are damaged. 6. At county middle school, roof shifts and walls collapse, but no loss of life occurs. 7. Some residents want to return to their homes to escape heavy rains, but the civil defense insists that people stay in tents during the aftershock period.
Relevant knowledge supports mitigation of disasters.	July 28, 3:42 a.m.	Agricultural meeting in Qinglong City.	More than 800 meeting attendees are able to exit urban building complex, avoiding serious injury.	One attendee misses the lecture on EQ safety held at county headquarters on the evening of July 27 and hence does not leave the building in the safest manner; he is cut by breaking glass.
Survivors of disasters can play a significant role as rescuers.	July 28, 3:42 a.m.	Dr. Dong Wu.	Wakes relatives at first sound of the rumbling and runs outside; lifts two relatives out of their home through an open window before the building collapses.	Saves himself and his relative's entire family. Drives 180 km to find a functioning hospital for one injured relative; stays to help injured at the hospital for 4 days. Qinglong County officials, who had sent Dr. Dong to Tangshan on medical business, dispatch a search car, which finds him on day 7; they bring him back to his much relieved family in Qinglong.

Well-prepared local survivors can be the first to assist others during a disaster.	July 28.	Qinglong County.	Immediately organizes a rescue effort: within 5 h after EQ, sends first medical team to the disaster zone.	Sends the first rescue team that reaches Tangshan after the M7.8 (mainshock) EQ. In total, three rescue teams are sent. Supplies, water, and food also are sent to Tangshan. Production is maintained. Receives injured at county hospital.
<i>Aftershocks</i>				
EQs continue to create havoc after mainshock; close cooperation between PAs, scientists, and lay public is essential to minimize damage and loss of life. <i>Limiting damage requires collaborative action.</i>	July 28, onward, for 6 months.	Area in and around Tangshan.	<ol style="list-style-type: none"> 1. Large aftershocks, M6.2 and M7.1, occur on July 28; many significant EQs occur for months after the M7.8 mainshock. 2. Aftershocks define EQ rupture zone; region of damage is centered on Tangshan and stretches radially for 200 km. 3. Heavy rains follow mainshock. 	<ol style="list-style-type: none"> 1. M7.1 aftershock destroys almost all of the remaining buildings left standing after the mainshock. Survivors rebuild four times, with efforts often destroyed by aftershocks. 2. Aftershock activity causes many more deaths and injuries. 3. Heavy rains impede rescue efforts, adding to the death toll. 4. As many as 400,000 people live outdoors. 5. Careful questioning of lay public by teams of scientists after M7.8 mainshock provides invaluable data on EQ precursors, enabling rescuers to organize their efforts around the aftershocks. (In the village of Yangguanlin, the observations of children lead scientist to predict the Ninghe M6.9 aftershock in November 1976.)

(continued)

Events Analysis				
	When	Who	What	Impact
<i>Public Administration Lessons</i>				
<i>Recovery</i>				
From EQ ashes, a new city arises; PAs, scientists, and lay public continue to learn from GTE. <i>Crisis provides opportunity for learning.</i>	From 1976 to 1986.	Area in and around Tangshan.	<ol style="list-style-type: none"> 1. Rebuilding begins in damaged region almost immediately. 2. New building codes protect to EQ intensity level of VIII (8). 3. Historical sites designated to educate officials, scientists, and lay public on EQs. 4. Monument and museum built by Tangshan City in memory of GTE victims. 	<ol style="list-style-type: none"> 1. Some schools open in the streets after 1 month; some factories begin production within 2 weeks. 2. One million sheds house survivors for six months after the EQ. 3. After 7 years, people return to normal housing. 4. After 10 years, all buildings are reconstructed, except for seven historical sites, which are preserved as examples of the destructive power of EQs.

29.B Appendix: United Nations Global Programme for the Integration of Public Administration and the Science of Disasters

Established in January 1996 by the UN secretariat and directed by the UN Department of Economic and Social Affairs (UNDESA), the United Nations Global Programme for the Integration of Public Administration and the Science of Disasters (UNGP-IPASD) facilitates the sharing of information, data, and experiences among scientists and administrators. The program builds on three pillars: (1) improvements in coordination and cooperation in government operations, (2) advances in anticipating the occurrence of natural disasters, and (3) public education and participation in disaster awareness and preparedness.

While its goal is to reduce human suffering related to the incidence of natural disasters, the global program also serves to improve the effectiveness and efficiency of public administration so that everyday routine, as well as disaster management functions, is performed optimally. Both anticipation and management aspects are integrated in this program, in order to take advantage of scientific information on disasters and public administration capacity to respond to such information with measured, effective strategies.

The UNGP-IPASD encourages the integration of applied natural sciences and public administration in order to strengthen significantly the capacity of local communities to assess and mitigate their immediate risk from natural disasters, particularly from EQs. Although natural events are often global in scope, it is said, "all disasters are local." By integrating international and local networks of scientists and administrators, a global monitoring network for disasters can be linked to the most operational level, that is, any community, especially those linked to the Internet.

Since its inception, the UNGP-IPASD has involved participants from Armenia, Brazil, China, Ecuador, India, Iran, Japan, Mexico, Mongolia, Peru, the Philippines, Russia, Slovakia, Trinidad and Tobago, Turkey, Ukraine, and the United States. Financial support has come from the United Nations Development Programme (UNDP) and the Foundation for Research and International Education relating to Natural Disasters (FRIEND), a not-for-profit NGO set up to fund program activities. The program's accomplishments and ongoing activities include community pilot projects, regional conferences, publications, and information-sharing activities. Particularly noteworthy achievements are as follows: (1) the UNGP-IPASD's facilitation in the early-warning successes for the 1997 large EQs in Jiashi County, China (Li and Kerr, 1997), and for the 1998 catastrophic floods in southern China; (2) research on best practices in public administration in natural disasters; (3) publications, including a practical handbook for communities seeking ways to reduce their vulnerability to large and sudden disasters; and (4) information sharing through national and international workshops, as well as through the UNGP-IPASD website (<http://www.globalwatch.org/ungp/>).

The global program held its first United Nations Interregional Technical Conference in January 1997 to bring together PAs and scientists for the rapid development of global networks for early-warning research and communication. In February 1998, a workshop was held to launch a practical international network to collect and share scientific data relating to precursors of EQs and weather disasters as monitored by geomagnetic methods.

UNGP-IPASD represents a contribution of the UNDESA to the International Decade for Natural Disaster Reduction (IDNDR). The global program used an initial donation of US \$150,000 to the UN Trust Fund UNEPPA (United Nations Fund for Integrating Public Administration and the Science of Earthquakes in Prediction) to support research related to Qinglong County and to hold the first international conference of the UNGP-IPASD in Beijing, China, in January 1997.

29.C Appendix: Evaluation of Short-Term and Annual Prediction of Earthquakes

To evaluate the practical results of prediction research, the UNGP-IPASD developed ESTAPE. ESTAPE provides city administrators and public safety officials with a simple tool to evaluate EQ predictions so as to distinguish which information should be taken into account in preparing their communities for natural disasters.

29.C.1 How ESTAPE Works

Fundamental premise: Any prediction, to be evaluated by ESTAPE, must have been made before the predicted event. In order to ensure the soundness of an ESTAPE evaluation score, the following information needs to be on record: (1) the date on which and (2) the agency to which the prediction is submitted and/or accepted; (3) a listing of the method(s) used to generate the prediction; and (4) the name of the individual or group that calculates the ESTAPE score. Adherence to these procedural prerequisites assures a level of confidence in the ESTAPE score.

Key inputs: ESTAPE is based on three key parameters that are typically used to describe EQs: magnitude, time, and location. ESTAPE looks at the error (misfit) in the parameter values between the predicted natural event and the actual EQ.

Scoring of predictions: If the prediction is completely accurate, that is, the magnitude, time, and location of the actual EQ have values that match those predicted, a 100% score is attributed to each parameter, giving an overall combined score of 100%. Anything less than a perfect match in any of the parameters is scored according to the degree of *error* or *misfit* using the tables ESTAPE-S and ESTAPE-A.

ESTAPE-S (Table 1 of Chu and Col, 1998) is used to evaluate short-term predictions of EQs. Short term typically implies several weeks to several days before an event. ESTAPE-A (Table 2 of Chu and Col, 1998) is used to evaluate annual predictions. As long as the forecasted seismic event occurs within 1 year of the date of submission of the prediction, the score for the time parameter of an annual prediction is 100%. We note here that ESTAPE scores for short-term predictions are very time sensitive, whereas by comparison, the scoring of annual predictions is much less time sensitive. For this reason, overall scores for the two types of prediction categories (short term and annual) are not comparable.

The Internet: The ESTAPE evaluation approach is currently available on the Internet at <<http://www.globalwatch.org/ungp/>>. Listings of official predictions made over the last 30 years are posted on this UNGP-IPASD website. For references that describe ESTAPE in detail, please refer to Chu and Col (1999) and UN (1998).

29.C.2 Strengths of ESTAPE

The ESTAPE approach creates an open environment where any individual can independently evaluate the practical results of prediction research. ESTAPE focuses on providing scientific information in a format that is easy to understand and which can then be used by public officials and members of civil society. In its essence, ESTAPE provides a *yardstick* to measure EQ prediction reports.

For example, the information contained in the short-term prediction that contributed to the successful early warning for the Qinglong County community of nearly a half-million people during M7.8 Tangshan EQ has an overall ESTAPE score of just over 60%. Thus, information associated with scores of 60% or greater is socially useful.

In the more recent successful early warning for a series of larger than M6 EQs in Jiashi County in western China (Li and Kerr, 1997), the overall ESTAPE score for the multidisciplinary prediction effort by UNGP-IPASD scientists is 88%. This result is encouraging, for it indicates that by combining a number of different approaches to EQ prediction, the resulting forecast is more likely to reflect the real situation.

Single predictions can be assessed by ESTAPE for accuracy. Even more potent and revealing is the comprehensive analysis of prediction records that span years of forecasting work using different methodologies. PAs can assess these catalogs of past predictions using ESTAPE to see which forecasting technologies have the best *batting record* for anticipating EQs. The practical benefits of such a screening are that officials and individuals can then chose to act on the information provided by the more reliable of methodologies.

As an example of a prediction catalog, crustal stress experts in China have officially submitted their predictions to the Chinese Seismological Bureau during the last three decades. A UNGP-IPASD evaluation using ESTAPE of their more than 175 short-term EQ predictions made over these years shows that their method was socially useful (overall ESTAPE-S scores of 60% or more) for one out of every three EQs. For a detailed listing of the 175 predictions, see <http://www.globalwatch.org/ungp/>. For an evaluation of an annual prediction catalog using ESTAPE-A, please refer to Chu and Col (1999) and UN (1998).

For PAs, annual forecast(s) from methodologies screened by ESTAPE can provide these officials with lead time to set up local EQ offices, conduct disaster education campaigns, and raise public awareness to the importance of networking and communicating changes in the natural environment. Short-term forecasting technologies would also be implemented in the region of concern and lay-monitoring equipment installed with the training of local observers. All of the information gathered through these activities, when integrated into a comprehensive disaster plan, can play a significant role in mitigating the impact of large and sudden natural disasters such as EQs.

29.D Appendix: State Council Document No. 69: Successful Medium-Term Forecast and Fundamental Policy for Multisectoral Participation

The background for the early-warning success of Qinglong County was set in the early 1970s, when top Chinese policy makers asked EQ scientists to assess the disaster situation for North China. Their request resulted in State Council Document No. 69 (United Nations, 1996; <http://www.globalwatch.org/ungp/>). This document, a national policy statement issued in June 1974, directed disaster managers to prepare for a possible natural disaster of devastating magnitude within the ensuing 2 years. This forecast was later confirmed by the occurrence of the North China M7.3 Haicheng EQ in 1975 and the M7.8 Tangshan EQ in 1976.

Though successful in its medium-term assessment, the major social effect of Document No. 69 (see the first and last sections in the following) was to encourage multisectoral participation in disaster monitoring and preparedness. National policy makers recognized that public education

and combining the efforts of citizens, PAs, and scientists in disaster monitoring could increase the probability of recognizing precursors of destructive imminent EQs, as well as reduce public panic.

With the existence of Document No. 69, PAs were encouraged to take initiatives in expanding their disaster mitigation efforts. The public officials of Qinglong County took the challenge of this document seriously. A review of the activities in the *events analysis* (Appendix 29.A) reveals that PAs went beyond the expectations of their job descriptions to create the disaster mitigation success of Qinglong County. When interviewed, each of these officials said, “I was just doing my job.” But in several key cases, the individuals performed in exemplary manner, and taken as a whole, the institutions in the community worked in a coordinated manner to bring about an integrated success.

State Council Document No. 69
People’s Republic of China
June 29, 1974

29.D.1 State Council Endorses Chinese Academy of Sciences’ Report on the Earthquake Situation in North China and the Bohai Sea Area

To the leading PAs of Beijing, Tianjin, the provinces of Hebei, Shanxi, Shandong, and Liaoning and the autonomous region of Inner Mongolia:

Please pay close attention to the information and implement the recommendations in the attached Chinese Academy of Sciences *Report on the Earthquake Situation in North China and the Bohai Sea Area*.

EQ work is an important mission that concerns the preservation of lives and property. We look to you to build and strengthen EQ management offices by implementing the national policy, that is, place top priority on EQ preparedness, integrate the efforts of professionals and the lay public, and combine Chinese and Western methods. Intensify EQ preparedness and mitigation efforts by mobilizing professional teams and organizing lay public monitoring and preparation.

At present, the science and technologies to monitor and predict EQs are still in their early stages. Therefore, the large EQs forecasted in this report for this year and the next year are estimates only; they may or may not occur. However, we should operate on the assumption that there will be a large EQ and should therefore make preparations.

At the same time, you must minimize the potential for public panic and social disarray that this alert may cause.

“Report on the Earthquake Situation in North China and the Bohai Sea Area”

Chinese Academy of Sciences, June 15, 1974

29.D.2 To the State Council

From June 7 to 9, 1974, the SSB held a conference on the EQ situation in the North China and Bohai Sea area. Representatives came from 20 units of EQ disaster management and research institutions of Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia, Shandong, and Liaoning.

The conference analyzed the EQ situation of the aforementioned areas. The majority opinion is that, within this year or the next year, EQs of M5 to M6 may occur in the Beijing–Tianjin area; north part of the Bohai Sea; Handan and Anyang in the border area between Shanxi, Hebei, and Henan; the Linfen Basin in Shanxi; the Linyi area in Shandong; and the

central part of the Yellow Sea. EQs of around M5 may occur in Inner Mongolia in the area around Baotou and Wuyuan.

The principal evidence for the previous condition is as follows:

Beijing–Tianjin area

- Recent frequent occurrences of small EQs
- Abnormal readings of crustal deformation
- Anomalous gravity measurements
- Unusual changes in radon content in groundwater

Northern Bohai Sea area

- Changes in water level in Jinxian County had been gradual over the past few years, with a rate of 0.11 mm/year. However, the cumulative change in water level has already reached 2.5 mm (in 9 months).
- Geomagnetic anomaly of 22 gamma recorded in the Dalian area.
- Six tide-monitoring stations in the northern Bohai Sea area all reported increases of 10–20 cm in sea level in 1973, a phenomenon that has not been seen for the past 10–20 years.
- Marked increase in microseismicity.

Linfen Basin in southern Shanxi

- Anomalies in seismic velocity in recent years

Shanxi, Henan, Hebei border area, and the central part of the Yellow Sea

- Increase in microseismicity

Linyi area in southern Shandong

- A pattern of high seismicity in the area peripheral to Linyi has emerged in the past few years. This pattern is similar to the one that formed before the historic 1668 M8.5 EQ in the same area.

In addition, based on the historical pattern of major EQ activity, the study of regional seismicity, the influence of the Western Pacific seismic belt, and those EQs with focal depths of 400–500 km on North China, some colleagues believe that North China has accumulated enough seismic energy for an EQ of M7–M8.

Furthermore, prolonged drought in the northern part of North China and abnormal meteorological conditions rarely seen since 1949—a warm winter, a cold spring, and imbalance in humidity during the past year—indicate the possibility of a major EQ of around M7 in North China.

In contrast, some colleagues have observed an increase in the earth's rate of rotation over the last year, which from past experience indicates that large EQs are unlikely. An additional observation is that there is usually a long time period between large EQs in this region. They therefore believe that no EQ greater than M5.5 will occur in North China in the next few years.

Learning from the lessons of the successive devastating EQs in Liyang County in Jiangsu Province and Zhaotong County in Yunnan Province, the conference participants recommend that we should operate on the assumption that there will be a large EQ despite the inconclusive analysis. Therefore, we should heighten our alertness and prepare for the sudden strike of an EQ of $M > 6$.

Our recommendations for strengthening EQ work in the risk areas are as follows:

1. Strengthen leadership in EQ work. Appoint at least one public official in each of the seven risk areas (Beijing, Tianjin, etc.) to take charge. Strengthen existing seismological bureau and EQ offices in Beijing, Tianjin, Hebei, Inner Mongolia, and Liaoning. In Shanxi and Shandong, where there are no established EQ offices or lay-monitoring stations, such facilities should be set up immediately. Initiate EQ preparedness work at all regional and county levels and integrate the management of professional and amateur (lay public) monitoring teams.
2. Develop lay public monitoring and preparation networks and mobilize the public in earnest. In the seven risk areas, there are currently about 5000 people who participate in amateur monitoring teams, which is still inadequate. Experience has shown that in areas where good lay monitoring and preparation are implemented, it is possible to capture imminent precursors, thereby mitigating losses. Factories and major mining enterprises should take steps to organize amateur monitoring teams and train volunteers. Villages should establish public education and monitoring programs and make effective use of meteorological stations, schools, and amateur science groups. At the same time, avoid panic by preparing the public psychologically for potential calamity.
3. Professional teams should investigate fully all the areas in which anomalies have occurred, provide comprehensive analysis, and continue to monitor the EQ situation. Raise the level of EQ prediction and strive for timely early warning. Assure the normal functioning of the 109 professional monitoring centers in the risk areas. New centers should be considered if necessary. Professionals should also work with the public and draw from their valuable experiences and consider development of lay monitoring and preparing a personal goal.
4. Establish two regional groups. One group, Beijing–Tianjin–Tangshan–Zhangjiakou, headed by the SSB, should include EQ offices in Beijing, Tianjin, and Hebei, the Geophysics Institute, the Seismic Geology Group, and the Seismic Measurement Team. The second, the Bohai Group, should comprise of the Liaoning, Tianjin, and Shandong EQ offices, headed by the Liaoning office. These two groups should cooperate closely and share all monitoring data in a timely manner.

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Chapter 30

Altruism in Chinese Emergency Management

The Case of Wenchuan Earthquake

King W. Chow

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Psychological factors deserve due research attention in crisis and emergency management (Doepel, 1991; Pauchant, 1993). This chapter focuses on one such factor—altruism—which has been reflected on in Western emergency management (see, e.g., Shariff, 2002). In the deadly earthquake that took place in Wenchuan, Sichuan, on May 12, 2008 (hereafter Wenchuan Earthquake), many Chinese state cadres and citizens acted altruistically. Even a 10-year-old boy had risked his own life to pull four classmates from the wrecks, at the absence of peer influence and adult supervision. These altruistic acts are at odds with the current literature (Caulfield, 2006; Chan and Chow, 2007; Chow and Luo, 2007), which indicates that many Chinese state cadres and citizens are self-serving. The Wenchuan Earthquake altruistic phenomenon has compelled scholars to think hard on the implications of altruism for Chinese emergency management in particular and public administration generally. To enhance a better understanding of this phenomenon, this author had organized a field research in the quake-hit area. The purpose was to shed light on altruism in Chinese emergency management and public administration.

30.1 Altruism and Pragmatism in Chinese Public Administration

Research (Chow and Luo, 2007) has indicated that while pragmatism has been in prevalence in China since the Communist Party of China (CPC), under the leadership of Deng Xiaoping, launched a major economic reform three decades ago, altruism was a key factor contributing to the establishment of the People's Republic of China.

In brief, from the 1920s to the mid-1950s, CPC was in a strategizing era striving to proactively and strategically create conditions for constructing a new world for Chinese people to live with security and dignity and in decency. In 1921, when CPC was formed in Shanghai to initiate proletarian revolution, China was an agricultural society. Support to CPC was minimal, particularly after the Nationalist regime brutally suppressed the party in 1927. It was Mao Zedong who first advocated a strategic approach to launch a poor people revolution, rather than the proletarian revolution, by establishing revolutionary bases in mountain areas with peasants serving in the red army. His strategy was proven effective—CPC successfully established the Provisional Soviet Government in Jiangxi and a red army with more than 80,000 soldiers. With his removal from the leadership post in the early 1930s, followed by the Nationalist regime's military victory, CPC was forced out, launching its 25,000 mile Long March in 1934. Downsized from 80,000 plus to around 30,000 soldiers in an ambush in Hunan with the likelihood warned by Mao but disregarded by the party leadership, total dissatisfaction among stakeholders pushed Mao back to power.

Under Mao's leadership, CPC adopted all available strategies that one could imagine, such as the arrangement of having thousands of soldiers engaged in farming to solve food-supply problem, to search for ways to build the capacity of CPC during the Sino-Japanese war. Eventually, wide popular support to CPC was one major factor making it possible for CPC with only one million plus soldiers to defeat Chiang Kei Shek's four million strong military force, armed with American advanced equipments. One example is illustrative. The central China great battle in late 1948 involved 600,000 CPC's liberation army and 800,000 well-equipped nationalist soldiers. Behind the scene, more than two million peasants had participated in auxiliary work, making it possible for the liberation army to concentrate on combats, crushing its opponents in merely three months. "The great battle was won by having one million wood carts operated by peasants" was still well remembered by the elderly, as they are proud of the people's direct involvement in the liberation war (see Uhalley [1988] for a good account of the history of CPC). This author did a field research study in 2005 in Baizhong, Sichuan, the area where the red army had established its revolutionary government in the 1930s. Interviews with informants familiar with the CPC development indicated that the altruistic factor was a prime factor leading to CPC's success in establishing the People's Republic. Researchers (e.g., Blecher, 2003; Butterfield, 1982; Ma, 1966) familiar with corruption and maladministration in contemporary China would find it interesting that CPC membership in the strategizing era could be a death warrant, as CPC members were often sent to accomplish the most dangerous missions. Altruism, however, had made CPC members strong and persistent, wishing that their actions could liberate the poor people in pain and agony and help create a better world for all.

The author's previous field research (Chow, 1991) revealed that cadres' style of work during 1949–1966 was distinctively different from that during 1966–1990. Before the Cultural Revolution (1966–1976), the organizational climate within the state administration was positive: many cadres, particularly leading cadres, did internalize the communist cause, and the overwhelming majority of cadres had internalized the values of altruism and professionalism, striving to serve the people and perform well. Internalization of the communist ideology, which defined

the scope and nature of the public service, had contributed to making cadres committed to the public service. By then, CPC members were not only vanguards of the proletariats but also models of advanced human growth and development, characterized by their commitment, fraternity, and altruism.

All this, however, changed starting in the mid-1960s. During the Cultural Revolution (1966–1976), radicals and opportunists, along with the mobs, stormed the state bureaucracy. As they practiced many dirty tricks to seize power and suppress opponents, they objectified a reality characterized by irresponsibility, extremism, corruption, and realpolitik. In such a context, one's survival depended very much on whom one knew, what power one had, and what tricks one could use to maintain good relationships with others. As such, Chinese state cadres and citizens became self-centered, concerned merely with protecting their own interests. Since then, most cadres had become present-oriented and self-interested, lacking commitment to serving the public. While there was still a minority committed to the communist cause, they might be suppressed by their leading cadres or might have alienated their colleagues, or they were overloaded due to their willingness to accept responsibilities. Regardless, they became isolated as the others had accepted the prevailing norms of self-serving and pragmatism. In short, a reified reality was constructed with cadres feeling vulnerable and lost. In interpreting situations, they merely considered how egoistic value could be upheld, while altruism and integrity, as well as the motto of serving the people, were merely words to be uttered to ensure job security.

To end the political chaos and economic stagnation, CPC under Deng Xiaoping's leadership had initiated various reforms since 1978, including the introduction of a mixed economy and the opening of China to the outside world. The reforms triggered an economic boom, raising the standard of living of the majority of China's population and, at the same time, increasing inequalities and decreasing social coherence (Goldman and MacFarquhar, 1999). Economic progress has not helped change the bureaucracy; in fact, bureaucratic problems still prevailed, particularly in the form of *reform corruption* as Ma (1996) has noted.

Meanwhile, state cadres, caught in the streams of development, are in the process of transformation (Chan and Chow, 2007). Frequent travelers to such developed areas as Shanghai and Guangzhou would note that the standard of living has been rising while consumer behavior and lifestyle are assimilating the Western model. How developed these areas may be, reports about how government officials have unduly exercised public authority, compelling the public to stage protests, are still plentiful. While e-government has been on the agenda, secrecy remains a norm and thus documentation of how policies are actually made is still absent. Public hearing, imported from the West, is becoming popular but is, in essence, window dressing. More important, challenges to the legitimacy of CPC are still prohibited—critics and democrats may speak of how to perfect the leadership of CPC, but casting any doubt on the desirability of the party's monopoly of public authority would backfire. The mass media, though becoming more marketized, remains an instrument of socialization advocating the party line and policies. Then, socially, people from all walks of life may criticize the malperformance of individual public agency or cadre, but they cannot blame the party or question its legitimacy. Thus, they would rather attend to their personal issues, such as making more money and enjoying life. All these indicate that while China is developing economically, she is not, politically.

In this pragmatic context, cadres do know well the name of the game—people's dictatorship under the leadership of CPC—and act accordingly in this context of monopoly of public authority. Corruption becomes epidemic due to unchecked absolute power vested in the bureaucracy; and rent-seeking is observable in every public entity, including schools, hospitals, and social security offices. It is therefore difficult to find exception in the responses from informants in the

author's study when they were asked which groups have benefited the most from the development of China in the past 20 years—state cadres! Cadres have in turn experienced subtle transformation, changing from vanguards of the proletariat dictatorship into a hybrid, using a different frame of reference—a composite of instrumental rationality, utilitarianism, and even public service motive—to decide on what they should do, now and in the future. They still monopolize both political and economic powers, exercising power like the old vanguards while living like capitalists and supporting the CPC regime, but for the purposes of maintaining their privileged status and protecting their power base.

Outright corrupt practices are socially and politically unacceptable, and cadres could be sacked if documented. But when cadres acquire the know-how in optimizing benefits from legitimate investment through the subtle, though illegitimate or unethical, use of formal power, they may soon undergo the same transformation as some cadres already did. Cadres' full-scale transformation into self-serving hybrid with monopoly of public authority is likely to have a fundamental effect on CPC's ruling of China. After all, at least from the chaos theorists' point of view (Farazmand, 2004; Overman, 1996), as Chan and Chow (2007) have warned, atomization of economic power, when blended with atomization of administrative power, may eventually trigger atomization of political power and, in turn, political chaos and institutional crisis.

30.2 Altruism in Wenchuan Earthquake

In the current pragmatic context, cadres' becoming self-serving hybrids is inevitable, generating salient political impact on the legitimacy of the CPC regime. The inevitability of transformation, however, is mediated by many factors, including altruism. There are signs, as highlighted by the Wenchuan Earthquake, that altruism still exists in China, though currently marginalized.

Wenchuan county is located in the mountain area of northwestern Sichuan, which is the largest province in western China in terms of vast territory and population. A deadly earthquake that measured at 7.6 on the Richter scale took place on May 12, 2008, at 2:28:01 p.m. The earthquake's epicenter was 80 km west-northwest of Chengdu, the capital of Sichuan. The focal depth of 19 km was recorded. Even such cities as Beijing and Shanghai, which are 1500 and 1700 km away, respectively, were affected—high rises swayed with the tremor. In less than a week, the China Seismological Bureau revised the magnitude of the earthquake from 7.6 to 8.0 on the Richter scale after its specialists carried out real-time and detailed measurements of the quake.

Lasting close to 2 minutes, the quake had seriously damaged buildings, bridges, and other public facilities in an area of more than 100,000 km². Around 15 million people were affected and approximately 5 million became homeless, and tens of thousands of people were instantly killed. Strong aftershocks, some exceeding magnitude 6, continued to hit the area even months after the main quake, causing new casualties and damage, with Beichuan, the county near Wenchuan, suffering the most, as it was repeatedly struck by strong aftershocks, with 80% of the buildings in the county collapsed. As of July 21, 2008, 69,197 persons were confirmed dead, including 68,636 in Sichuan province, and 374,176 injured, with 18,222 listed as missing. The casualty figures include 158 earthquake relief workers who were killed in landslides as they tried to repair roads. It was reported that the economic loss ran higher than US\$75 billion, making the earthquake one of the costliest natural disasters in Chinese history (http://en.wikipedia.org/wiki/2008_Sichuan_earthquake).

In less than 2 hours after the earthquake, Premier Wen Jiabao flew to Chengdu to oversee the rescue work. Under the instruction of President Hu Jintao, the Chengdu Military Area Command dispatched 50,000 troops and armed police to help with disaster relief work. As highways into the

quake-hit areas were seriously damaged, rescue teams could not arrive timely to discharge their duties. While helicopters were deployed for the delivery of food, water, and emergency aid and for the evacuation of the injured, local rescue and self-reliance were essential.

After the Wenchuan Earthquake took place, state cadres and residents in the earthquake areas acted to respond to needs created by the natural disaster. Meanwhile, many Chengdu residents acted as volunteers and undertook self-initiated earthquake relief actions, such as rushing to the affected areas to provide support or needed supplies, particularly clean water and medicine. Concerned watchers—almost all Chinese citizens—were deeply touched by the eventual reports about the heroic acts of many cadres and teachers who died in the course of rescue or protection of other people. They were also touched by the rescue and supporting work performed by cadres and citizens from all walks of life, in addition to the supports given by many people outside the affected areas. But did cadres and volunteers actually act altruistically as reported? And what are the implications of observing their altruistic acts?

In view of the significance of altruism in the strategizing era as discussed earlier, this author had organized research assistants to go to Deyang City, Dujiangyan City, Mianyang City, and Pengzhou City of Chengdu City between August and October 2008 to interview cadres and volunteers involved in the Wenchuan Earthquake relief work. Convenient sampling was used. The researchers interviewed a total of 37 persons, including 16 state cadres, 9 teachers, 2 reporters, and 10 volunteers from all walks of life. Their age ranged from 18 to 50 years old, with the mean being 30. A total of 23 informants were willing to report their education level, and the overwhelming majority had received high school education, with 15 having had college education (7 of them were holders of MA degree). The semistructured interviews lasted, on average, for 2 hours. The central questions revolved around the issues about their relief work and the reasons for undertaking their actions.

As an exploratory study, this research did not use the rigorous methods as suggested in the field (see, e.g., Gill and Meier, 2000). It also tried to avoid the use of the so-called coherent qualitative research (Dodge et al., 2005) to give a complete account of the narratives of the informants. The rationale was that the researchers recognized the possible existence of *multiplicity of possible accounts of experience*, which researchers could not capture and record in their studies (Frosh, 2007). For example, none of the informants had expressed grievance toward the government in raising crisis preparedness among the residents in the potentially hazardous areas, as governments in the West have done (Fowler et al., 2007). Nevertheless, the findings do shed light on the wellspring of altruistic citizenship. Further, the findings provide a basis for asking further serious questions.

The principal findings include the following. First, state cadre informants indicated that they were involved in all sorts of relief work as assigned by their supervising officers, while volunteers did supporting work as assigned by cadres in charge.

Second, the main reason given by the informants for cadres to participate was the fulfillment of official responsibility and, for volunteers, the urge to help the needy. Their elaboration, however, indicated that most of the cadres interviewed also had a strong urge to help, to the extent that they would serve as volunteers if they were not officially assigned to provide specific relief.

Third, some informants had admitted that they found it fearful after the relief work but they did not think of the danger during the relief process as they only thought of helping people. They also indicated that they did not expect return of favor or receipt of award for their relief acts, as their only concern was how to help the needy. This finding serves as a basis to challenge the proposition in the field that altruism could be considered an act of reciprocity in repeated situations, as advocated in one stream of study of altruism (Fehr and Fischbacher, 2003).

Fourth, most informants suggested that they found their relief service performed honorable and self-gratifying, even though they had risked their life in the process. Some also suggested that

the peer approval in the process reinforced their intention to help the needy, that supportive attitude at the spot had also reinforced their action, and that group actions in relief work had created mutual support and reinforcement. Even though critical reflexivity was not a driving force when they acted altruistically, they did eventually think of their own values and relational needs with other people and did not regret what they had done, thus meeting the expectations about reflexive practitioners (Cunliffe, 2004). This means that these altruistic beings were at a rather mature stage of personal growth and development (Pfaffenberger, 2007).

Fifth, some informants had had their family members suffer or die in the disaster but had insisted that they remain at their post to perform. Their main rationale was that it was their duty (either as a state cadre or as a full-fledged citizen) to remain on the scene to do what they were expected to do. This finding suggests that altruists do make ethical decisions, even in times of crisis, as research has suggested (Christensen and Kohls, 2003).

Sixth, the author had checked their educational backgrounds and could not find any indication that education played a role in promoting or reinforcing their sense of responsible administration or citizenship. Rather, they just had the gut feeling of the need to fulfill their responsibility as a fellow citizen to help others. This finding implies that the CPC leadership should not count on formal education as a means to nurture citizenship and altruistic tendency. Instead, policy research should be conducted to find out, through a holistic perspective, what factors promote altruism; so, should empirical studies be pursued to infer cadre altruistic capability, which, as one form of capability from the resource-based view, is not readily observable (Dutta et al., 2005). Reference to the altruistic acts noted in the strategizing era and the prescription of the Alderfer's (1969) theory of existence, relatedness, and growth needs is likely to facilitate this needed policy research.

And seventh, a recent study (Lee et al., 2005) has suggested that "Sixty exemplary altruists (EA) ... showed a high sense of integrity and autonomy ... a strong parental attachment, and their parents served as lifelong models for them. It was also observed that many experienced psychological or financial difficulties in their early years. A high sense of moral responsibility and a sense of internalized social responsibility to help those who are experiencing difficulties were primary reinforcers and maintainers of these individuals' altruistic behavior" (pp. 146–147).

This study shows that some informants shared some common characteristics, while others did not. Given that the so-called exemplary altruists are publicized figures, while the informants of our studies are common people who have committed altruistic acts in emergency situations, the two cohorts may be different. Besides, the informants in this study could be considered individual cases within one single case of disaster relief, thus creating barriers for comparison (Flyvbjerg, 2004). Notwithstanding the important issues of generality and validity noted in the field (Adcock and Collier, 2001), the limited number of altruistic persons examined in these two studies deserve caution. Indeed, we may even suggest that both sets of findings are inconclusive.

30.3 Discussion

30.3.1 *Research and Policy Implications*

In sum, current research (Chan and Chow, 2007) has shown that many state cadres are becoming self-serving hybrids with monopoly of public authority. To stop these cadres' transformation,

policy and management practices must be made to promote altruism to counterstrike individualism and atomization of interests. The principal finding of this field research is that there are still altruistic cadres in the Chinese administrative world. The corresponding case of Lv Rizhou of the Shanxi Province (in Central China) is illustrative. His biography indicates that he was sacked in the 1990s—transferred to the policy study office of the provincial government of Shanxi, having no formal authority to accomplish anything that could impact the management and development of Shanxi. Believing that he was supposed to make a difference in China, he hung in there long enough to get the opportunity to serve as a mayor with *real* power to change the reality of mediocrity in Zhangzhi City. Once in power, he worked more than 15 hours/day on a continual basis, went to various municipal offices, towns, and villages to investigate, and undertook drastic actions to make the bureaucracy work. He did not hesitate in using his power in ways to accomplish his goals of turning things around even when his acts would alienate other cadres. He, being a CPC member, has internalized the altruistic values, latent when he was sacked and manifested when in power. Lu Rizhou is not alone. Such CPC leaders as President Hu Jintao and Premier Wen Jiabao have no record whatsoever that would point to their possible violation of any party code of ethics. Instead, their continuous introduction of public programs to mitigate social and economic maladies and their routines of years of dinning with workers or peasants in Chinese Lunar New Year festival, visiting mine workers underground, etc., all point to their genuine commitment to the interest of people.

In short, there are still altruistic cadres in the Chinese administrative world. One may wonder if the moral basis of Chinese public administration with Confucian teaching (Frederickson, 2002) might have nurtured altruism into an administrative heritage; others may doubt if altruism is really part of human nature (Fehr and Fischbacher, 2003; Hoffman, 1981). One may also wonder, “How could altruistic cadres hang in there long enough to get empowered to make a difference?” Somehow, there must be factors acting in concert to reinforce their ideological commitment and to give rise of these altruistic cadres to power, in addition to their peculiar types of strategies and tactics that they employ to ensure their survival and eventual empowerment. Further research is needed as the answer would shed light on the reforming of public bureaucracies in developing countries in ways that are not too drastic to induce outright rejection (Grindle, 2004), but sufficient to help create a critical mass of altruistic administrators to serve their citizenry.

In the case of China, more in-depth interviews, as well as longitudinal studies, would help, on the one hand, document the existence of a small group of state cadres who still subscribe to the communism ideology or have a genuine altruistic need to serve the citizenry and, on the other hand, furnish critical information about what factors drive these cadres to reinforce their public service motive and under what conditions they could rise to power. Further, when cadres and citizens could be altruistic, others could be egoistic and unethical, as thieves were arrested in the affected areas for stealing and as citizens were caught robbing relief supplies. Humanity is capable of doing good and evils (Diaz-Laplanche, 2007). Addressing these questions would help make our speculation about the future changes in China more educational, for whether altruistic or egoistic cadres will be in charge would make drastic differences in not only how public organizations are to be managed but also how China will be governed.

30.3.2 Research Implications for Breakthrough

More importantly, the preliminary findings reported here indicated that altruistic cadres and volunteers had a strong urge to help others, even risking their lives in the process. These findings render the current interpretation of altruism as being an act of reciprocity (Fehr and Fischbacher, 2003) invalid.

Interestingly, even the altruistic informants could not give a satisfactory account of their strong urge to help others. Their socioeconomic characteristics are so various that there is no obvious correlation among those factors and their altruistic need. One may suggest that it is actually their human nature (Hoffman, 1981). Religion could play an important role in accounting for behavior (Houston and Cartwright, 2007). The informants' religion, however, was also not a factor, as most did not claim to have religion, particularly those who were CPC members. Then, in contrast, many people in the earthquake areas did not show their urge to help others. Rather, they waited for help or attended to their family. Why then are some altruistic while others are not?

This leads us to consider whether or not the traditional approach to understanding human behavior and inner forces is appropriate. For centuries, we have employed the Newtonian approach to generate usable knowledge. This approach considers that we live in the physical world in which all matters (organic or inorganic), including human bodies, are composed of molecules—we the human beings can therefore be called molecule beings. The approach also dictates that we human beings act and interact among ourselves to create a social world, through objectification and then reification. In this social world, regularities and predictability of social behaviors can be prescribed and enhanced, by persuasion, by manipulation, and/or by force. Members of this social world live, grow, experience, and leave footprints. We human beings can therefore be called social beings.

This conventional approach directs our attention to the essence and change of substance in the overlapping zone of the physical world and the social world. With social scientific knowledge, we also know that, if triggered by contextual forces, we might act as almost all of us would—like an animal. And with social scientific knowledge, we all know that we, as animals, are born to die and thus we need to take care of ourselves and enjoy life and have a good time while we still can. This knowledge base helps reinforce the social world that builds on individualism best reflected by the seemingly reasonable motto—*after all, if you do not take care of your own interests, who will?* Given that it is perfectly all right in this social world to serve self-interest, people are becoming *substantively rational*—doing whatever is necessary to protect themselves and their loved ones, regardless of the price to be paid by the other individuals, groups, and/or society. This is individual rationality in practice and in prevalence.

When individual rationality overshadows collective rationality, predicaments become inevitable, while crimes, abusive behavior, hypocrisy, etc., are turned into natural components of the reified social reality—in which people feel vulnerable but have to accept the current dog-eat-dog social world. One should not blame knowledge, which compels us to face the reality we are in. In the age of abundance of knowledge, it is just inevitable that we would know enough about human nature, essence, internal needs, and behavioral tendencies, to the extent that we finally recognize that we are all trapped in this social world. No matter what we choose to do, we are under its manipulation. Acting in concert with our internal physiological and psychological forces are the sociological forces, which also induce social–psychological impacts on us, continually shaping and reshaping the patterns and the meaning of our lives.

So, in sum, we are locked in the overlapping zone of the molecule world and the social world. In this zone, we learn to act, think, and treasure in ways other people have prescribed. We, the human beings made up of molecules, are raised to observe social rules and have our values and even destiny defined by external social forces.

Living in this overlapping zone of the molecule world and the social world, we inevitably realize that once we are born, death is awaiting. No matter how we try to define and redefine the meaning and value of life, we are bounded by the limited time span—typically less than

80 years. Then, our molecular body will decay and we have to die, leaving behind all that we have struggled to enhance, build, and maintain—fame, glory, power, wealth, love, and the like.

Given the threats of death and losing all that we have, we just have to *live* as we live—doing whatever we want to do or feel like doing—for we are not too sure if there is a tomorrow. With such an understanding, the question about how to live a meaningful life may seem dubious. Yet, the question is hardly dubious. What if we are more than social beings and molecule beings? What if we are, in essence, an aggregate of molecule beings, social beings, and particle beings—that is, we do have a soul, which is composed of particles and such a particle being could reincarnate—and we, in fact, live in the interlocking zone of the molecule world, the social world, and the particle world?

In the light of the discussion in the preceding paragraphs, it should now be obvious that we human beings might need to employ a new paradigmatic approach to understand the essence of the worlds we live in. Underscoring the following points is imperative.

First, yes, indeed, we do live in the overlapping zone of the molecule world and the social world. In this zone, we learn to act, think, and treasure in ways other people have prescribed. But then, we also operate in the interlocking zone of the molecule, particle, and social worlds. The particle self, called soul, will reincarnate. Thus, we live, not one life, but multi-lives.

Second, without the conception of the interlocking zone of the molecule, particle, and social worlds, we may very well accept a belief that living in this overlapping zone of the molecule world and the social world, we are born to die, leaving behind all that we have struggled to enhance, build, and maintain—fame, glory, power, wealth, love, and the like. Given the threats of death and losing all we have, we just have to *live* as we live. With such an understanding, the question about how to live a meaningful life may seem dubious.

With the conception of the interlocking zone, the question is hardly dubious. If we are in essence an aggregate of particle being, molecule being, and social being, we would realize that life as molecule and social beings is supposed to be an opportunity to enhance goodness in us, in turn, the enrichment of our soul. With this proposition, we should no longer be afraid of death, as we know where we will be after death and who would be there to take good care of us. We should only be concerned with to what degree and extent have we made good use of our time to live a meaningful life. Could all these be precisely what altruistic people are like and would act in time of crisis, willing to sacrifice themselves for others?

In addition to the two points earlier are also some important implications that can be drawn from the interlocking zone proposition: for example, respectful people are not those with knowledge, power, and/or wealth, but those who are kind and caring, who have a strong urge to help others, and who have a strong sense of responsibility in that they always strive to perform job and task in the most efficient and effective manner (and are committed to improving their knowledge, skill, and ability in order to better perform); in the interlocking zone, we need to have a new ideology about our goals to be pursued in this present life—to be altruistic, kind, and caring so that we would continuously grow and develop to become a fully grown person—and with the new ideology, we would be able to *choose the right thing to do and then do it right*.

The understanding earlier is based on an unconventional approach to account for the existence of altruistic beings. In the past, such an approach would be considered superstitious. In view of the rapid development of theories of new sciences in the disciplines of natural sciences, particularly quantum theory, the interlocking zone proposition could be a valid one pending empirical documentation. Development of empirical data collection methods for this purpose may eventually lead to revolution in the field without major opposition (Dryzek, 2006).

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Chapter 31

Crisis Management in Japan

Lessons from the Great Hanshin-Awaji Earthquake of 1995 and the Great East Japan Earthquake of 2011

Masaru Sakamoto

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31.1 Introduction

Generally, the issue of crisis management can be related to various emergency situations. Some emergencies are related to natural disasters, such as earthquake, tsunami, volcanic eruption, typhoon, tornado, torrential rain, and heavy snowfall. Other emergencies are related to man-made disasters such as nuclear accident, environmental pollution, fire, and food poisoning. Another type of emergency is related to the administrative crises involving such things as financial failure, corruption, privacy information leak, or social crises involving population outflow and unemployment.

In recent years, Japan has experienced a number of tragic disasters. These include the Hokkaido-Nansei-Oki Earthquake in July 1993, the Great Hanshin-Awaji Earthquake in January 1995, the sarin nerve gas attack on the Tokyo subway system in March 1995, the massive outbreak of food poisoning from 0 to 157 *Escherichia coli* bacteria in May 1996, the Tokaimura nuclear accident at a uranium processing plant in September 1999, and the Great East Japan Earthquake in March 2011. The Great East Japan Earthquake was the fourth largest in the last 100 years (see Table 31.1).

Due to the geographical, geological, and meteorological conditions, Japan has experienced various kinds of natural disasters, including earthquake, tsunami, volcanic eruption, typhoon, tornado, torrential rain, and heavy snowfall. Japan's islands are located at the point where four of the earth's tectonic plates—the Eurasian and North American continental plates and the Pacific and Philippine Sea oceanic plates—meet (see Figure 31.1). This is one of the reasons why earthquakes so frequently occur in Japan (see Table 31.2).

The Great Hanshin-Awaji Earthquake instilled in Japanese a sense of danger of earthquake, and this time the Great East Japan Earthquake has brought another terrible memory to the Japanese. The experience of these disasters has given us an opportunity to enhance our awareness of the need for emergency preparedness and crisis management. Although the term *crisis management* has become popular in Japan, its significance has not necessarily been well understood, even in the case of the accident at the Fukushima Daiichi (No.1) nuclear power plant.

Focusing on the Great Hanshin-Awaji Earthquake of 1995 and the Great East Japan Earthquake of 2011, this chapter describes the following three points: (1) the conditions and problems of Japan's crisis management system; (2) the recent developments in the reform of Japan's crisis management system; and (3) the requirements for a safe and sustainable society in the post-Fukushima nuclear accident.

Table 31.1 World's Great Earthquakes

<i>Magnitude</i>	<i>Year</i>	<i>Place</i>
M 9.5	1960	Chile
M 9.2	1964	Alaska
M 9.1	2004	Sumatra
M 9.0	1952	Kamchatka
M 9.0	2011	East Japan

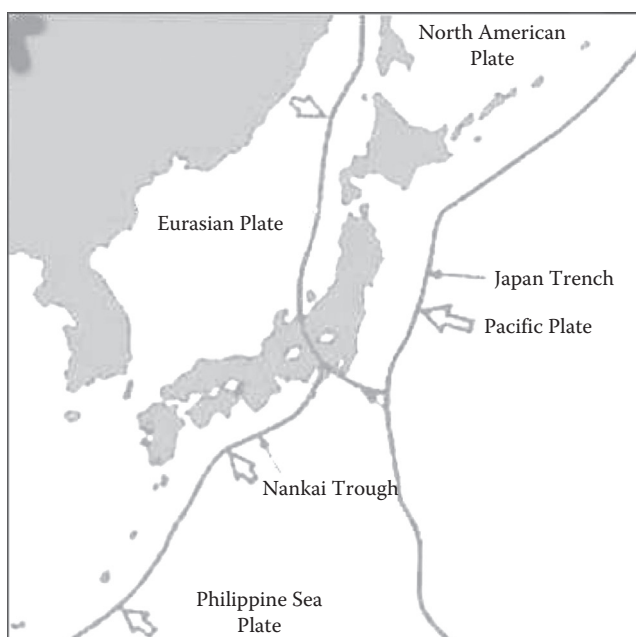


Figure 31.1 Location map of four different plates.

Table 31.2 Japan's Major Earthquakes since the Meiji Era (1891–2011)

Type of Earthquake	Date	Magnitude	Dead	Injured	Fully Collapsed	Burnt
<i>Ocean trench earthquake</i>						
Meiji-Sanriku Coast Earthquake	6/15/1896	8.2	21,959	3,899	7,957	
Great Kanto Earthquake	9/1/1923	7.9	105,385	103,733	79,733	212,363
Showa-Sanriku Coast Earthquake	3/3/1933	8.1	3,008	1,092	2,346	216
Great East Japan Earthquake	3/11/2011	9.0	16,140 (except 3,123 missing)	6,112	128,582	286
<i>Inland epicentral earthquake</i>						
Nobi Earthquake	10/28/1891	8.0	7,273	17,175	222,501	
Fukui Earthquake	6/28/1948	7.1	3,769	22,203	36,184	3,851
Great Hanshin-Awaji Earthquake	1/17/1995	7.3	6,434 (except three missing)	43,792	104,906	7,036

Source: Data derived from HP major earthquakes statistics of Japan's Meteorological Agency and Fire and Disaster Management Agency.

31.2 Great Hanshin-Awaji Earthquake of 1995

31.2.1 Overview of the Great Hanshin-Awaji Earthquake

31.2.1.1 Inland Epicentral-Type Earthquake

At 5:46 a.m. on January 17, 1995, the Great Hanshin-Awaji Earthquake hit Kobe and its surrounding areas, including Nishinomiya, Ashiya, Takarazuka, Awajishima Island, Amagasaki, Itami, Akashi, Kawanishi, Kakogawa, Takasago, Miki, and parts of Osaka and Kyoto prefectures (see Figures 31.1 and 31.2). On January 21, Japan's Meteorological Agency (JMA) upgraded the intensities of the quake at Sannomiya (business center of Kobe) and northern Awajishima Island to 7 on the Japanese scale (corresponding to at least 11 on the modified Mercalli scale), making these the highest intensities ever experienced in Japan.

According to Japan's Meteorological Agency, the epicenter (7.2 on the Richter scale) was located just below Awajishima Island; the quake was caused by a movement of a fault that runs below Awajishima Island and Kobe. Among its unique characteristics, the vertical and horizontal shaking occurred simultaneously. The quake caught the residents of the Kansai region off guard and killed more than 6400, including those who died from shock after the calamity. Unfortunately, almost half of the victims were aged 60 or older, and the majority were either crushed or suffocated to death in collapsing buildings—usually their homes. The quake caused especially serious damage to old, flimsy wooden houses with heavy tiled roofs—the sort of structures least likely to withstand a major tremor.

Before the earthquake, it was assumed that in the Hanshin-Awaji areas there would be no earthquake. In addition, the master plans for disaster prevention in Kobe and other municipalities

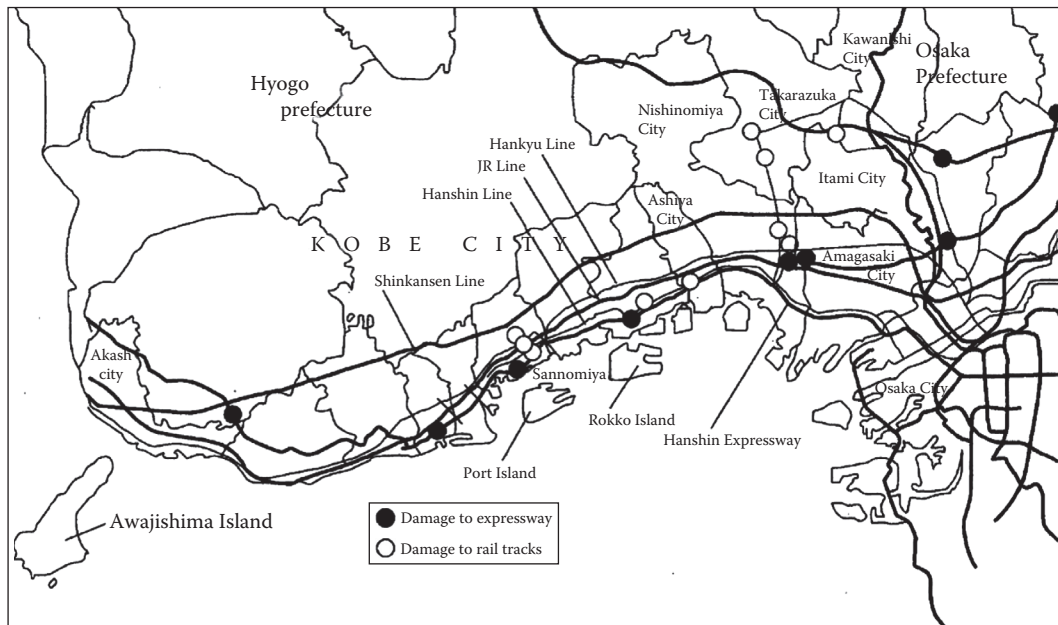


Figure 31.2 Location map of damage to transport lines in Kobe and its surrounding areas affected by the 1995 earthquake.

were designed to prevent only magnitude 5 earthquakes, not those of magnitude 6 and higher. Therefore, preparations for a large-scale vertical-thrust earthquake in major urban areas were undeniably inadequate.

31.2.1.2 Comparison with the Great Kanto Earthquake of 1923

The Great Hanshin-Awaji Earthquake was the inland epicentral-type great earthquake, while the Great Kanto Earthquake was the ocean trench-type earthquake. According to the report of the then Ministry of Construction, the gravity measurement registered in the temblor in Kobe was more than twice that of the Great Kanto Earthquake of 1923. In terms of magnitude on the Richter scale, the January 17 quake was a high 833 gal in Chuo Ku (ward), Kobe, compared with an estimated 300–400 gal in the case of hardest-hit areas in the 1923 quake. The gal is a unit of acceleration equivalent to 1 cm/s².

As Table 31.2 shows, the Great Kanto Earthquake of 1923 caused destructive damage to Tokyo and its surrounding areas (as for the location, see Figure 31.2). As this quake occurred just around noon, when meals were being prepared, the majority of the victims were killed not by the collapsing buildings themselves but rather by the ensuing fires. Since, at that time, most of the houses were built of wood, those that burned down completely numbered 212,353; the victims numbered 105,385 dead, and 103,733 injured. The other damages were 79,733 fully collapsed structures, 79,272 half-collapsed structures, and 130 washed away by tsunami. The total amount of damage was estimated at about 5.5638 billion yen (Table 31.2 and Morita Takamura (2004), p. 34).

Despite the fact that the death toll from the Hanshin-Awaji Earthquake was the worse in Japan's postwar history (see Table 31.2), the effect would have been considerably more horrific if the tremors had occurred later in the day. At 5:46 a.m., not many automobiles were on the roads, and the first Shinkansen (bullet train) of the day had been set to start running at 6 a.m.

Had the quake occurred a few hours later, when the trains were running (with an average capacity of about 1600 passengers), the casualty rate would have been much higher.

Further, because many people were still asleep and most of those who were awake had yet to begin preparing meals on that fateful morning of January 17, the number of heating and cooking fires lit at that time was considerably lower than what would have been the case if the quake had struck an hour or even half an hour later.

In addition, it was a blessing that the quake occurred on Tuesday, after three consecutive holidays, as all cabinet ministers were in Tokyo and they were able to attend a cabinet meeting to discuss emergency measures. However, the cabinet failed to take quick and appropriate action in the wake of the earthquake, as shown later.

31.2.2 Damages in Kobe and Its Surrounding Areas

The Great Hanshin-Awaji Earthquake has taught us many lessons. It exposed the wretched fragility of highly advanced urban infrastructures, and its occurrence highlighted the inadequacies of lifesaving efforts: highways were blocked by rubble and traffic, firefighters were incapacitated by the cutoff of water pipes, and rescue teams had no equipment to remove debris to save those buried underneath. While recent buildings built according to the latest codes appeared to have withstood the impact, a large number of reinforced concrete structures were completely destroyed. The earthquake caused especially destructive damage to Kobe.

According to the data confirmed by the Fire and Disaster Management Agency on May 19, 2006, damages in Hyogo prefecture consisting of Kobe and other municipalities were as follows (population 1995 census).

31.2.2.1 Human Toll and Damage to Housing

The toll in Kobe City (population 1,423,792) was 4,564 dead and 14,678 injured. Damage to buildings was 61,800 fully collapsed, 51,125 buildings partially collapsed, 6,975 completely burned down, and 413 partially burned. Of those who died, 58% were 60 years old or older. Many people died of crush injuries or suffocation (73%) or were found injured under the ruins. The damage to the surrounding cities was as follows (see Figure 31.1).

Nishinomiya City (population 390,389): 1,126 dead, 6,386 injured, 20,667 fully collapsed buildings, 14,597 partially collapsed, 50 completely burned, and 2 partially burned.

Ashiya City (population 75,032): 443 dead, 3,175 injured, 3,915 fully collapsed buildings, 3,571 partially collapsed, 11 completely burned, and 1 partially burned.

Takarazuka City (population 202,544): 117 dead, 2,201 injured, 3,559 fully collapsed buildings, 9,313 partially collapsed, and 2 completely burned.

Awajishima Island (population 162,738): 62 dead, 1,119 injured, 3,460 fully collapsed buildings, 5,323 partially collapsed, 1 completely burned, and 1 partially burned.

Amagasaki City (population 488,586): 49 dead, 7,145 injured, 5,688 fully collapsed buildings, 36,002 partially collapsed, and 8 completely burned.

Itami City (population 188,431): 22 dead, 2,716 injured, 1,395 fully collapsed buildings, 7,499 partially collapsed, and 1 completely burned.

Akashi City (population: 287,606): 11 dead, 1,884 injured, 2,941 fully collapsed buildings, and 6,673 partially collapsed.

Kawanishi City (population 144,539): 4 dead, 551 injured, 554 fully collapsed buildings, and 2,728 partially collapsed.

Kakogawa City (population 260,567): 2 dead, 15 injured, and 13 partially collapsed buildings.

Takasago City (population 97,632): 1 dead, 8 injured, and 1 partially collapsed building.

Miki City (population 86,562): 1 dead, 19 injured, 25 fully collapsed buildings, and 94 partially collapsed buildings.

Hyogo prefecture (population 5,401,877): 6,402 dead (3,680 female, 2,713 male, 9 unknown), 3 missing, 40,092 injured, 104,004 fully collapsed buildings, 136,952 partially collapsed, 6,147 completely burned, and 64 partially burned.

Osaka prefecture (population 8,797,268): 31 dead, 3,589 injured, 895 fully collapsed buildings, 7,232 partially collapsed, 1 completely burned, and 5 partially burned.

Kyoto prefecture (population 2,629,592): 1 dead, 49 injured, 3 fully collapsed buildings, and 6 partially collapsed.

The total was 6,434 dead, 3 missing, 43,792 injured, 104,906 fully collapsed buildings, 144,274 partially collapsed, 7,036 completely burned, and 429 partially burned. The total cost of the damage was estimated to about 9.9268 trillion yen in the case of Hyogo prefecture, about 288 billion yen in the case of Osaka prefecture, and 2.7 billion yen in the case of Kyoto prefecture. Lifeline facilities were severely damaged over large areas. Because of the fierce vibrations, which lasted a mere 20 s, 900,000 households were left without power, 850,000 households were without gas, and water supply cuts affected about 2.5 million people. In Kobe City, 222,127 evacuees

were living in shelters as of January 18, 1995, and 236,899 persons were using shelter services on January 24, 1995 (peak).

The myth of Japan as a safe country, which had been built up over the 50 years since World War II, had collapsed.

31.2.2.2 Damage to Infrastructure

Road and railway networks were cut into pieces with the collapse of bridge girders supporting the Hanshin expressways, the main artery connecting Osaka and Kobe, as well as those of the JR-Sanyo Shinkansen (see Figure 31.1). Traffic was interrupted due to sinking ground, cracks, and collapsed buildings. The access to Port Island and Rokko Island—these are reclamation islands—was interrupted. The main roads in the harbor area were cut off. Almost all container berths and wharves were unusable. Liquefactions of land occurred throughout the bayside area.

Many important public facilities, including the city hall and some hospitals, were either damaged or collapsed entirely, and 80% of schools were damaged. Museums, the central library's older buildings, the Port Island sports center, sake breweries, and the Ijinkan (historic foreign residences) were also severely damaged.

About one-third of the parks were damaged (collapsed buildings, cracks, etc.), and 110 sections of graded rivers and 23 sections of regular rivers were damaged; 162 places needed reinforcement immediately after the earthquake. Furthermore, electricity, gas, and water supplies were cut off over an extensive area, and telephone lines were interrupted, causing major chaos in the affected area.

31.2.2.3 Damage to Business and Economy

Many of the large manufacturers in Kobe suffered damage to their main factories, and their production lines were interrupted.

About 80% of the shoe factories were damaged and 7 of the 31 sake breweries were seriously damaged. One-third of Kobe's shopping districts and half of the markets were heavily damaged. Many facilities used for tourism, accommodations, and conventions were damaged, in addition to many harbors for fishing vessels, farms, and other agricultural facilities.

The economy in Kobe City decreased because companies shifted from Kobe or reduced their production. Many container cargoes were shifted to other ports due to the severe damage to Kobe port. The interruption of Hanshin expressways has detrimentally affected not only Kobe's economy but also Japan's economy as a whole. Total damage was approximately 7 trillion yen.

31.2.3 Recovery and Reconstruction in Kobe

31.2.3.1 Infrastructure Recovery

As for the railway and road networks (see Figure 31.1), the JR line recovered most rapidly. The JR Shinkansen line between Shin-Osaka and Himeji was out of service, but full service resumed in April 1995 so that Kobe and Osaka were directly connected. The Hankyu private railway line's full service connecting Kobe with Osaka and Kyoto resumed on June 12, 1995. The Sanyo private railway line's full service connecting Kobe with Akashi and Himeji resumed on June 18, 1995. The Hanshin private railway line's full service connecting Kobe with Osaka resumed on June 26, 1995. Operation of the entire municipal subway system resumed on February 16, 1995, with some stations remaining closed. Full service resumed on March 31, 1995. The train connecting Port

Island to the mainland was fully restored on July 31, 1995, and the train connecting Rokko Island to the mainland was fully restored on August 23, 1995. All of the municipal buses (73 routes) resumed on June 22, 1995.

The Kobe route of Hanshin expressways connecting Kobe and Osaka was opened in October 1996. Its Wangan route, running along the bay area between Osaka and east side of Kobe, was fully reopened on September 1, 1995. The harbor highway connecting Port Island with Rokko Island was fully reopened in July 1996. All lanes of the Kobe Oohashi, connecting Port Island with the mainland, reopened in July 1996. Rokko Oohashi connecting Rokko Island with the mainland reopened on September 28, 1995.

31.2.3.2 Housing Reconstruction

Housing started in Hyogo prefecture in fiscal 1996 and totaled up to 125,623. Of this figure, 100,738 were in the 20 municipalities that were devastated by the quake. In case of Kobe, 33,823 temporary shelters were newly built (29,178 in Kobe, 3,168 outside of Kobe; 1,477 units of public housing are also being used as temporary shelters).

The Kobe City government has created a *Three Year Plan for Housing Reconstruction after the Earthquake*, and 72,000 houses were built after the quake. A total of 45,000 were built by the public sector and 27,000 by the private sector. In total, 6,000 units of public housing for the quake victims were built, and 1,500 units of public housing, damaged by the quake, were rebuilt.

At the end of 1996, 45 local conferences for Urban Land Readjustment Projects had been established, and 11 local conferences for Urban Redevelopment Projects had been established. The redevelopment has been proceeding at a steady pace in 11 designated districts, although a rezoning plan had not been finalized for Moriminami in Higashi-Nada Ku (ward) until October 1999.

31.2.3.3 Support for Volunteer Activities

During the earthquake, over 1.20 million volunteers conducted a variety of relief activities in evacuation shelters. As a result of their invaluable help during the quake, 1995 is called the original year of volunteer activity in Japan. During the earthquake, volunteer activities with specific targets and skills were especially evaluated. Therefore, it is essential to systematize volunteering in disasters and to create a structure to coordinate volunteer activities.

In Kobe City, a volunteer center was established for each ward council of social welfare since 1995 to support volunteer activities. In 1996, the Hanshin-Awaji Earthquake Reconstruction Fund started to provide subsidies to volunteers who assisted the victims with their self-support activities. The Fureai (Interaction) centers were established at 236 places, supported by the central government. The purpose was to help to form communities in the temporary housing areas and to use the centers as bases for volunteer activities. A computer network was formed in 1996 to connect the city volunteer centers and ward volunteer centers to reinforce coordination work. Registered volunteers were covered by the insurance scheme.

As a lesson, the affected local governments must take a leadership role in establishing a system for registering and dispatching disaster relief volunteers with specialized skills.

31.2.3.4 Economic Vitalization

As for the situation in industries, large manufacturing companies have been restored almost completely, but functions have decreased. However, shoe manufacturing (a key local industry) had

achieved only a 60% recovery as of October 1997, while department stores in downtown Kobe were fighting an uphill battle, with their proceeds hovering just above 80% of pre-earthquake figures.

Some 90% of Kobe's hotels and sightseeing facilities had reopened by the end of March 1996, but the number of tourists visiting Kobe reached only 60% of the pre-earthquake level. In May and June 1997, Kobe hotels enjoyed a combined room occupancy rate greater than before January 1995. In order to support local businesses and secure enough employment, the city government put several projects into effect, such as special financing (139.3 billion yen in total). As for the port facilities, 93 out of 170 berths were available as of May 1996. Container berths were used 24 h a day as a temporary measure. Of 201 shipping routes, 160 were reopened as of May 1, 1996. 82.3% of container cargo and 89.5% of the number of container ships were back in service as of April 1996.

31.2.4 Government's Responses to Earthquake

31.2.4.1 Initial Responses of Government Leaders

The government leaders' initial responses to the quake were very slow, while local governments fell into chaos, with many officials themselves becoming victims. In an interview dated January 25, 1996, the then Prime Minister Tomiichi Murayama was asked, "What did you do after you received the first reports on the quake?" He replied as follows:

"I learned of the quake on the 6 a.m. TV news. The newscaster said the quake's intensity was 6 on the Japanese scale of 7 in Kyoto, but said nothing about Kobe. Kobe was so severely damaged that no reports were reaching TV stations.... Then, at around 7:30 a.m., my secretary called me and said damage was likely to be widespread. So I decided to go to my office earlier than usual." (Yomiuri Shinbun, January 25, 1996) The arrival time of the prime minister to his office was about 8:30 a.m.

It was an incredible surprise that the Prime Minister's Office (Kantei) not only received initial information about the temblor from TV broadcasts but also that he had to rely on such sources in his initial effort to gauge the scale of the disaster.

Meanwhile, the governor of Hyogo prefecture, comprising Kobe and its surrounding areas, was also slow in compiling information. The governor arrived at his office at 8:20 a.m. by car, but 2½ h had passed since the quake. Although he tried to take the necessary emergency measures in order to prevent the disaster from worsening, it was too late to seek help from the Self-Defense Forces (SDF). Unfortunately, he did not get enough information to seek help from the SDF until 10 a.m. In relation to the initial response of the mayors, the arrival time to their offices ranged between 6:35 a.m. (mayor of Kobe City) and 10:30 a.m. (mayor of Nishinomiya City). The differences were due to their varying knowledge of the crisis.

31.2.4.2 Responses of Administrative Organizations

Despite the differences in the initial response of the chief executives, the administrative organizations in the areas affected by the quake managed to respond to the emergencies. The recent survey research for the section chiefs and upper-level officials in affected areas (Hyogo prefectural government, Kobe municipal government, and another 9 cities and 10 towns) suggests the conditions of the organizational responses of each government to the emergencies.

Table 31.3 shows what kinds of jobs were created during the 7 days after the quake, while Table 31.4 shows the degree of the similarities between disaster-related jobs and regular jobs.

Table 31.3 Jobs Created by Officials in the 7 Days after the Quake

	<i>Hyogo Prefecture</i>	<i>Kobe</i>	<i>Cities</i>	<i>Towns</i>	<i>Total</i>
Same as before the quake	2.9	0.8	1.3	10.9	2.3
Same, but job quantity increased	2.2	6.3	4.4	8.8	5.1
Changed to the disaster-related jobs	46.7	65.0	42.7	16.3	45.7
Added disaster-related jobs to regular jobs	47.4	28.0	51.6	61.9	45.3

Source: Kume, I., *Kobe Hogaku*, 46(4), 687, 1987.

Table 31.4 Similarities between Disaster-Related Jobs and Regular Jobs

	<i>Hyogo Prefecture</i>	<i>Kobe</i>	<i>Cities</i>	<i>Towns</i>	<i>Total</i>
All are related jobs	36.2	34.6	22.5	19.0	26.9
Most are related jobs	35.4	23.8	27.1	28.4	27.2
Parts are related jobs	15.0	21.5	26.5	31.0	24.4
None are related jobs	13.4	20.1	23.8	21.6	21.5

Source: Kume, I., *Kobe Hogaku*, 46(4), 688, 1997.

Referring to the organization theory proposed by H. Simon and J. March, the study points out that the responses of the administrative organizations at affected local governments to emergencies tend to depend on the *coordination by feedback* in addition to the *coordination by disaster prevention plan*, but the degree of their dependence is different from the levels of governments (see Kume 1997: Tables 31.3 and 31.4).

According to Table 31.3, the ratio of disaster-related jobs created through the mobilization of the employees from the existing organizations tended to increase at rising levels of government. According to Table 31.4, the ratio of the job similarities to the regular jobs in ordinary times also tended to increase at rising levels of government. These tables show that the larger the administrative organizations, such as prefecture and city, compared to the smaller ones, such as the town, the better they were able to respond to the emergencies through coordination of existing personnel resources. Although the disaster prevention plans at the local level were not able to respond to emergencies effectively, the administrative organizations of the affected local governments attempted to respond to the emergencies through coordination by feedback.

Despite the organizational responses to the emergencies at the local level, the people living in Japan have been forced to recognize that the nation does not have a reliable crisis management system.

31.2.5 Crisis Management System in the Great Hanshin-Awaji Earthquake of 1995

The Great Hanshin-Awaji Earthquake forced us to recognize the conditions of Japan's crisis management system. It exposed the problems of Japan's earthquake countermeasures, organizations, and laws in dealing with emergency situations.

31.2.5.1 Disaster Prevention Issues

The 7.9 magnitude quake in 1995 resulted in over 6000 victims. Unfortunately, most of the victims were killed by the collapse of old structures. In the case of Kobe and other municipal governments, their master plans for disaster prevention have not been designed to prevent magnitude 6 and higher-level earthquakes. The prevention plans for magnitude 6 and higher-level earthquakes would impose a heavy financial burden on the local governments. Therefore, it might be difficult for them to pay for the necessary expenses for preventive measures. However, even if the local governments were to face a financial crisis, governments should recognize that the most important task is to protect the lives and property of their people and create effective earthquake countermeasures.

31.2.5.2 Organizational Issues

In case of emergencies, the existing three offices (the Cabinet Security Affairs Office, the Cabinet Information Research Office, and the Cabinet Councilors' Office) under the control of the cabinet secretariat shall respond to crises, but it has not functioned as a control tower.

In Japan, the prime minister, the head of the executive branch, shall determine and declare a state of emergency. Under the current system, a countermeasures headquarters is established within the government based on the Basic Law on Disaster Countermeasures in times of a disaster, but in a state of emergency involving national defense or public order, there are no provisions provided in laws relating to the SDF and police concerning the establishment of a command center.

Therefore, the nation should create a centralized emergency management organization for dealing with national emergencies under the prime minister's direct command that can oversee relief and reconstruction operations. It is urgently important that a system should be set up in which a single organization can make swift decisions by taking over, if necessary, the responsibilities usually reserved for ministries or local governments during national emergencies. In this sense, the US Federal Emergency Management Agency (FEMA) would be effective as such an organization model.

31.2.5.3 Emergency Response Issues

Crisis management requires strengthening the prime minister's power and eliminating the harmful effects of factionalism in government ministries and agencies. Under the constitution, the prime minister is the head of government—equivalent to a president with the representative right in a company. Furthermore, the Cabinet Law restricts the prime minister's power to something like that of a chairman; also, the National Government Organization Law concerning national administrative organizations makes the prime minister head of the Prime Minister's Office—a position equal to that of other ministry heads.

The prime minister, therefore, does not have the power to give binding directives to ministers even in cases of emergency. The prime minister is able to instruct and supervise ministers only by

following decisions made at a cabinet meeting. It is necessary to revise the Cabinet Law to create a responsible and flexible mechanism to deal with emergencies.

In addition, the prime minister should be given all relevant information for the swift decision making. The government information on natural disasters collected by local authorities, police, firefighters, and the SDF was not directly reported to the Prime Minister's Office (Kantei). Therefore, it is necessary to reorganize the government information system, enabling it to collect all the relevant information in the Prime Minister's Office.

31.2.5.4 *Legal Issues*

31.2.5.4.1 *Emergency Law*

The primary purpose of a state is to protect the lives and property of its people. Therefore, the state must have a crisis management system established in law to respond to emergencies involving disasters, nuclear accident, and terrorism. A number of nations have included provisions in their constitutions for dealing with emergencies. However, Japan has lacked such laws and regulations for emergencies. In contrast, Germany included emergency provisions in its constitution in 1968, which temporarily restrict people's rights and abrogate standing rules.

According to these provisions, a joint committee comprising members of the lower and upper houses of the German legislature will be set up in case of an emergency in order to provide emergency legislation. However, the provisions stipulate that those laws will be valid for only 6 months, and if the parliament rejects the laws during that period, they will be rescinded. It must be examined whether Japan should enact an emergency law similar to that of Germany.

31.2.5.4.2 *SDF's Dispatch*

The first 48 h of a disaster are considered crucial for rescue operations. In the Hanshin-Awaji Earthquake, the SDF's delay in joining relief activities in the initial hours after the quake was criticized. On January 17, it was not until 10 a.m., or more than 4 h after the quake struck, that the governor of Hyogo prefecture requested the SDF to help.

Why did the SDF delay in taking action for rescue? Under the Self-Defense Forces Law (Article 83) regulating SDF operations, SDF members may be dispatched to a disaster area, in principle, only at the request of governors concerned. Under the law, this authority had been granted only to governors. Unfortunately, mayors of Kobe and the heads of surrounding cities and towns were unable, for long hours, to contact the governor of Hyogo prefecture to request the dispatch of SDF troops. The quake brought to light the legal problems in intergovernmental relations and the lack of rudimentary crisis management in relation to the dispatch of the SDF and its function.

31.3 **Great East Japan Earthquake of 2011**

31.3.1 ***Overview of the Great East Japan Earthquake***

31.3.1.1 *Ocean Trench-Type Earthquake*

On March 11, 2011, at 2:46 p.m., the Great East Japan Earthquake hit the Tohoku region, north-east Japan. The epicenter was off the coast of east Japan in the Pacific close to Tohoku, as indicated in Figure 31.3. The quake's magnitude was 9.0 (see Table 31.2), the strongest ever recorded in Japan.



Figure 31.3 Map of areas that sustained major earthquakes or disasters that occurred in modern Japan.

The great earthquake was caused by the interlocking of several epicentral areas in the Japan Trench (see Figure 31.1). The strongest seismic intensity was measured as 7 (maximum) in Kurihara City in Miyagi prefecture, and maximum recorded acceleration of the ground motion reached 3000 gal. The seismic ground motion was observed in a wide area in Japan from Hokkaido to Kyusyu.

The great earthquake generated a massive tsunami. The recorded maximum height of the tsunami tide was 9.3 m (Soma City, Fukushima prefecture), and the run-up height of the tsunami wave was recorded at 40.5 m, the highest ever observed in Japan. The earthquake caused liquefaction extensively in the Kanto region, which is far away from the epicenter. In the Tokyo metropolitan area, due to the aftermath of the earthquake, all of the railway lines stopped running, and roughly 100,000 people were unable to get home.

In addition, serious accidents at the Fukushima nuclear power plants were caused after the great earthquake and the tsunami occurred. The Great East Japan Earthquake was a compound disaster of earthquake, tsunami, and nuclear power plants accident. The Great East Japan Earthquake vastly exceeded expectations in all aspects, such as the scale of the earthquake, the height of the tsunami, the extent of flooding, and the scale of human and material loss.

31.3.1.2 Comparison with the Great Hanshin-Awaji Earthquake of 1995

The Great Hanshin-Awaji Earthquake was an inland epicentral-type earthquake. The damages stemming from 1995 quake were concentrated in Kobe, Nishinomiya, and Ashiya cities, which are

all large urban areas. In these areas, the demographic density was very high (2,970 persons/km²: 1990), and the population of the three cities grew 3.8% during the period of 1985–1990. Since the epicenter of 1995 quake was close to urban areas, a large part of the damage comprised the collapse of buildings and its harm to human lives.

Meanwhile, the Great East Japan Earthquake was an ocean trench–type earthquake. The collapsed houses and buildings in the coastal areas were mainly damaged by the tsunami. The damage was concentrated mainly in the prefectures of Iwate, Miyagi, and Fukushima. The population density of these three prefectures combined is a relatively low (157 persons/km²: 2010), and the three prefectures had recorded a 2.2% decline during the period from 2005 to 2010. The Great East Japan Earthquake caused damages to many of the residents of a sparsely populated and rapidly aging region.

According to the White Paper on Disaster Management 2011 of Cabinet Office, the dead people over 60 and 70 years accounted for 65% and 45%, respectively, of the 15,270 victims (as of April 11, 2011) in Iwate, Miyagi, and Fukushima prefectures. The ratio of these age groups in the population of Iwate prefecture is 35% and 21%, respectively. Therefore, the victims' rates are twice as large. In the case of the 1995 Hanshin-Awaji Earthquake, people over 60 and 70 years accounted for 55% and 36%, respectively, of the 6402 victims in Hyogo prefecture. Higher mortality rates for aged people have been recognized as an important issue in the 1995 earthquake. The same case occurred in the Great East Japan Earthquake. We need to develop evacuation measures that are effective for Japan's aged society.

31.3.1.3 Rescue Operations

According to the data (as of May 31, 2011) of the Cabinet Office, the National Police Agency dispatched approximately 307,500 staff. The Fire and Disaster Management Agency dispatched 1,558 Emergency Fire Response Teams, 6,099 staff, and a total of 27,373 teams, and approximately 103,600 firefighters joined. In addition, the Ministry of Defense dispatched approximately 107,000 corps of Japan SDF.

In addition, national officials and officials from other local governments were dispatched to the affected local governments. The international rescue teams from 28 countries, regions, and organizations were accepted. *Operation Tomodachi (friendship)* by US Forces dispatched more than 16,000 corps, approximately 15 ships and 140 airplanes (maximum). Many NPOs and volunteers have also played important roles in the operation of evacuation shelters by helping in the preparation of meals and clearing up of the muddy houses.

According to the data (as of May 31, 2011) of the Extreme Disaster Management Headquarters, the assist measures for the lives of affected people are as follows.

Procured supplies: food (approximately 26 million meals), drink (approximately 8 million bottles), blankets (approximately 410,000), fuel (approximately 16,000 kL), diapers (approximately 400,000), medicine (approximately 240,000 boxes), partitions (approximately 66,000), etc.

Transportation: Japan Truck Association (total 1900 trucks), airplanes of Japan SDF (total 150), police and private helicopters (5), and ships (8).

31.3.2 Damages in Affected Areas

According to the report of the Fire and Disaster Management Agency on February 11, 2012, the earthquake and the tsunami caused 16,140 deaths, 3,123 people went missing, and 6,112 people were injured. A total of 128,582 buildings fully collapsed and 244,031 buildings were partially

destroyed. The fires caused by the earthquake were only 286, but the fires caused by the tsunami struck the evacuation buildings and caused serious damages. In addition, 20,425 houses were flooded above the floor and 15,502 houses were flooded below the floor in the tsunami attacked areas. Unfortunately, 92.4% of deaths were caused by drowning (4.4% by crushing, 1.1% by burns, and 2.1% unknown), and 65% of the dead were over 60 years old.

The great earthquake and tsunami caused especially destructive damage to Iwate, Miyagi, and Fukushima prefectures. The Fire and Disaster Management Agency, as of February 11, 2012, reports the damages of the affected areas as follows (population 2010 census).

31.3.2.1 Human Toll and Damage to Housing

Hokkaido (population 5,506,416): 1 dead, 3 injured, 4 partially collapsed buildings, 329 flooded above the floor, and 545 flooded below the floor.

Aomori prefecture (population 1,373,339): 3 dead, 1 missing, 61 injured, 311 fully collapsed buildings, 853 partially collapsed buildings, and 5 fires.

Iwate prefecture (population 1,330,147): 4,669 dead, 1,316 missing, 188 injured, 20,185 fully collapsed buildings, 4,561 partially collapsed buildings, 1,761 flooded above the floor, 323 flooded below the floor, and 34 fires.

Miyagi prefecture (population 2,348,165): 9,471 dead, 1,747 missing, 4,132 injured, 83,894 fully collapsed buildings, 138,389 partially collapsed buildings, 15,403 flooded above the floor, 12,840 flooded below the floor, and 135 fires.

Yamagata prefecture (population 1,168,924): 3 dead, 40 injured, 10 partially collapsed buildings, and 37 fully collapsed buildings.

Fukushima prefecture (population 2,029,064): 1,933 dead, 56 missing, 182 injured, 20,030 fully collapsed buildings, 64,017 partially collapsed buildings, 1,053 flooded above the floor, 340 flooded below the floor, and 11 fires.

Tokyo To (population 13,159,388): 7 dead, 117 injured, 13 fully collapsed buildings, 190 partially collapsed buildings, and 33 fires.

Ibaraki prefecture (population 2,969,770): 24 dead, 1 missing, 707 injured, 3,064 fully collapsed buildings, 23,839 partially collapsed buildings, 1,719 flooded above the floor, 710 flooded below, and 31 fires.

Tochigi prefecture (population 2,007,683): 4 dead, 132 injured, 265 fully collapsed buildings, and 2,070 partially collapsed buildings.

Gunma prefecture (population 2,008,068): 1 dead, 41 injured, 7 partially collapsed buildings, and 2 fires.

Chiba prefecture (population 6,216,289): 20 dead, 2 missing, 251 injured, 798 fully collapsed buildings, 9,861 partially collapsed buildings, 154 flooded above the floor, 722 flooded below the floor, and 16 fires.

Kanagawa prefecture (population 9,048,331): 4 dead, 131 injured, 38 fully collapsed buildings, 406 partially collapsed buildings, and 6 fires.

Saitama prefecture (population 7,173,680): 104 injured, 22 fully collapsed buildings, 192 partially collapsed buildings, and 12 fires.

The great earthquake caused liquefaction extensively in the Kanto region, which is far away from the epicenter. In Ibaraki prefecture, the houses inland at the southern end of the affected region were not damaged by the tsunami, but were damaged by the earthquake or by the resulting foundation failure. Approximately 19,000 houses in Ibaraki, Chiba, Saitama, Kanagawa, and other prefectures were damaged due to liquefaction.

31.3.2.2 *Damage to Roads and Infrastructure*

The earthquake caused damages to the transportation infrastructure in wide areas. Right after the earthquake, 15 expressway routes and 69 sections on the national highways were closed, and numerous sections in the prefectural/municipal roads were closed. In addition, other transport infrastructures were also severely damaged. The Tohoku Shinkansen was suspended due to the fallen catenary poles, broken wires, and damaged elevated structures. The runway of Sendai Airport was covered with debris and cars by the massive tsunami attack, and all 14 ports in stricken areas on the Pacific coast were shut down due to the tsunami damages. In addition, the earthquake caused land subsidence to occur over a large area. After the earthquake, the subsidence in Sendai Plain, Miyagi prefecture, had grown to 16 km² from 3 km².

On June 24, 2011, the Cabinet Office estimated the cost of damages to the stocks of infrastructure as follows: damage to buildings (housing, offices, plants, machinery, etc.): approximately 10.4 trillion yen; damage to lifeline utilities (water services, gas, electricity, and communication and broadcasting facilities): approximately 1.3 trillion yen; damage to infrastructure (river, road, harbors, drainage, airport, etc.): approximately 2.2 trillion yen; damage to others (including agriculture, forestry, and fisheries): approximately 3.0 trillion yen. The total cost of the damaged stocks in disaster areas is estimated to approximately 16.9 trillion yen on June 24, 2011, but the round estimate excludes the damage to nuclear power plants and other damages to Japan's economy.

31.3.2.3 *Tsunami Damage*

The damage from the tsunami was extensive and severe. This was especially true along the Pacific coast from Tohoku region, which was close to the epicenter, down to the *Kanto* region.

The tsunami damage is concentrated mainly in Iwate, Miyagi, and Fukushima prefectures. The extent of flood damage in a majority of these areas goes beyond what is anticipated by tsunami hazard maps, and the height of the tsunami in most of the flooded areas exceeded the height estimated by tsunami hazard maps.

The population density of affected prefectures is relatively low, and these prefectures had recorded a 2.2% population decline during the period from 2005 to 2010. The Great East Japan Earthquake resulted in a disaster in sparsely populated and rapidly aging regions and produced compounded damage from the combination of earthquake, tsunami, and nuclear power plant accident.

31.3.2.4 *Accident at the Fukushima Daiichi Nuclear Power Plant*

On March 11, 2011, the Great East Japan Earthquake triggered the nuclear accident at the Fukushima Daiichi (No. 1) nuclear power plant (see Figure 31.3), owned and operated by the Tokyo Electric Power Company (TEPCO). This accident was ultimately declared Level 7 (severe accident) by the international nuclear event scale.

When the earthquake occurred, Units 1–3 of the Daiichi plant were in normal operation, and Units 4–6 were undergoing periodical inspections. The emergency shutdown feature, or SCRAM, went into operation at Units 1–3 immediately after the commencement of the seismic activity. The seismic tremors damaged electricity transmission facilities between the TEPCO Shin-Fukushima transformer substations and the Fukushima Daiichi nuclear power plant, resulting in a total loss of off-site electricity. There was a back-up 66 kV transmission line from the transmission network of Tohoku Electric Power Company, but the back-up line failed to feed Unit 1 via a metal clad-type circuit (M/C) of Unit 1 failed due to mismatched sockets (NAIIC, 2012, p. 12).

The loss of electricity made it very difficult to effectively cool down the reactors timely.

Cooling the reactors and observing the results were heavily dependent on electricity for high-pressure water injection, depressurizing the reactor, low-pressure water injection, the cooling and depressurizing of the reactor containers, and removal of decay heat at the final heat sink. Explosions considered to be hydrogen explosions had occurred at Reactor 1 on 12th, Reactor 3 on 14th, and a blast sound considered to be a hydrogen explosion was heard at Reactor 2 on March 15th.

The severe nuclear accident ultimately emitted an enormous amount of radioactive material into the environment. The Fukushima nuclear accident reminded the elderly Japanese people of serious aftereffects of the atomic bombings on Hiroshima and Nagasaki in August 1945.

31.3.3 Recovery and Reconstruction in Affected Areas

31.3.3.1 Current Situations of Evacuees

The Construction Agency has issued the number of evacuees. According to the data (as of 12 September, 2013), the total number of evacuees reaches about 286,000. Of which, about 271,000 people live in the temporary housings, public housings etc., and 99 people live in evacuation centers (community hall, school, etc.) in Kanto areas. The evacuated people live in more than 1,200 municipalities located in 47 prefectures. Of these evacuees, 51,251 people have been evacuated from Fukushima. 7,474 people and 1,531 people have been evacuated from Miyagi and Iwate respectively.

Regarding the status of Fukushima, most of the evacuees are from the Evacuation Order Area. Evacuation zonings have been reviewed or are currently under review in areas where radiation is considered to be below safe levels, while decontamination efforts have been accelerated.

31.3.3.2 Transportation Interruption and Rubble Removal

The affected areas have faced different challenges while recovering from tsunami damages compared to those from earthquakes. The first challenge was the interruption to transportation in the coastal areas. Ports, railways, and roads could not be used due to heavy damage. In some places, the helicopter was the only way to bring water, food, and other life necessities. Some municipalities lost city/town halls and could not provide help and services to people. As the offices themselves were victims of disasters to a greater or lesser degree, it was very hard to establish a headquarters to help refugees and affected people.

Disaster wreckage was another big problem in reconstruction of infrastructure. The earthquake and tsunami generated 18.8 million tons of wreckage in three prefectures of Iwate, Miyagi, and Fukushima (as of August 22, 2012). Disaster management plans are required to focus not only on the refugees but also on the treatment of the wreckage. According to the Reconstruction Agency (as of August 22, 2012), approximately 15.7 million tons (80% of the total) of wreckage was transported to temporary dump places located in these prefectures and other areas.

31.3.3.3 Infrastructure Recovery

31.3.3.3.1 Tohoku Expressway and Airport

According to the information from the Reconstruction Agency, 347 km out of 675 km of the expressway, which connects Tohoku and Kanto regions, was damaged in the great earthquake, but traffic restriction was lifted on March 24, 2011, following the completion of emergency restoration

measures. The Sendai Airport badly damaged by the tsunami was reconstructed rapidly thanks to the cooperation between the Japanese SDF and the US Armed Forces.

The entire runway was restored and became useable by March 29, 2011.

31.3.3.3.2 Lifeline

Electricity supply: Maximum number of households without electricity supply in Iwate, Miyagi, and Fukushima prefectures was approximately 2,580,000 (March 11, 2011), but the number has decreased to approximately 111,000 households (rate of recovery: approximately 96%, as of May 30, 2011).

Town gas supply: Maximum number of households without gas supply in the aforementioned three prefectures was approximately 420,000, but the number has decreased to approximately 60,000 households (rate of recovery: approximately 86%, as of May 30, 2011).

Liquefied petroleum gas supply: Maximum number of households without LP gas supply in the aforementioned three prefectures was approximately 1,660,000 (March 11, 2011), but the number has decreased to approximately 80 households (rate of recovery: approximately 96%, as of May 30, 2011).

Water supply: Maximum number of households where water supply was interrupted nationwide was approximately 2,300,000 (March 11, 2011), but the number has decreased to approximately 45,000 households (rate of recovery: approximately 98%, as of May 30, 2011). These remaining 45,000 households are located in areas where houses were destroyed by the tsunami.

According to the Reconstruction Agency, all infrastructures including railways, expressways, electricity supply, water and gas supplies, etc., except the warning areas due to the nuclear accident, were restored (as of July 22, 2012).

31.3.3.3.3 Promotion of Housing Stabilization

According to the information from the White Paper on Disaster Management of the Cabinet Office, 23,795 emergency temporary houses have been constructed, 36,956 houses were under construction, and additional 2,076 houses were planned as of May 30, 2011. In addition, the secondary evacuation to public-owned houses (free) and temporary evacuation to hotels and inns (free) beyond prefectural borders have been promoted. However, the housing reconstruction has not sufficiently developed. As of July 22, 2012, the construction of disaster public housing has only finished 1% of the planned 20,000 houses in Iwate, Miyagi, and Fukushima prefectures. Thus, a total of approximately 270,000 evacuees are still living in the temporary houses as of 500 days after the earthquake (Asahi Shinbun, July 22, 2012).

31.3.4 Government's Responses to the Earthquake

31.3.4.1 Initial Responses of Government Leaders

31.3.4.1.1 Prime Minister's Response

When the earthquake struck at 2:46 p.m. on March 11, Prime Minister Naoto Kan was attending an Audit Committee in the Upper House. After the chairman declared the meeting adjourned, he moved to the crisis management center in the basement of the Prime Minister's Office. Mr. Tetsuro Ito, deputy chief cabinet secretary for crisis management, was tasked with establishing

an emergency response office at the Prime Minister's Office, where he would gather information and coordinate initial response activities. Furthermore, the Extreme Disaster Management Headquarters was established in the afternoon on March 11.

On March 12, the government established the Local Headquarters for Extreme Disaster Management in Miyagi prefecture. Between March 13 and 14, the Extreme Disaster Management Headquarters took the following emergent measures: application of the Disaster Relief Act, designation as extremely severe disaster, application of the Support Act for Livelihood Recovery of Disaster Victims, designation as specified major disaster, and decision of the reserve fund for relief supplies to the disaster-stricken area.

31.3.4.1.2 Miyagi Prefecture's Response

When the earthquake occurred, Prefectural Disaster Task Force was formed on the fifth floor of the prefectural building. The disaster task force is automatically formed when an earthquake with a seismic intensity of 6 or greater on the Japanese scale is measured within the prefecture.

At 2:49 p.m. on March 11, a major tsunami warning was issued for Miyagi, Iwate, and Fukushima prefectures by JMA. At 3:02 p.m., the governor of Miyagi prefecture made a request to the national government to deploy SDF troops to Miyagi, and the Prefectural Disaster Task Force held its first meeting. The governor held a news conference, and called for residents to remain calm, promising restoration from the disaster. At 9:05 p.m., the national government–dispatched survey team arrived in Miyagi prefecture, and the fourth meeting of the Prefectural Disaster Task Force was held.

Before the disaster, the prefectural government, local municipalities, and outlying organizations communicated by phone and fax using the government's emergency wireless communication system. However, after the disaster, three regional prefectural government buildings and five cities and towns were cut off due to the earthquake and tsunami damage, and the congestion of communication circuits made it difficult for officials to communicate with one another. In the immediate aftermath of the earthquake, officials struggled to contact one another using their personal phones and mobile phones owned by local municipalities. Thus, the prefecture shipped in emergency wireless communication systems (phones and fax machines) and satellite phones by air and ground from March 13 to 15.

31.3.4.2 Government's Emergency Response Organizations

31.3.4.2.1 Response to Nuclear Accident

The main organizations of the government's accident response were the prime minister's Nuclear Emergency Response Headquarters, the Secretariat of the Nuclear Emergency Response Headquarters of Nuclear and Industrial Safety Agency (NISA), and the Regional Emergency Response Team. At the time of the accident, the government's accident response system did not function as planned due to the effect of the tsunami and the earthquake and the lack of a prepared response to a prolonged severe accident. The Crisis Management Center, located in the Kantei building, had its hands full with the earthquake and tsunami, so it was unable to respond to the nuclear accident. In addition, the Nuclear Safety Commission (NSC) was unable to provide advice based on their organization's knowledge. When the accidents occur, every information system should be shared in real time. Although there was teleconference system connecting the Kantei and each related organization, the system was not used for sharing information between the Kantei and the related organizations.

Meanwhile, Fukushima prefecture's emergency response system was established based on the assumption that a nuclear disaster would not occur at the same time as an earthquake and tsunami. As a result, it was not prepared to respond to the accident. Although the Fukushima prefecture prepared its Regional Disaster Prevention Plan, this did not include the possibility of a nuclear disaster caused by natural disasters.

In accident situations, TEPCO must communicate with the NISA through the off-site Emergency Response Center (ERC), but this was not possible due to the malfunctioning of the off-site center, which was powerless from earthquake damage. For this reason, the actual on-site situation of the vent in Unit 1 was not communicated to NISA and the Prime Minister's Office. However, TEPCO brought its own teleconference system to the off-site center and used it to connect the head office with the plant in Fukushima. If TEPCO connected its system to the government's teleconference system, it may have been possible to share information in real time in the early stages.

31.3.4.3 *Establishment of Reconstruction Headquarters and Reconstruction Agency*

In response to the Great East Japan Earthquake, the Reconstruction Headquarters was established on June 24, 2011, in the Cabinet Office based on the Basic Act on Reconstruction. The headquarters is expected to lead the nation in the reconstruction process by promoting and coordinating the policies and measures of the government as well as supporting reconstruction projects to be implemented by the local municipalities.

A new government agency named *Reconstruction Agency* was established on February 10, 2012, under the Cabinet Office in order to promote and coordinate all the policies and measures for reconstruction in an integrated manner. The agency's regional bureaus were also established in the affected three prefectures: Iwate, Miyagi, and Fukushima. The agency headed by the prime minister will exist 10 years in order to plan and coordinate the national policies and measures for reconstruction. The agency supports the efforts of afflicted local governments for reconstruction and serves as a *one-stop vis-à-vis* the local authorities.

31.3.4.4 *Relief Activities of SDF and Volunteers*

Organizations can be effective when their personnel can work together. What is most important for crisis management is how to mobilize personnel and systems in case of crises. It is important to establish procedures or manuals stipulating how to respond to the crises, to develop crisis control skills and knowledge, and to train officials accordingly. However, there are limited numbers of officials dealing with crisis management in public organizations. In addition, if officials have themselves been hurt in disasters, they cannot function. Therefore, the relief activities of SDF and volunteers during the disasters were indispensable. In addition, mental care for the aftereffects of the disasters and daily activities for disaster prevention are also essentially important.

31.3.4.4.1 *SDF's Relief Activities*

On March 11 at 3:02 p.m., governor of Miyagi prefecture made a request to the national government to dispatch SDF troops to Miyagi, at the moment only 26 min had passed since the quake had struck. It was a very quick request, compared the case that more than 4 h had passed after the Great Hanshin-Awaji Earthquake struck. On March 11, SDF troops were dispatched for disaster relief

and rescue work at the requests of governors of the affected prefectures including Iwate, Miyagi, Fukushima, Ibaraki, Aomori, etc. On March 13, having received an order from Prime Minister Kan to make preparations to dispatch 100,000 personnel, the number of dispatched SDF personnel surpassed 100,000 by March 18. At the peak, the number of personnel reached approximately 107,000 (including ready reserves and regular reserves), about 543 aircraft, and nearly 54 ships. The bases and camps in the disaster area played a vital role in the provision of assistance including procuring large amounts of needed food, clothing, and equipment on an emergency basis.

The SDF troops worked without regard for the danger of exposure to radiation and contributed to averting a critical situation due to the accident at the Fukushima Daiichi nuclear power plant. In addition, they also contributed to radioactive material decontamination, monitoring the air dose rate, and providing support for the evacuation of residents living in the vicinity of the plant. Although in the 1995 earthquake the delay of SDF dispatch due to the legal issue was criticized, the swift dispatch of SDF in the 2011 disaster has contributed to ensuring the safety of disaster victims and stability for the lives of those in the region.

31.3.4.4.2 Volunteers' Relief Activities

In the Great Hanshin-Awaji Earthquake, over 1.20 million volunteers conducted a variety of relief activities, and in the Great East Japan Earthquake, volunteers' relief activities have also been prominent. In their relief activities, activities with specific targets and skills have been especially evaluated. Furthermore, it is essential to systematize volunteering in disasters and to create a structure to coordinate volunteer activities. Therefore, the local governments must take a leadership role in establishing a system for registering and dispatching disaster relief volunteers with specialized skills.

31.3.5 Crisis Management System in the Great East Japan Earthquake of 2011

31.3.5.1 Legal Issues

The 7.9-magnitude Hanshin-Awaji Earthquake resulted in over 6000 victims. As vast majority of deaths were due to the collapse of old structures, the government has since continued to educate and drill its public on what to do in case of an earthquake or tsunami and enforced stricter building codes to strengthen its infrastructure. The 9.0-magnitude East Japan Earthquake resulted in over 16,000 victims, though vast majority of deaths were due to the tsunami. So, this situation is in contrast to the 1995 earthquake.

At the time of the 2011 disaster, the laws, regulations, and infrastructure were based on the assumption that the scope and magnitude of possible natural disasters would not exceed the precedent. There was a failure to take into account the prospect of unprecedented events such as earthquake and tsunami on March 11, 2011. Especially, the laws and regulations governing nuclear power in Japan failed to keep pace with evolving international laws, standards, and practices. As a result, the laws and regulations governing Japan's nuclear power industry at the time of the accident were outdated relative to those of other countries.

31.3.5.2 Emergency Response Issues

The government accident response systems failed to function. Regarding the response to the Fukushima nuclear accident, the Kantei had to make important decisions without having any

contact with the off-site center that was supposed to collect crucial information (NAIIC Report, 2012 and Government-commissioned Panel Report, 2012). These reports also said that the government failed to handle the disaster professionally, noting that the then Prime Minister Naoto Kan may have added to the chaos by questioning the injection of seawater, confusing workers at the plant desperate for any way to cool the reactors, though this situation happened because of the lack of information from the TEPCO headquarters.

The government also failed to give a detailed announcement about what was happening and how it might affect people living nearby. The NISA was reluctant to inform the media that reactor Unit 1's fuel rods had possibly melted. Because of the lack of on-site information, then Chief Cabinet Secretary Yukio Edano was forced to repeat that radiation would not have immediate harmful effects on people's health. However, this vagueness only raised public concerns (*Japan Times*, July 24, 2012).

31.3.5.3 Organizational Issues

The *iron triangle* between the operators (TEPCO), regulators (Ministry of Economy, Trade and Industry [METI] and NISA), and academic scholars (NSC) has established a cozy relationship among them. In essence, the regulators and operators prioritized the interests of their organizations over the public's safety and decided that Japanese nuclear power plant reactor operations will not be stopped. Because the regulators and operators have consistently maintained that the safety of nuclear power is guaranteed, they had a mutual interest in averting the risk of existing reactors being shut down due to safety issues. The relationship under *iron triangle* lacked independence and transparency and was far from being safety culture. Nuclear Accident Independent Investigation Commission (NAIIC) defined the situations as *regulatory capture* in which the oversight of the industry by regulators effectively ceases.

31.3.5.4 Evacuation Issues

The Ministry of Education, Science, Culture, Sports and Technology (MEXT) oversees the System for Prediction of Environmental Emergency Dose Information (SPEEDI). The SPEEDI system estimates where radioactive material will spread based on data, including figures provided by the NISA on the amount of radioactive material released. The SPEEDI system was designed to pinpoint which areas should be evacuated after a nuclear accident. However, the government initially withheld SPEEDI's projections after the Fukushima nuclear accident, claiming that releasing the data would cause unnecessary panic. The decision to issue evacuation instruction to residents living near the stricken nuclear plant would normally have been the responsibility of local government headquarters in the area, but local authorities were not functioning in the hours after the disaster struck.

As the evacuation areas spread further and further, the Minami-Soma City government instructed residents to move away from the city. The Namiemachi town government told its residents who had initially evacuated to other paths of the town to instead take shelter in Nihonmatsu in the prefecture. These evacuation routes fell directly under the radioactive material being spewed out of the plants reactors. SPEEDI's projections had predicted the radioactive material would spread over these areas. Residents had no SPEEDI's information, so they had to follow the instructions by their mayors, who were unaware of the potential danger. Moreover, the central government and the Fukushima prefectural government differed over the amount of radiation exposure that should be the standard for determining which residents should undergo radiation screening. The NSC did not properly resolve this double standard.

31.4 Lessons from the Great Hanshin-Awaji Earthquake and the Great East Japan Earthquake

The 1995 Great Hanshin-Awaji Earthquake and the 2011 Great East Japan Earthquake have taught us many lessons. These lessons can be summarized from the following points.

31.4.1 Lessons from the Great Hanshin-Awaji Earthquake

31.4.1.1 Revision of Master Plan for Disaster Prevention

The Central Disaster Prevention Council, a panel chaired by the then Prime Minister Tomiichi Murayama, revised a new master plan for disaster prevention on July 18, 1995. It details steps to minimize damage arising from the disasters and emergency measures to be taken immediately after the disasters, as well as the roles that the national and local governments and residents should play in restoring stricken areas. This is a step forward for effective crisis management. However, this plan did not tell how the local governments should create the organization responsible for crisis management and draw up their own master plan for disaster prevention in relation to the national government and local governments or the relationship between prefectural government and municipal governments. The new master plan will be inadequate as compared with the FEMA's manual in the United States, directing the organizational structures in relation to the intergovernmental relations.

In the 1995 earthquake, the vast majority of victims were caused by the collapse of old structures, while recent structures built according to latest codes could withstand its impact.

Increasing the earthquake resistance of old constructions is a major issue. Given a lesson that the *retrofit* type of construction proved resistant to the Northridge earthquake of 1994, it is important to promote the construction designed for magnitude 7 and higher-level earthquakes and to create urban communities capable of resisting earthquakes.

31.4.1.2 Organizational Reform

At the time of the earthquake, there existed three offices that fall under the control of the cabinet secretariat that respond to crises: the Cabinet Security Affairs Office, the Cabinet Information Research Office, and the Cabinet Councilors' Office on Internal Affairs. The Cabinet Security Affairs Office, which comprises senior bureaucrats of the then Defense Agency, the Foreign Ministry, the National Police Agency, and four other government bodies, was accused of being ineffective during the Gulf War and in the aftermath of the Great Hanshin-Awaji Earthquake. The crisis management system under the Kantei has been also criticized for its lack of competency in collecting information and for its poor interministry liaison/coordination capabilities.

In order to strengthen the control of the Kantei over natural disasters and contingencies, the Administrative Reform Council, chaired by the succeeding Prime Minister Ryutaro Hashimoto, recommended a drastic reorganization of central government offices and a stronger role for the cabinet to boost the cabinet's crisis management function. Based on the recommendation, the succeeding Hashimoto's Cabinet decided to form an organization to oversee crisis management in order to beef up the Cabinet Security Affairs Office. The Hashimoto Cabinet submitted the reform bill to the ordinary Diet Session in 1998, and the government reorganizational plan was implemented in 2001. In addition, the new post of a *crisis*

management specialist who has the same status as the deputy chief cabinet secretary was created. The creation of the post was partly effective under the recent drive for administrative and financial reform, but it did not function as planned.

31.4.1.3 Legal Reform

31.4.1.3.1 Revision of Cabinet Law Article 6

The Cabinet Law Article 6 stipulates that “the Prime Minister shall exercise control and supervision over the Administrative Branches in accordance with the policies to be decided upon at Cabinet Meetings.” Thus, at the time of crises or emergency situations, Japan’s prime minister could not take direct command or supervise officials of ministries and agencies; instead, he had to follow the cabinet decisions in directing ministries. Because of these limitations, it was difficult for the prime minister to exercise strong political leadership.

The Reform Council intended to strengthen the prime minister’s powers, but the Cabinet Legislation Bureau and others opposed to granting the prime minister powers that might violate the constitution, which reads, “The Cabinet, in the exercise of executive power, shall be collectively responsible to the Diet.” Therefore, the Reform Council compromised in proposing that the cabinet approve in advance the system whereby the prime minister would make decisions. However, the council’s proposals are inadequate, especially when compared to the situation in Germany. As mentioned earlier, Germany amended its constitution to incorporate detailed provisions for dealing with emergencies. If the government seeks the creation of effective crisis management system under the prime minister’s leadership, it is necessary not only to revise the Cabinet Law Article 6 but also to enact an emergency law similar to that of Germany.

31.4.1.3.2 Revisions of Basic Law on Disaster Countermeasures and Antidisaster Basic Law

Following the quake, Japan’s government has revised the Basic Law on Disaster Countermeasures in order to beef up the Kantei’s ability to gather information and established a system that allowed the prime minister to have prime ministerial aides. Under the revised law (article 24), it became possible to set up a Disaster Countermeasure Headquarters without following decision made at a cabinet meeting.

In the Hanshin-Awaji Earthquake, SDF members were unable to take part in the rescue operations swiftly because of the delay of the request by a prefectural governor. The SDF’s delay in joining relief activities in the initial hours after the quake resulted in worsening the disaster. Under the Article 83 of SDF Law, SDF troops are to be deployed for disaster relief and rescue work at the request of the prefectural governor. This authority had been granted only to governors. Following the quake, this article has not been revised, but the function of the SDF in case of crises became more effective through the revision of the related laws.

The revised Anti-Disaster Basic Law (Article 68) of December 1995 allowed the municipal governments’ heads to request the SDF to dispatch troops for relief efforts. Further, under the revised law (Article 63), SDF’s dispatches for disaster rescue operations are authorized to demarcate areas where people are banned from entering in times when policemen and Maritime Safety Agency personnel are not available. These are very important reform of intergovernmental relations, making it easier for the SDF to act swiftly.

Under the previous Anti-Disaster Basic Law and Large Scale Earthquake Special Measures Law, the government was unable to set up a Disaster Countermeasure Headquarters comprising all cabinet ministers unless an emergency disaster proclamation calling for economic control was issued first. However, with the revision (Article 28), no such proclamation is required in extreme disaster scenarios such as the quake. In addition, the revised law requires the national and local governments to make efforts to promote mutual assistance pacts among local entities for emergency situations, register and train volunteers, and consolidate for volunteer activities. These revisions of two disaster laws are expected to strengthen crisis management functions of the Prime Minister's Office and local government heads.

31.4.2 Lessons from the Great East Japan Earthquake

The Pacific coast of northeast Japan has a history of damage caused by great earthquakes and tsunamis such as Meiji Sanriku Coast earthquake and tsunami in 1896, Showa Sanriku Coast earthquake and tsunami in 1933, and Chilean earthquake and tsunami in 1960. Considering that accumulation of stresses between the Pacific and the North American Plates generates great earthquake periodically, such great earthquake and tsunami inescapably occur (see Figure 31.1, Tables 31.1 and 31.2). Thus, it is important to design countermeasures against mega earthquake and tsunami based on a concept of *disaster reduction* to minimize damage.

31.4.2.1 Earthquake and Tsunami

31.4.2.1.1 Earthquake Damage

31.4.2.1.1.1 Revision of Basic Disaster Management Plan — The 7.9 magnitude quake in 1995 resulted in over 6000 deaths. Because the victims were killed by collapsing structures, the government has since continued to educate and drill its public on what to do in case of an earthquake or tsunami and has implemented regulations and policies that made the country well prepared for earthquakes. Despite these countermeasures, the 9.0 magnitude quake in 2011 resulted in over 16,000 deaths, though the vast majority of deaths were due to the tsunami. As the lessons learned from the 2011 earthquake, the Basic Disaster Management Plan for earthquake and tsunami countermeasures was revised in December 2011.

The Basic Disaster Management Plan concerning disaster countermeasures will be decided by the Central Disaster Management Council. The council was established in the Cabinet Office based on the Disaster Countermeasures Basic Act. The council consists of the prime minister (chairperson), all ministers, heads of major public institutions, and experts. The scientific knowledge of earthquake and tsunami is not sufficient. When new knowledge of earthquake and tsunami become available, in order to make the crisis management more effective, it is vital to incorporate the latest knowledge in the disaster prevention plan. In the local governments, they need to consider their own disaster management measures, such as revising Local Disaster Plans for municipalities and formulating wide-area disaster management plans through the joint efforts of multiple local governments.

31.4.2.1.1.2 Revision of Legal System for Disaster Management — The national and local governments must review the legal system for disasters and revise swiftly for the future disasters in order to enable the unified responses to wide-area large-scale disasters between national and local governments. In addition, the establishment and operation of an Extreme Disaster Management

Headquarters and the form of role-sharing between responsive organizations within the government also need to be revised. For a swift response to disasters such as the quake, it is necessary to enhance our awareness of need of emergency preparedness. It is a matter of course that we need to store such necessities as food, water, flashlights, and radios in anticipation of disasters.

31.4.2.1.2 Tsunami Damage

31.4.2.1.2.1 Creative Reconstruction: Moves to Highland Area — For the reconstruction of the heavily damaged areas, should people continue to live in the same areas in the future? The best way to save lives against tsunami is to live in highland areas.

Although the idea of relocating residents into compact communities on highland seems to be ideal, many problems and contradictions lie to achieve this move. If we examine the number of people and the associated public infrastructure and industrial and commercial zones, it is difficult to decide where these new communities can be located. As a good model for the creative reconstruction, the shopping arcade reconstruction plan in Ishinomaki City of Miyagi prefecture will be very suggestive (Ministry of Land, Infrastructure, Transport and Tourism, 2012).

31.4.2.1.2.2 Ishinomaki Model: Application of *Fixed-Term Land Lease Right* — A shopping arcade near Ishinomaki station stands deserted due to damage from the mega tsunami. Under the Special Zone for Reconstruction Law, city officials in charge of reconstruction, business owners, and disaster victims can jointly set up a reconstruction entity to carry out projects on behalf of the central and prefectural governments to provide business and employment opportunities to local companies and residents. Investments in the companies will get preferential tax treatment. The project is aiming to create a city center that is easy for elderly residents to live in, with retail shops and housing for disaster victims built around a city hospital that is slated to relocate near JR Ishinomaki station in fiscal 2015.

Regarding the reconstruction of shopping arcade, it is worth noting that the project applied an idea of *Fixed-Term Land Lease Right* to the landowners of shopping arcade to avoid the rise in construction costs due to the land purchase. According to Article 22 of the Land and Building Leases Law, in cases where a Land Lease Right is established with the duration of 50 years or more, the tenants cannot extend the duration through renewal of the contract (including renewal pursuant to a request for renewal or due to continued use of the land or due to purchase of the land). As of August 2012, 90% of the landowners agree with the plan. The reconstruction plan intends to build a multistoried building in which the first floors will be parking space and second floors will be allocated for retail stores as well as commercial and medical services, and the third floors or more will be residential space including houses of arcade owners and 2000 public houses. In this way, the community function and emergency evacuation function in the event of a disaster will be incorporated in that shopping district.

31.4.2.2 Fukushima Nuclear Power Plant Accident

31.4.2.2.1 Devotion to the Myth of Nuclear Safety

The Fukushima NAIIC concluded that the Fukushima nuclear power plant accident cannot be regarded as a natural disaster, but it was a profoundly man-made disaster that could and should have been foreseen and prevented. The commission pointed out the following: “The TEPCO Fukushima Nuclear Power Plant accident was the result of collusion between the government, the regulators and TEPCO, and the lack of governance by said parties. They effectively betrayed

the nation's right to be safe from nuclear accidents. Therefore, we conclude that the accident was clearly manmade" (NAIIC 2012, p. 16).

The government-commissioned panel also concluded that the meltdowns that took place at the Fukushima nuclear plant were caused by a government and a utility that were ill prepared for an emergency because they were devoted to the myth of nuclear safety (Gs Panel 2012, p. 20).

31.4.2.2.2 Failure of Kantei's Emergency Response

The government-commissioned panel said that "the Prime Minister's Office had to make important decisions without having any contact with the off-site center that was supposed to collect crucial information." In addition, the panel also said the government failed to handle the disaster professionally, noting that the then Prime Minister Naoto Kan may have added to the chaos by questioning the injection of seawater, confusing workers at the plant desperate for any way to cool down the reactors. As for whether TEPCO wanted to withdraw all its workers from the Daiichi plant, the panel said it could not find evidence that the utility seriously considered that option (Government Panel, 2012, p. 26).

31.4.2.2.3 Absence of Independent Nuclear Safety Regulatory Organization

31.4.2.2.3.1 Deconstruction of *Iron Triangle* — In order to deconstruct the *iron triangle* in nuclear power industry, the new safety organization must be created. The organization with regulatory oversight over nuclear safety has to make decisions effectively and independently. Furthermore, the new nuclear safety regulatory organization should be granted independence and should maintain transparency.

In addition, the new nuclear safety regulatory organization must be granted the authority, financial resources, and personnel it needs to function autonomously as an entity concerned with nuclear safety and should be given the responsibility of explaining nuclear safety issues to the people living in Japan.

31.4.2.2.3.2 Creation of Nuclear Safety Regulatory Commission — Based on Article 3 of the National Government Organization Act, the new independent organization was established as a *Nuclear Safety Regulatory Commission* in July 2012. The regulatory commission's intended task is enhancing nuclear power plant safety, not making judgments about the wisdom of nuclear power generation. The appointment of five commission members must subject to approval by the Diet under the new legislation. Improper staffing of the commission would throw the administration of nuclear energy into confusion, damaging public confidence.

The *Nuclear Regulatory Organizations Act* stipulates to create a Nuclear Disaster Prevention Council to be chaired by the prime minister. A Nuclear Regulatory Agency, which will be established as the Secretariat of the Nuclear Safety Regulatory Commission, is supposed to become an integrated body for nuclear energy-related regulatory administration, which has been undertaken by different government organizations, such as METI and MEXT. It is vital to have the agency staffed by personnel with expert knowledge and strong willingness to serve their missions. To secure the new regulatory entity's independence from the government, the National Diet agreed to employ a *no return rule*. Under the rule, officials who are transferred to the nuclear regulatory commission from concerned ministries, such as METI and MEXT, will not be allowed in principle to return to the ministries. As of August 31, 2012, the appointment of commission members

has not been approved yet in the National Diet. It was because the staffing for the *nuclear village* members dominated the nuclear policymaking process has come to be looked upon with great suspicion in the post-Fukushima nuclear accident. The National Diet approved the appointment of commission members in February, 2013.

31.4.2.2.4 Reform of Nuclear Laws and Regulations

Prior to the accident, the primary purpose of the nuclear laws and regulations was promotion of nuclear energy. The laws should be rewritten with emphasis placed on prioritizing public safety, health, and welfare. The roles, responsibilities, and relationship of the operators, regulators, and other involved entities should be clearly delineated in the Act on Special Measures Concerning Nuclear Emergency Preparedness. The accident has highlighted the need for sweeping, fundamental reform of said laws and regulations to bring them into line with international standards. It is necessary to create a system to make the regulators to reflect changing international standards into the laws and regulations. In addition, monitoring mechanism for resulting infrastructural implementations should be devised.

Regarding Kantei's initial response to the nuclear accident, it was criticized that the excessive intervention by the then Prime Minister Naoto Kan caused confusion at the Fukushima Daiichi power plant after the Great East Japan Earthquake. In the discussion process of the bill, the opposition parties insisted that only the new commission should have authority over nuclear reactors and the prime minister should not issue any instructions in case of a nuclear crisis. However, the parties eventually reached an accord to allow the prime minister to issue instructions at the time of a nuclear crisis except on matters to be covered by the commission's technical and expert judgment based on its member's expertise. Thus, the prime minister will be able to issue instructions to the commission if it fails to take prompt measures to curb nuclear damage at the time of emergency. In the event of a nuclear accident, the act calls for a nuclear disaster countermeasures headquarters to be set up under the Nuclear Disaster Prevention Council. The prime minister will lead the headquarters in order to take sufficient measures for ensuring swift and effective responses to an accident.

31.4.2.2.5 Revision of Operational Guidelines of SPEEDI and Its Realization

It is necessary to build mutual trust between the public and the government and to provide accurate information in an emergency while avoiding societal confusion and mistrust. In order to protect the lives of residents in the disaster, and to prevent the spread of harm from the disaster, measures should be taken to improve operational guidelines of the SPEEDI system so that crucial information on radiation dose rates is provided promptly in a manner acceptable to the people. In addition, SPEEDI system should be effective to the countermeasures against nuclear accidents in local governments.

In this sense, it is worth noting that the evacuation action program of Takashima City, Shiga prefecture, located near the Oi nuclear power plant, plans to evacuate residents by bus to the safe routes or areas according to SPEEDI's projections. Instead of using cars that caused serious traffic jams at the time of the Great Hanshin-Awaji Earthquake, using the prepared buses and railways seems to be very effective as evacuation measures. The local government should take its evacuation measures combined with the SPEEDI system in order to protect the lives of residents against the nuclear accident.

31.4.3 Other Lessons from the 1995 and 2011 Disasters

31.4.3.1 Education for Disaster Prevention and Risk of Tsunami Fires

31.4.3.1.1 Daily Evacuation Training

When earthquake and tsunami occur, it is very important to run away individually and immediately, and not wait for a unified action. These prevention activities had a great effect, even in face of the biggest tsunami. In Kamaishi City, nearly 3000 children in elementary and middle high schools managed to evacuate safely. After the 2011 earthquake, most elementary and middle high schools evacuated students to high places. It is worth noting that this action was taken before the local governments issued evacuation alerts. Relying too much on hard structures such as coastal dyke leads to the misjudgment of the evacuation. Therefore, local governments should promote the warning system for earthquake and tsunami and soft measures in workshops for disaster prevention, such as discussions and practices to find evacuation places and routes.

In addition, public awareness activities are needed to provide residents with basic, practical knowledge of how radioactive substances are released during a major nuclear accident, how they are dispersed by wind and other agents, and how they fall back to the ground, as well as knowledge of how the exposure to radiation affects human health. The local governments need to prepare evacuation readiness plans that take into account the exceptionally grave nature of the earthquake, tsunami, and nuclear accident, periodically conduct evacuation drills in a realistic circumstance, and take steps to promote the earnest participation of residents in those drills.

31.4.3.1.2 Risk of Tsunami Fires

The 2011 tsunami destroyed houses near the shore and washed them inland together with boats, cars, etc. Fuel tanks in ports and harbors were ruptured and resulted in oil spills. When fires broke out due to the fuel from tanks, boats, vehicles, and propane gas cylinders, and electrical systems shorting in salt water, they spread to the large amounts of accumulated building debris and expanded. Vehicles ran into walls of evacuation buildings due to the rapid flow, and fires could easily break out due to the gasoline leaks. In case of the area around Nakano elementary school (tsunami evacuation building), Miyagino ward, Sendai City, the residents regularly underwent tsunami evacuation training and a large number of people evacuated to the school on the day of the earthquake. A car washed into the first floor of the school, and the leaking gasoline was possible to cause fires, which are considerably more dangerous than external fires. In front of the gymnasium of the school, large amounts of burnt cars, boats, and debris accumulated.

In case of Kadonowaki elementary school (tsunami evacuation building), Ishinomaki City, many people evacuated to the school. A large number of cars belonging to the evacuees parked on the school grounds were washed out by the tsunami, after which a fire broke out and spread from the cars to the building. Therefore, the evacuees had to escape through the back of the school building in the direction of a hill behind the school. In the 2011 tsunami, the evacuees managed to get to the designated tsunami evacuation building, but they had to be evacuated once again to a safe area, when the tsunami fires started spreading to the building. The secondary evacuation was very difficult since the surrounding area was submerged in tsunami water and they had to evacuate between tsunami intervals. Fire brigades were unable to approach the fire due to mountains of building debris, and in the meantime, the fire developed into a large-scale fire. In case of weak persons, they had to hide in the safe fire compartment of the building. It is difficult to evacuate from

tsunami evacuation buildings and collapsed houses in case of fire. These situations will become more dangerous in the metropolitan and urban areas. It is vital to consider the secondary safe evacuation routes, safe zones in the buildings, fire extinguishing equipment, or other strategies.

31.4.3.2 Mental Care for Aftereffects of Disasters

Many victims of the disasters suffered serious injuries both mentally and physically and lost their dreams and hopes for the future. The Great Hanshin-Awaji Earthquake struck a region with a rapidly aging population. When wooden houses collapsed, many senior citizens died under the ruins of their houses or furniture. The victims who had lost their homes were forced to take refuge in schools and parks, shivering both from the bitter cold and the fear of aftershocks. At the emergency's peak, the number of evacuees amounted to 320,000, among whom the elderly in particular were forced to live with great difficulty in unfamiliar surroundings. The long period of residence in evacuee shelters caused mental fatigue or psychological stress, especially among children, the handicapped, and the elderly. Therefore, systematic care and counseling for the psychological stress that they have suffered from the earthquake must be provided over long periods.

According to recent survey research involving firefighters and rescue team members who engaged in fire and rescue activities after the quake, they tended to feel stressed or fatigued as a result of their work during the quake. These symptoms had been caused by their feelings of self-accusation for failing in fire and rescue missions. Given their feelings, it is essential to provide mental care and counseling to help them deal with the trauma resulting from the earthquake. The lessons from the 1995 earthquake tell us that the psychological impact of the 2011 earthquake, tsunami, and nuclear accident also requires careful, attentive, and systematic assistance over the long term. In addition, it is essential to provide sustained assistance to bereaved children and orphans on whom the psychological impact will be especially great, as well as on-the-ground medical activities and technical advice to local support staff. These include healthcare workers, local government officials, fire and police service personnel, and teachers who, despite engaging in assistance activities, were disaster victims themselves.

31.5 Conclusion: Toward a Safe and Sustainable Society in the Post-Fukushima Nuclear Accident

In concluding this chapter, several requirements for a safe and sustainable society in the post-Fukushima nuclear accident are described in the following sections.

31.5.1 Recognizing the End of a Safety Myth

First, it must be recognized that a safety culture was not established in Japan. As mentioned in the introduction, Japan's islands are located at the point where earthquakes so frequently occur.

Thus, it is necessary to humbly face the reality of natural threats, keeping in mind that Japan has often had earthquakes in its long history. After 3.11 mega quake and tsunami, the meltdowns at the Fukushima Daiichi nuclear plant were caused.

However, the nuclear accident was not due to the natural disaster, but it was due to the safety myth that the total loss of electricity for cooling down reactors would not occur. Thus, the National Diet-commissioned panel concluded that the nuclear accident was a man-made disaster due to

regulatory capture, and the government-commissioned panel also concluded that it was caused by a government and a utility that were ill prepared for an emergency.

31.5.2 Creating a Safety Culture

Second, it is vital to create a safety culture to people's lives in a civil society. Traditionally, Japanese people have lived in harmony with the natural threats. We cannot avoid the critical impact of natural disasters. Disaster prevention is needed, but complete prevention is impossible. Therefore, a new concept of *disaster reduction* to minimize damages should be prevailed as a leading principle. In other words, the disaster countermeasures based on a concept of *risk reduction* should be created. Toward building a safe and sustainable society through reconstruction, it is important to change our attitudes to predict risks. However, to plan safety measures, nothing can be done without setting assumptions. At the same time, it must be recognized that the worst case would occur beyond assumptions.

The assumptions should be reviewed with flexibility based on the latest knowledge or skills of earthquake and tsunami. Furthermore, the Fukushima nuclear accident presented us crucial lessons on how we should be prepared for such an accident. The government must continue to investigate the causes of the accident and should transfer as lessons to future generations the whole picture of damage to humans. Based on the recorded results of the comprehensive investigation of these disasters, the government must create safety measures and prepare for the disasters.

31.5.3 Building a Sustainable Society

Third, a sustainable society based on a safety culture should be built. In recent Japan, energy policy has been developed from the viewpoint of low-carbon and stable supply. Accordingly, the nuclear power plant has been promoted as no carbon energy. But now, *safety* has emerged as a core issue in energy policy. Prior to the 3.11 earthquake and tsunami, Japan generated 30% of its electrical power from nuclear reactors. Nuclear energy was a national strategic priority in Japan. However, after the Fukushima nuclear accident, for the first time nuclear emergency had been declared in Japan, and 140,000 residents within 20 km of the plant were evacuated. The total amount of radioactive material released is unclear as the crisis is ongoing. The Energy White Paper of METI, approved by the Japanese Cabinet in October 2011, says that public confidence in safety of nuclear power was greatly damaged by the Fukushima disaster and calls for a reduction in the nation's reliance on nuclear power. Many of Japan's nuclear plants have been closed or their operation has been suspended for safety inspections. Of Japan's 54 reactors, last Tomari Unit 3 reactor in Hokkaido went offline for maintenance on May 5, 2012. As a result, Japan's nuclear-produced electrical power completely stopped for the first time since 1970.

Although it is uncertain to what degree fossil fuel consumption will be reduced and to what degree renewable energies will be increased, the government is unlikely to completely abandon nuclear energy. Despite protests, on July 1, 2012, Unit 3 of the Oi nuclear power plant in Fukui prefecture was restarted. As of August 31, 2012, the government has not proposed future energy policies of Japan, including the promotion or abolition of nuclear power. We need to abandon nuclear power, which is uncontrollable in case of an accident. Renewable energies including wind, solar, geothermal, and biomass are expected to improve energy self-reliance and revive local communities.

31.5.4 Shift of Sense of Value

Fourth, shift of sense of value to evaluate the bonds or ties among local community members should be promoted. In disasters, supports from the public organizations and community are indispensable. After the disaster, people rediscovered the value of bonds or ties among local community members, which are sometimes forgotten in normal daily life. In the Great Hanshin-Awaji Earthquake, over 1.20 million volunteers conducted a variety of relief activities, and many people were rescued from the rubble of collapsed structures by family and neighbors. In the Great East Japan Earthquake, a variety of relief activities of volunteer groups has also been prominent.

The physiological and psychological effects of the disaster on victims will be deep and long-lasting, and experience from the 1995 earthquake shows that post-traumatic stresses may increase in intensity and scope if not adequately tackled. The combined needs of the affected communities of Tohoku areas are very great and cannot be quickly resolved. The regional development plan should be designed to formulate clusters of self-sufficient cities in a decentralized manner. For the paradigm shift that local people have ownership, share the common values, and feel prides of their community, the local governments should encourage citizen's participation in social maintenance and improvement.

31.5.5 Reconstructing a Community Focused on the Elderly

Fifth, reconstruction of a community focused on elderly people should be developed. The autonomous frameworks for community development should be formulated with making maximum use of local resources and unique characteristics of local history and lifestyle. In this sense, the reconstruction plan in Ishinomaki will be very suggestive.

The deceased over the age of 60 years accounted for 65.2% of the deaths caused by the Great East Japan Earthquake, which largely exceeded in its proportion in demographic composition. The experience from the Great Hanshin-Awaji Earthquake shows that mutual cooperation among a community not only prevented death in isolation but also contributed to maintain the health level of the people even under the harsh conditions. In order to revitalize the affected Tohoku areas, reinforcement of community bonds and community reconstruction focused on the elderly are needed.

31.5.6 Remembering the Lessons from Disasters

Sixth, the lessons from the Great Hanshin-Awaji Earthquake and the Great East Japan Earthquake should be remembered. These tragedies have taught us many lessons about the prime minister's leadership, reliable crisis management system, reform of legal and organizational system, effective information gathering and providing strategies, care for the elderly, the handicapped, and children especially susceptible to disasters, and measures for protecting the livelihood of disaster victims. The national and local governments should revise disaster countermeasures based on these lessons and enhance their crisis management systems for the possibility of a major disaster in the future.

Finally, we should always remind ourselves that Japan is extremely vulnerable to earthquakes, tsunamis, typhoons, and volcanic eruptions. The Japanese saying that "Natural disaster visits us at times when people least expect it" is surely true. The proverb that "Preparing for the worst is the best prevention" is also true. The governments must learn that the most important task is to protect the lives and property of their people as the lessons of disasters. Bearing in mind that the Great Hanshin-Awaji Earthquake caused 6434 deaths (except 3 missing) and the Great East Japan

Earthquake caused 16,140 deaths (except 3,123 missing), the national and local governments should seek to build a safe and sustainable society without relying on nuclear power energy. This is a mission of governments and part of their mourning for the victims of these disasters.

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Chapter 32

Benchmarks and Standards for Emergency Management in India and the United States

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32.1 Introduction

Emergency (disaster) management is maturing as a profession in both the United States and India as evidenced by the establishment of benchmarks and standards of practice and organization. The development of standards has followed in the wake of catastrophic events in both nations and in recognition of growing vulnerabilities. Greater incidence of disasters and growing levels of damage in terms of impact on life and property provided significant impetus for policy and programmatic reform. Formal standards and principles of good practice are gaining broad acceptance. The changes are indicative of greater professionalization and increasing linkages between science and the management of hazards (Comfort, 1988).

Emergency management is now on the USAID, policy agendas in both nations as an important responsibility of government. It is a responsibility that requires investment of resources and is no longer seen as an interruption in normal governmental activity and administrative priorities. The change was most visible in the changing role of the disaster manager, transitioning from an air raid warden to a trained specialist in the United States (Waugh, 2011) and from a generalist administrator to a trained and experienced disaster manager in India. Setting up specialized

agencies and benchmarks of performance is an example and are evidence of the growing professionalization of the field. As will be seen in this chapter, there has been significant correlation between these developments and the occurrence of major disasters.

The adoption of benchmarks and standards is in large measure due to failures in ad hoc disaster responses. In most cases, reform efforts were outcomes of public policy reviews, which highlighted shortcomings during catastrophic occurrences. These *focusing events* lead to policy changes due to significant losses of life and/or property and to the perception of vulnerability to future disasters (Birkland, 1997). Combined with rising expectations from governments and increasing political costs associated with failure (Abney and Hill, 1966; Waugh, 2006), there are drastic changes in perceiving disaster management, from reactive responses to proactive administrative mechanisms and policies. This chapter is a preliminary examination of the adoption of benchmarks and standards for emergency management in India and the United States and their correlation with *focusing event* disasters and other influences.

Focusing events are major causal factors in bringing about policy reform in emergency management (Erramilli, 2009). The process is traced through the factor of organizational learning as a result of experience. More than any other factor, experience leads to policy reform and capacity building, in terms of specialized agencies and dedicated resources. Standards and benchmarks get established in evaluating the progress of reform as well as in fixing performance indicators for administrative actions.

The steps toward greater professionalization have included legislation, the creation of specialized agencies, and the development of standards and administrative routines. New legislation was enacted when the existing statutory framework was found to be unclear or unable to provide legal cover and means of navigating uncharted paths. Unlike omnibus agencies that dealt with emergencies on an ad hoc basis, new organizations focused exclusively on addressing situations posed by disasters, as well as on planning to mitigate future losses. Benchmarks were created to remove ambiguities and uncertainties for emergency personnel as well as to clarify expectations and deliverables for the public.

The development of standards as well as increasing professionalization among practitioners is an important measure of change. Increasing emphasis on creating strategies and procedures for governmental responses (Canton, 2007), as well as initiating a process of improving skills and specialization of its community of personnel, is part of the reform process. The development of benchmarks facilitates common standards in disaster management and also allows comparison among different units/locations/disasters. At the same time, it also enables performance to be measured against these standards. The latter is important for public administration scholars and practitioners. Moreover, in large and/or federal nations, the standards provide a normative goal of public policy.

32.2 Emergency Management Standards in the United States

In the United States, the development of benchmarks and standards was a direct result of poor responses to catastrophic disasters, beginning with Hurricane Hugo in 1989 and Hurricane Andrew in 1992 and culminating with Hurricanes Katrina and Wilma in 2005. During the 1990s, the Federal Emergency Management Agency (FEMA), the International Association of Emergency Managers (IAEM), and the National Emergency Management Association (NEMA) developed the Certified Emergency Manager (CEM[®]) credential for those who have the requisite experience and training to be considered professional emergency managers. IAEM largely

represents local emergency managers and NEMA represents state emergency management officials. Today, the CEM credential is the national standard and some states have programs of training that lead either to the CEM or to a state credential. IAEM has a code of conduct and has also identified a common body of knowledge, helping establish the profession as a distinct area of expertise. Emergency management sections have also been created within the American Society for Public Administration, the American Planning Association, and the American Public Works Association. Disaster Recovery Institute International (DRII) represents business continuity planners and provides professional training in the field.

In 1991, the National Fire Protection Association (NFPA) developed its NFPA 1600 standard for emergency management and business continuity programs, and, in 2001, the Emergency Management Accreditation Program (EMAP), with the assistance of FEMA, NEMA, and IAEM, developed a standard for public sector emergency management programs. EMAP conducted baseline assessments of compliance by 52 states and territories for FEMA and began accrediting state and local programs in 2003. Approximately half of the 50 states and the District of Columbia, as well as several local programs, have been accredited as of early 2010. Both standards encourage a comprehensive approach to emergency management and define programs in terms of the involvement of all stakeholders (governmental and nongovernmental) in disaster mitigation, preparedness, response, and recovery efforts. In short, it is not the role of government alone to manage hazards and deal with disasters. Public, private, and nonprofit organizations, as well as volunteers and emergent organizations, represent the community's and the nation's emergency management capabilities. The CEM standard for individuals and the NFPA 1600 and EMAP standards for emergency management programs have become the benchmarks for the practice and profession of emergency management in the United States and, to some extent, in Canada, and similar standards are being adopted in other nations (Waugh, 2007; 2011) (Figure 32.1).

After-action reports by involved agencies and analyses by scholars and government researchers identified major weaknesses in the response efforts, and the Congress responded to the reports by passing the Post-Katrina Emergency Management Reform Act of 2006 to assure that federal disaster operations would be coordinated by the FEMA and managed by professional emergency managers. To a lesser extent, attention was paid to issues related to long-term recovery from the disasters, although that changes since the 9/11 attacks and the Katrina disaster. Vulnerability to hurricanes and other severe coastal storms is increasing. According to NOAA, over 50% of the

EMAP standards	
• Program management	• Operations and procedures
• Laws and authorities	• Logistics and facilities
• Hazard identification and risk assessment	• Training
• Hazard mitigation	• Exercises, evaluations, and corrective action
• Resource management	• Crisis communications, public education, and information
• Planning	• Finance and administration
• Direction, control, and coordination	
• Communications and warning	

Figure 32.1 EMAP standards. (From EMAP, www.emaponline.org)

American population lives within 50 miles of the coast and, by 2025, 70% will live with that zone. (NOAA, 2005) Better understanding of earthquake, tsunami, and other hazards is also encouraging greater attention to benchmarks and standards among local officials, community leaders, and business executives in the United States (Waugh, 1996). While loss of life due to disasters has been declining, the Hurricane Katrina disaster demonstrated that officials should be concerned about social vulnerability, particularly among the poor, elderly, and those with chronic conditions like diabetes and heart disease. It has been the most visible natural disaster in recent times, leaving deep scars in the social fabric and raising questions about the efficacy of the administrative systems. Federal-state relations and coordination between different tiers of government came under scrutiny, apart from serious questions about other aspects of emergency management. (Waugh, 2006) As a *focusing event*, it attracted wide media attention and led to significant administrative changes.

The poor response to Katrina also led to significant change in the profession of emergency management. Despite the increased definition of the professional community, it was clear during the Hurricane Katrina disaster in 2005 that many public officials, the media, and the public at large did not understand the emergency management function. As a result, in 2007, Michael Selves, then IAEM president, initiated an assessment of the profession to develop a definition of emergency management. With the assistance of FEMA's Emergency Management Institute, the agency's training arm, a working group representing FEMA, IAEM, NEMA, the EMAP Commission, the NFPA 1600 committee, the private sector, and the academic community, was convened. The working group defined emergency management as "the managerial function charged with creating the framework within which communities reduce vulnerability to hazards and cope with disasters." The group identified eight core principles for the profession and practice of emergency management:

1. *Comprehensive*—involving all hazards, all stakeholders, and all impacts
2. *Progressive*—anticipating and preparing for future disasters by building resilient communities
3. *Collaborative*—developing and maintaining close working relationships built upon trust, teamwork, consensus, and open communication
4. *Integration*—ensuring unity of effort among all levels of government and all elements of the community
5. *Coordination*—organizing stakeholders with a common purpose
6. *Risk-driven*—utilizing sound risk management, hazard identification, risk analysis, and impact analysis
7. *Flexible*—utilizing creative and innovative approaches to solving disaster challenges
8. *Professional*—valuing scientific knowledge and practical experience and based upon education, training, experience, ethical practice, public stewardship, and continuous improvement (Waugh, 2007)

The definition and principles have been endorsed by the emergency management community and are being integrated into professional training.

32.3 Disaster Management Standards in India

In the case of India, exposure to risks is central to understanding the importance of disaster management. Its salience arises from the fact that 60% of its landmass of 3.29 million km² is vulnerable to earthquakes, more than 40 million hectares to floods, 8% of its area to cyclones, and

68% to drought (Government of India, 2004b). Droughts and epidemics had been the two most important causes of fatalities. Of the other disaster agents, floods and cyclones (as windstorms are known in India) have been most frequent, and earthquakes had killed an average of 2468 per event, which was exceeded only by the toll of 8395 casualties due to rarely occurring tsunamis (as wave/surges are known in India) (CRED, n.d.). Flooding in river plains has been a regular occurrence in parts of India like Bihar and Assam. Importantly, commentators had noted an increase in the number of *great natural disaster events* that was attributed to growth of population and urban growth (Sinha, 2001).

Similarly terrorist incidents, transportation accidents in urban locations, and communal and caste riots have also taken a heavy toll (Parasuraman and Unnikrishnan, 2002). In recent times, India has been subject to repeated and serious terrorist attacks with a high incidence of casualties (NCTC, 2007). The dollar value of losses of property due to these incidents has been equally staggering. For a developing country like India, economic damages of disasters were doubly devastating. In addition to the setback to economic processes and activities, the opportunity cost of expenditure on response and recovery was extremely significant.

The manner in which government agencies dealt with these and the other events left a lot to be desired, setting the stage for policy reform and capacity building exercises. A lack of preparedness was a cause for devastation in the 2004 tsunami (UNDP, 2004; ADB et al., 2005) and a need to comprehensively address recovery operations was clearly articulated (Provention Consortium, 2005b). Despite known vulnerability, the absence of concrete plans and lack of resources as well as ignorance of requirements have been other shortcomings (Kabra and Khator, 2001). Scholars and international organizations noted grave shortcomings of the lack of transparency and poor consultation (Provention Consortium, 2005a) and the lack of institutionalized involvement of local community and NGOs (Winchester, 2000). There was no institutional mechanism for planned involvement of nonstate actors who, nevertheless, had stakes in the disaster. Shortages of resources as well as issues of disconnect between scientific knowledge and developmental needs were also identified (Pilgrim, 1999).

In one of the few overviews of the subject, it was noted that disaster management in India was characterized by delayed response, absence of early warning systems, and lack of resources, inadequate coordination, failure in maintaining essential stores of emergency provisions, poor coordination with security forces, and weak or nonexistent standard operating procedures (USAID, 2007). Clearly, at every stage of public administration in dealing with disasters, critics found serious shortcomings.

Consistent with the correlation between focusing events and policy reform, shortcomings in disaster management were seen to engage the attention of policy makers. In a paradigmatic shift, Indian administration shed a policy that had persisted since colonial rule. Hitherto, emergency management in India was characterized by a centuries-old framework that stressed provision of emergency relief after a disaster (Rajan, 2001), instead of long-term mitigation or preventive measures. It was reactive and operated after onset of disaster conditions instead of a proactive policy that planned for all eventualities and took steps to offset or minimize adversity. The time became ripe for discarding an age-old, relief-oriented policy, replacing it with a proactive one that stressed preparedness, mitigation, and recovery, in addition to response.

There were different factors at work, in the changes that were taking place in the disaster management domain in India. The first was a process of organizational learning from experience. The literature on organizational learning considers experience as a major factor (Senge, 1990; Easterby-Smith et al., 1999). Specifically in this domain, experience of disasters has been considered a major factor in organizational learning (Comfort, 1988). The long list of disasters contained many that

were *focusing events* that provided impetus for policy reform. A massive cyclone (windstorm) killed more than 10,000 people in the state of Andhra Pradesh in 1977 (Winchester, 2000; Ramesh, 2001). The Bhopal gas tragedy in 1984 has been considered the worst in history of industry. The massive earthquake in Latur in 1993 and the *super cyclone* that devastated the coastal state of Orissa in 1999 also came in that category. Following widespread devastation by floods in 1998, the state of Gujarat was struck by a high-intensity earthquake in 2001 that killed more than 20,000 people (UNDP, 2001). And the dreaded list also included the South Asian tsunami of 2004 that claimed more than 15,000 lives in the coastal states of India (CRED, n.d.). As hypothesized, there were significant changes in disaster policy after these focusing events.

The other major factor was exogenous in the form of international influences, through experience sharing and assistance. Information about overseas best practices aided this process, by providing standards and benchmarks to policy makers. The Indian government had explicitly acknowledged external influence, in the form of the International Decade for Natural Disaster Reduction (IDNDR) (Government of India, 2004b). The IDNDR initiated a process whereby India gained valuable insights on a continuing basis through interaction with other countries and international bodies. The 1994 Yokohama Strategy also played a significant role in changing a relief-oriented approach to one that relied on mitigation and prevention. Being the largest recipient of World Bank aid for disaster management programs in recent times also exposed India to international norms and standards (World Bank, 2006). A United Nations Environment Programme–Awareness and Preparedness for Emergencies at Local Level (UNEP–APELL) program was instrumental in raising awareness levels as well as improving practices in transportation sector and of hazardous chemicals by addressing vulnerabilities to man-made disasters (Gupta, 2004). Then there was a UNDP–USAID–EU program aimed at capacity building at state and community levels in 17 of the most disaster-prone states in India since 2002 (Government of India, 2004a). International agencies like USAID were also assisting India in developing climate forecast systems. These, therefore, were among the critical influences that led to policy reform, capacity building, and establishment of benchmarks.

The process of disaster management reforms can be traced back to the mid-twentieth century. Importantly, India had been one of the earliest countries to develop standards in disaster management. Significantly, half a century ago, India was one of the few countries to initiate earthquake engineering and earthquake disaster mitigation. However, thereafter, it did not keep pace with the rest of the world in research and implementation. Then there was the cyclone of 1977 in coastal Andhra Pradesh that killed tens of thousands of people in addition to destroying property worth millions. Thereafter, a World Bank–funded project was implemented that was successful in inculcating effective administrative measures such that the damage from more powerful and intense cyclones of later years was nowhere close (All India Disaster Management Institute, 2006).

The Bureau of Indian Standards (BIS) had framed building safety codes for most type of disasters. Soon after the beginning of IDNDR, an earthquake struck the area around Latur district in the state of Maharashtra in 1993. More than 9500 lives were lost. Thereafter, the BIS revised designs for construction in earthquake zones. It updated codes for earthquake-resistant design and construction of earthen and masonry buildings, reinforced concrete standards, and repair and seismic strengthening of buildings (Bureau of Indian Standards, 2005). The BIS also revised safety codes after the particularly damaging landslides in 1995 and 1998. It modified standards for preparation of landslide hazard zonation maps in mountainous terrain in 1996, for retaining walls for hilly areas in 1998, designs for landslide control in 1999. And in 2000, it worked on the codes for siting, design, and selection of materials for residential buildings in hilly areas.

The next major event was a disaster that was dubbed a *super cyclone*. It ravaged a number of districts in coastal Orissa in 1999. International agencies suspected the loss of life to be in excess of the official figure of 9985. The BIS formulated designs for improving the cyclone resistance of low-rise houses and other structures as well as framed a typology for surveying housing and building in cyclone-prone areas for assessment of vulnerability of regions and post-cyclone damage estimation.

Another significant *focusing event* was the 2001 earthquake that struck the Bhuj region of Gujarat on the morning of January 26, 2001. Following the super cyclone of Orissa and the Bhuj quake, there were major revisions in norms and standards in disaster management as well as a rethinking about its entire paradigm. A committee was set up to revise building codes, zoning regulations, and city, town, and country planning act (National Disaster Management Division, n.d.). More importantly, the government was looking at a fundamental recasting of public policy in disaster management. It initiated a process of change that was to revamp ethos, objectives, and organizational structures involved. It went beyond merely updating safety codes or creating new organizations and took the shape of comprehensive reorientation of the entire issue area (Government of India, 2004b). An Administrative Reforms Commission (ARC), only the second in independent India, was constituted to examine and suggest measures for efficient and sustainable administration at all levels (Government of India, 2005). Its terms of reference included crisis management and suggest ways to “(a) quicken the Emergency Responses of administration, and (b) increase the effectiveness of the machinery to meet the crisis situation and enhance crisis preparedness.”

Steps were taken to streamline disaster management in the entire country through formation of disaster management departments in provinces and state disaster management authorities and by promulgating disaster management codes in place of the outdated relief codes in all states. The status paper released by the Ministry of Home Affairs, which was notified as the nodal ministry for disaster management in 2002, documented the various changes that were planned (Government of India, 2004a). Natural disaster management cells were set up in Administrative Training Institutes in each state, to increase awareness and spread norms.

While the super cyclone highlighted the role of communication channels, Bhuj quake identified the need for specialist response teams, dog squads, trained search and rescue teams, and availability of a resource inventory and mobile hospitals. Hence, it was decided to establish 144 special response teams in 8 battalions of central paramilitary forces that included doctors and engineers. It led to setting up search and rescue teams, forming regional response centers as storage depots in different parts, and locating spatially dispersed mobile hospitals. In addition, there was training of hospital personnel for disaster situations, apart from introducing an incident command system. The country's premier institution for training civil servants was designated as a nodal agency, apart from identifying emergency support functions and teams from supporting departments and creating an all-India electronic database in the India Disaster Response Network. The changes advised creation of emergency operation centers (EOC) in states and districts apart from a national EOC in the nodal union ministry. Equally important, a need to create redundancy in communication facilities was recognized, and the POLNET channel of law enforcement was made available for this purpose. And, geographical information systems were used for mapping hazard zones and making vulnerability assessments.

Comprehensive reform covered long-term mitigation and prevention phases of disaster management. The Indian Meteorological Department and the Central Waters Commission took up modernization and upgradation of flood forecasting and early warning systems. One immediate result was changing the earlier two-stage warning protocol to a more detailed four-stage one.

The Government of India took assistance from USAID in strengthening climate forecast system. A national core group on landslide mitigation and another on earthquake mitigation were set up, and under its aegis, an expert committee was set up to draft building byelaws, town and country planning, and zoning regulations. The BIS was asked to develop building safety codes, and local government personnel and municipal architects and engineers were required to be trained in their implementation.

From the point of view of spreading awareness about the subject, disaster management was introduced in school curricula. Academic courses of engineers and architects included the subjects of disaster management. A national center that was set up in 1995 was upgraded to evolve into a National Institute of Disaster Management (NIDM) in 2003. Its purpose was to conduct research and documentation, develop training modules, conduct training programs, and assist research and training institutions and state training institutes. The NIDM was later given statutory recognition as the nodal institution for disaster management.

The 2004 South Asian tsunami was a defining moment in more than one way. In addition to a high number of casualties, a total unfamiliarity with this disaster type confounded the situation. Considering its inexperience in dealing with tsunamis, India became part of an international effort to install and operate tsunami detection systems in the Indian Ocean. Setting up a tsunami warning system according to international standards became a high-priority issue, and India went ahead with a plan to install a network of seismic stations, with up to 50 tide gauges and a dozen open-ocean tsunameter buoys (UNESCO, 2007).

Even in the case of man-made and industrial disasters, a similar process can be noted. The Bhopal gas tragedy in 1984 was instrumental in establishing/upgrading industrial safety standards in a number of countries (Rajkumar et al., 2006). In India, it led to Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules in 1989. It is a different matter that chemical industries have not displayed seriousness about implementing rules 13 and 14 of these rules, concerning on-site and off-site emergency plans. However, laxity in implementation has been noted and government policies speak of ensuring stricter compliance (Government of India, 2004b).

Under the influence of IDNDR in the 1990s, a major exercise was undertaken to improve APELL by UNEP in conjunction with the government and industry (UNEP, n.d.). Its purpose was to minimize the occurrence and harmful effects of technological accidents and environmental emergencies by identifying and raising awareness of industry-related hazards, to encourage risk reduction and mitigation, and to develop co-ordination between industry, local authorities, and community. It also included a Local Accident Mitigation and Prevention (LAMP) program on *Chemical Emergency Prevention, Preparedness & Response* in six high-risk industrial areas (HRIA) such as Mumbai, Haldia, Kanpur, Vadodara, Kochi, and Ennore from 1992 to 1997. Importantly, one major result of the APELL program was framing of a new set of rules, the *Chemical Accidents (Emergency Planning, Preparedness, and Response) Rules, 1996*. Moreover, the transport of hazardous substances was also recognized as a priority sector. A Road Transport Safety Initiative (RTSI) that focused on all hazardous and nonhazardous industrial goods was launched with the cooperation of UNEP, USAID, and NSCI (Gupta, 2004). And the chemical industry adopted the color code developed by ANSI/NFPA 704.

Increasing awareness of international levels as well as a need to adopt higher safety standards was becoming more evident. In the oil and natural gas sector, the Oil Industry Safety Directorate (OISD) developed standards and guidelines in accordance with internationally accepted measures for improving safety. It developed safety protocols, duly considering international benchmarks of IEC, API, NFPA, etc. (Verma, 2006). The Delhi Underground Rail System is another case in point where internationally recognized standards were adopted because there were none available domestically. It was noted that the Delhi Fire Service had no regulations concerning underground

rail systems, pertaining to certain critical segments of the system. Hence, the NFPA 130 standards in the evacuation segments and ventilation systems were followed (Earls, 2005).

A Disaster Management Act in 2005 was promulgated after the South Asian tsunami of 2004. Enactment of a common country-wide law and promulgating centralized policy changes were major enabling steps toward professionalization of the domain. They provide a common scheme and, unlike the preindependence emphasis on rudimentary emergency relief, laid down a detailed framework. Policy reforms on the whole laid down a framework for comprehensive improvement in all phases of disaster management. The new central policy included strengthening organizational structures, augmenting financial capabilities, improving human resources, building technical competence, incorporating training, including it in education, as well as raising standards (Government of India, 2004b; Gazette of India, 2005).

Importantly, policy reform in the new millennium laid down specific performance parameters during different phases of disaster management. In the mitigation and preparedness phases, states had to prepare long-term plans that were to be integrated with developmental policies. Long-term schemes that addressed concerns of prevention and mitigation phases were entitled to preferential treatment among development plans. Moreover, in earthquake mitigation, states were advised, among others, to prepare type designs for quake-resistant construction and updating building codes with the benchmarks fixed by the BIS. To reach preparedness milestones, states were to set up specialist disaster response teams, in addition to undertaking vulnerability analyses. In the response stage, preparations of emergency plans as well as drills involving all relevant actors and stakeholders were recommended. Of equal importance were institutional arrangements involving local communities and nongovernmental organizations. Finally in the recovery phase, as with mitigation, the formulation of long-term plans as well as structured involvement of non-state actors was put forward. It is relevant to note that many of these policy measures addressed weaknesses that had been identified even by the World Bank (2006).

The American experience has not been unlike the Indian experience in terms of the impact of *triggering events*. Certainly, Hurricane Camille in 1964 and the other major natural disasters of the 1960s and 1970s led to the creation of FEMA, at the request of the National Governors Association. Unfortunately, the legacy of 9/11 has been a preoccupation with terrorism and almost single-minded focus on the security of civil aviation and the nation's borders. The poor response to Hurricane Katrina was a reflection of the lack of attention to natural disasters and the diversion of resources from FEMA and its programs to mitigate, prepare for, respond to, and recover from such disasters. The Post-Katrina Emergency Management Reform Act of 2006 is intended to repair the nation's emergency management system and restore at least some of FEMA's pre-9/11 responsibility for coordinating federal disaster efforts and advising the president, but resistance to the reform within the Department of Homeland Security delayed the implementation of the reforms. Whether the reform effort will restore the nation's capacity to deal with catastrophic disasters remains to be seen. Still, the profession and practice of emergency management in the United States is progressing. Benchmarks and standards are helping shape the way that officials, as well as other stakeholders, are dealing with hazards and disasters.

32.4 Conclusions

Finally, it is important to understand the significance of standards and benchmarks in disaster management. There are multiple advantages that accrue from their adoption. And both scholars and practitioners can derive fruitful lessons. They provide an appropriate platform that enables

comparison and lesson drawing (Rose, 1991). In addition to setting out objectives, they are critical for undertaking comparison and, thereby, evaluation. More than assessing disaster management through a comparison of casualties and loss of property, evaluating it against indicators of expectations provides a better method of analysis. An intuitive approach may suggest basing all evaluations on losses of life and property. The implication would be that a comparison would reveal a better job when there are fewer casualties and losses. However, each disaster can be considered unique in terms of socioeconomic and technological characteristics of the place of impact that would make precise scientific comparison difficult. Most important, accurately relating casualties to disasters, apart from conceptual differences between damages and losses, leaves scope for confusion. Considering that vulnerable populations like the aged and underprivileged are more at risk, there is no agreement on what constitutes *disaster-related death, injury, or disease* (Bourque et al., 2006). Moreover, there is sizeable scope for ambiguity in computing indirect costs and secondary effects (Mileti, 1999; Kreimer and Arnold, 2000). Further, accurate aggregation of such details requires greater resources, thereby weakening chances of its wider application. In comparison, benchmark and standards appear clearly superior in enabling comparison and evaluation.

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Chapter 33

Crisis in Governance and the Arab Spring

Jamil Jreisat

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33.1 Introduction

Governance in the Arab world has been in a continuous crisis since the formal collapse of the colonial order, after World War II. The breakdown of the colonial rule did not result in stable, representative, and institutional governance in the Arab world. The main legacy of the British and French imperialism was the creation of a divided Arab world consisting of several states; many of them are ministates. In some cases, municipalities were recognized as sovereign states. Independence of these states was often accompanied by financial aid and military protection by the colonial powers to maintain loyal traditional rulers in office. By the 1950s, rulers in Libya, Egypt, Iraq, Jordan, Saudi Arabia, Kuwait, Qatar, city states that merged later into United Arab Emirates, Oman, and Yemen all were headed by hereditary royal families with absolute political powers. In reality, it was not unfettered independence attained by the Arab

countries after WWII; it was the start of new and different forms of foreign interference and influence over Arab governance.

The US involvement in Middle East and North African affairs before WWII was mainly cultural and educational, but during and after this war, the US involvement in the region was intensified (Lenczowski 1962). According to Miles Copeland, who served in the Middle East in senior positions for the US State Department and Central Intelligence Agency (CIA), the post-WWII energized and deepened the US involvement. Miles Copeland provides an account of one illustrative communication between the British Embassy in Washington and the US State Department in 1947. He describes the delivery of a British message on February 21, 1947, to Loy Henderson, Assistant Secretary of State for Near Eastern and African Affairs. The message was “His majesty’s Government could no longer afford” involvement in the region. “Either the United States Government would fill the gap or it would go unfilled _ or it would be left to the Russians” (Copeland 1969: 35).

In the following years, the US *priorities in the region* were often stated by senior US State Department officials as follows: secure markets for American exports, maintain unimpeded supply of oil, and protection of the state of Israel. To serve these objectives, the US policy aimed to prevent any unfriendly power from dominating the region, particularly the Soviet Union. Also, the US policy was committed to maintaining friendly Arab regimes by providing economic aid and political and military protection against any domestic or foreign threats. Today, the United States has military presence and bases in many Arab countries, including Kuwait, Qatar, Saudi Arabia, Bahrain, and Oman.

Historical evidence indicates that imperial states, having a superior military force, dominate inferior political entities and reduce them to satellite status. This thesis is substantiated in modern history where we find Spain, Portugal, France, England, Russia, and Japan acting as imperial powers at different times in relation to different geographic areas (Jreisat 2012: 145). At present, particularly after the invasion of Iraq in 2003 on false pretensions, the United States is referred to as the only or the last superpower, which acts as an imperial force in its relations with developing countries, particularly in the Middle East, as Edward Said points out, “much of the rhetoric of the ‘New World Order’ promulgated by the American government since the end of the Cold War _ with its redolent self-congratulation, its unconcealed triumphalism, its grave proclamations of responsibility ... all too easily produces an illusion of benevolence when deployed in an imperial setting” (Said 1993: xvii).

Furthermore, the US policies toward the region have often been shaped by domestic politics rather than by strategic mutual interests (Mearsheimer and Walt 2007). These objectives and policies produced grave contradictions. Unconditional support for Israel, for example, and undermining the United Nations (UN) resolutions on the legitimate rights of the Palestinian people weakened public support and trust of Arab regimes, deemed pro-American, hindered progress toward a settlement of the Israeli–Palestinian conflict, damaged the US image in the region, and contributed to the emergence of extreme local positions by affected local groups. In addition, Arab leaders, not freely elected or representative of their people, often relied on the support of a foreign power to stay in office. Such outside support made easier for these leaders to be more autocratic and less dependent on their citizens’ support, thus prolonging the crisis of antipathy to governance.

After ruling for decades and in spite of repeated policy failures, Arab autocratic leaders have not been receptive to views of local political opposition groups, free press, or governance reformers. Liberal, progressive, nationalist, and socialist political groupings were always suspect or regarded as subversive communists to be prosecuted. Citizens’ uprisings in 2011 and 2012 proved that authoritarian regimes and their methods of governance are unsustainable, regardless of the support from foreign powers. Policy failures on the socioeconomic development front, mismanaging

the resources of the country, corruption, denial of civil liberties, and not adapting to new realities all added to public resentment and intensified the crisis of Arab governance.

33.2 Governance: Politics and Administration

Governance of societies has attracted profound interest in the literature since Plato and Aristotle. The increasing focus on governance is largely due to the recognition of its wide-ranging effects and to growing awareness of its vital function in society. Increasingly, the role of governance is defined by the external challenges and internal developments that affect the security and the welfare of the people. The subject continues, however, to evoke diverse models and many conceptualizations (Ahrens 2002; Donahue and Nye 2003; Hyden 2002; Jreisat 2011a,b, 2001; Pierre 2000). “Good governance is important for development despite differences in the way it is defined” (Doeveren 2011: 301). In the past few decades, governance everywhere has been facing pressing demands and new challenges. Vigorous debates, assessments, and evaluations of the domestic and the international roles of governance are continuous.

During and after the 1980s, the power of the state in the industrialized countries and its ability to address societal issues were challenged from within. The rapid ascendance of neoliberal regimes in several advanced democracies regarded the state not as a source of collective action, or a base for solutions, but rather as a main source of many societal problems (Pierre 2000: 3). The thrust of this political thinking, and the following ideological bent in various countries, culminated in resolute confidence in a monetarist economic policy supported by deregulation, privatization, drastic reductions of civil service, and the push to *reinvent government* and to manage it *business like* (Falk 1999). In the United States, an assertive neoconservative extremist group, with their own particular agenda, gained prominence and untenable influence over public policy. The neoconservative ideas and doctrine of military preemption often provided the rationale for higher military spending and frequent military interference in foreign countries but demanded restricting domestic government initiatives. In September 2002, the US administration published the *National Security of the United States of America*, a report described as “enshrining the doctrines of preventive war and overwhelming U.S. military superiority” (Prestowitz 2003: 22). Skeptics of globalism encouraged the United States to walk away from international agreements and to undermine the concept and the practice of multilateralism that has been “an underpinning of the global system since the end of World War II” (Prestowitz 2003: 22).

A broad conceptualization of governance, including public administrative, refers to empirical manifestation of state adaptation to the global context. Governance, also, denotes representation of coordinated social systems and the role of the state in the pursuit of collective interests (Pierre 2000: 3). Another conception of governance focuses on “the extent and form of intervention and the use of markets and quasi-markets to deliver ‘public’ service” (Rhodes 2000: 55). Comparative analysis sharpened characteristics, underlined outcomes, and articulated a range of political patterns for societies that have significant meaning and validity. “In much of the public and political debate, governance refers to sustaining co-ordination and coherence among a wide variety of actors with different purposes and objectives such as political actors and institutions, corporate interests, civil society, and transnational organizations” (Pierre 2000: 3–4). Thus, governance is an organizing concept and an inclusive function that encompasses, in addition to central government, other players who share in the responsibilities such as local authorities, business, interest groups, voluntary organizations, and a variety of civic associations (Klingner 2006). In sum, governance is a system of many dimensions, continually evolving and adapting its complex web of

structures, processes, policies, behaviors, traditions, visions, and outcomes. The United Nations Development Program defines governance “as the exercise of economic, political, and administrative authority to manage a country’s affairs at all levels, comprising the mechanisms, processes, and institutions through which that authority is directed” (UNDP 2007: 1).

Public administration is the operational dimension of governance, providing the tools for efficient and effective implementation of public policies and decisions (Rohr 1986). Governance can be powerless without the instruments to carry out its policies (Jreisat 2012). “A strategy paper without a road map is a paper, not a strategy; a decision without implementation is a wish not a decision” (Schiavo-Campo and McFerson 2008: 3). One of the colonial legacies in the Arab world has been a centralized rule that limited administrative autonomy and narrowed administrative discretion in decision making. Command-and-control management has been the common model that was not constrained by relevant facts, knowledge, expertise, professional administrative ethics, or citizens’ preferences. Autocratic and corrupt political leaders tend to cultivate public management by relying on nepotism and cronyism in recruitment to senior positions in government to mirror their preferences and to ensure loyalty to their rule. The literature on Arab public administration often reveals common ailments, shortcomings, and failures of administrative reform strategies to achieve major changes (Ayubi 1992; Jabbra 1989; Jabbra and Jreisat 2009; Jreisat 2006; Palmer 1985).

Despite the apparent conceptual amorphousness, it is possible to analyze governance through its constant rudiments of (a) *structure*, the standard features and forms of the authority system in practice; (b) *process*, rules and authenticity of methods of decision making; and (c) *outcome*, measured quality and quantity of results of performance of governance, particularly in serving the common interest, delivery of public services, managing sustainable development, and stimulating a civil society. As the structure denotes the overall authority pattern that connects essential components and performance, the process promotes fairness and legitimacy of outcomes of public policy. Outcomes exemplify accountability of public decision making and illustrate the level of commitment to equity in the distribution of benefits and delivery of public services (Jreisat 2011a,b).

33.2.1 *Military and Arab Governance*

Since WWII, governance of various Arab states experienced crises of political shake-ups and military coups. One of the earliest military intrusions in politics in the contemporary Arab political history was Husni al-Za’im’s coup of March 30, 1949, in Syria. Miles Copeland, a senior CIA official in the Middle East at the time, describes the event as the following:

A political action team under Major Meade systematically developed a friendship with Za’im, then Chief of Staff of the Syrian Army, suggested to him the idea of a coup d’état, advised him how to go about it, and guided him through the intricate preparations in laying the groundwork ... the outside world knew the coup was strictly a Syrian affair, although it was after wards assumed, fairly generally, that Za’im was the ‘American boy’. (Copeland 1969: 50)

In less than 6 months, another Syrian army group revolted, surrounded Za’im’s house, and killed him (Copeland 1969: 54). This was known as Colonel Adib Shishakli’s coup, which also was terminated by another military coup. Following the Za’im’s coup, for decades, Syria was “a breeding ground for military coups and counter-coups until Hafez Al Asad became the President in the

1970 and established an unchallenged, highly centralized regime” (Ma’oz 1988). His son, current President Bashar al-Assad, took over after his father’s death and is now facing a violent uprising against his regime.

In 1953, the Egyptian army also revolted, ended the monarchy system of governance, and changed Egypt’s governance to a republic, starting the era of Gamal Abdel Nasser’s nationalist rule in Egypt. Similarly, in 1958, the Iraqi army took over governance, terminated the rule of the monarchy in a bloody coup, and established the Republic of Iraq. Yemen and Libya, too, experienced the same military take over and ended the monarchy rule in their countries. Military takeover was viewed as a daring way for ending the crises of governance in the Arab world and as attempts to correct the failings of the traditional regimes. But each of these military coups soon took on a life of its own and fell into the same pitfalls of the regimes they came to replace. The new military leaders did not produce more accountable or representative governance nor promoted civil liberties in the countries that they governed. The military regimes did change the system of governance in specific ways such as building up military power and being more assertive internationally, but they sustained centralization and limitations on political freedoms and civil liberties. The overall accomplishments of these military regimes, particularly in the socioeconomic development area, were limited and short of societal needs and potential.

Invariably, the systems, the processes, and the outcomes of Arab governance remained comparatively unchanged. To be sure, during military rule in many Arab states, some refinements and realignments of governance structures and functions were introduced, but the challenges encountered were often beyond the competence of these leaders and the capacity of their institutions. Mediating issues of change is a prime test and a reliable indicator of the effectiveness and overall competence of leadership. Beyond competence of leadership, existing attitudes, values, and overall political culture and traditions have a significant impact on what and how change in governance may be attained. Current emphasis on factors of leadership and political culture is due to the realization that societies change far more meaningfully through negotiation, reconciliation, and consensus building than through external pressure and intervention. Participatory decision-making processes are more likely to succeed than those dictated through an internal hierarchical commands. “A growing body of work suggests that important changes often take place incrementally and through seemingly small adjustments that can, however, cumulate into significant institutional transformation” (Mahoney and Thelen 2010: xi).

While systems of governance in the Arab world were rigidly maintaining traditional autocratic rule or going through successive crises, the Arab societies and people were not as inactive or stagnant. By the end of the past century, “Arab countries undoubtedly seen remarkable economic and social achievements ... But with the advent of the twenty-first century, they have started to face deep and complex economic and social problems that negatively affect their present and future” (AHDR 2002: v). The Arab countries invested substantially in education, health, and infrastructure. Oil revenues increased, and many countries outside oil producers benefited through job creation, contracts, and investments of oil income. By the beginning of the twentieth century, the Arab societies and people have changed dramatically in numbers, education, use of technology, demands for freedom, and expectations from their governments. Yet, Arab governance continued to be inflexible, highly centralized, personalized, and often despotic. Recruitment to senior public positions continued to be mainly based on nepotism and favoritism than on merit or achievement. Public decision making was often personal and idiosyncratic rather than institutional and data driven.

The performance of the political leadership and senior administrators, therefore, has often been described in negative terms. Subservience to foreign powers continued to haunt many Arab

leaders. At the same time, disparity of income, low overall economic growth, increasing poverty, high unemployment, and deepening sense of insecurity among citizens together created a combustible mixture of negative conditions that intensified the dissatisfaction of the public and deepened the crisis of Arab governance. Ultimately, these conditions ignited the explosions of the Arab Spring, where citizens demanded the removal of autocratic leaders in several Arab countries.

33.2.2 *Accelerating the Crisis of Governance*

At the root of the turmoil are some particular contextual developments such as the following:

1. *The Demographic trend* in the Arab countries created profound quantitative and qualitative changes in societies. In numbers, for example, Egypt, the largest Arab state, had a population of 26 million in 1960 (Hourani 1991: 373). Today, Egypt has over 82 million people. Similar growth ratios took place in most Arab countries where the rate of increase has accelerated mainly because of improved health care and lower mortality rates. According to recent estimates (ADHR 2009), the Arab countries will be home to some 395 million people by 2015, compared to 150 million in 1980. Rapid population growth has also changed the age distribution; about 60% of the population is under 25 years old, making Arab societies the most youthful in the world (AHDR 2009: 2). Demographic change increased demands for education, jobs, health care, water, mass transportation, and other services to unprecedented heights.
2. *Autocracy of the political rulers* permeated all aspects of Arab regimes, maintaining a highly centralized pattern of decision making and minimum processes of accountability. Political micromanagement, central control over funds, lack of coordination, and loss of accountability are some of the results. The highly centralized Egyptian bureaucracy, for example, has been regimented with extensive rules, regulations, and monitoring processes; yet one finds an astonishing lack of coordination as it is often difficult to pin down who is responsible for a certain task (Jreisat 1997: 148). In Saudi Arabia, within the hierarchical model, “communication has been largely vertical, with the patrons on top of the system” (Hertog 2010: 11). Job entitlement that saps motivation and vertical division resulted in concentration of power in the hands of the ruling family to reinforce centralization and the dominance of vertical exchange (Hertog 2010: 11). Overall, public participation in public affairs is simply not recognized or practiced in any Arab state.
3. *Corruption* is the misuse of public authority by public officials and exploitation of their public responsibility to commit illegitimate acts of fraud, bribery, embezzlement, nepotism, extortion, and influence peddling (Richter and Burke 2007: 81). Transparency International (TI) defines corruption as “the abuse of entrusted power for private gain” (TI 2011). TI Corruption Perceptions Index (CPI) ranks countries according to the perception of corruption in the public sector and provides an aggregate indicator that combines different sources of information about corruption, making it possible to compare countries. On a scale of 1 (most corrupt) to 10 (clean of corruption), most of the Arab countries scored under 4.5 on the 2011 index. Actually, the majority of the Arab people live in countries ranked within the bottom third on the 2011 index of TI CPI.
4. *Stifled administrative professionalism* of public administration in the Arab countries resulted in many deficiencies. Despite claims of past reform initiatives, overall performance of Arab bureaucracies has neither been commensurate with societal needs and professional responsibilities nor justifiable in terms of their financial cost. Postindependence Arab bureaucracies

were called upon to maintain law and order, execute decisions of the political leadership, and deliver the day-to-day public services (Jabbra 1989: 1). These functions were soon expanded to include important responsibilities for national socioeconomic development (Jreisat 1997). While the earlier traditional functions continue to be urgent, the expansion of administrative responsibilities and the unfolding global developments require different institutional abilities. As Farazmand points out, the twenty-first century “is characterized by rapid change, globalization, hyper-competition and hyper-uncertainty” (Farazmand 2009: 1007).

Arab administrative systems have not made the necessary transition nor have developed the vital administrative capacities to manage effectively within the old or the new contexts. Enabling political and social environments that facilitate effective performance is lacking. To organize and bring together qualities that can elevate overall performance of public management is a continuing process that depends largely on political support. Professional management requires a measure of administrative autonomy that may expand and contract according to need. But the autocratic rule of the Arab state has succeeded in limiting administrative discretion, diminishing reliance on professional decisions, and increasing centralization of authority.

The traditional concepts of the classic executive-centered theories of administration relying on hierarchical recipes on organizing and managing are increasingly inappropriate in a world of interdependence and multiplying horizontal obligations. The administrative discretion that allows managers to manage and to exercise professional choices is difficult to survive or coexist with autocratic and centralized political authority. Within an interdependent global system, negotiation, cooperation, and agreements are the modes of decision making rather than the commands of a central authority.

5. *Global influences* have been exerting pressures for privatization and contracting out public functions to business enterprises. The new public management (NPM) emerged to offer a new managerial paradigm of entrepreneurial system of governance and administration based on the market criteria of efficiency and flexibility (Farazmand 2002: 132). The NPM was not, however, an unqualified success story. The competitiveness envisioned to result from privatization and to increase efficiency rarely materialized. Instead, minimizing the role of the state and shrinking public service added greater complexity in the service delivery process and made coordination even more difficult. The critics point out that globalizing capital promoted corruption, reduced accountability, violated territorial sovereignty, and left no room for any choice for people or nations but to succumb to the dictates of the globalizing corporate power structure (Farazmand 2002: 128–129; Gawthrop 1998). The private sector, spearheaded by multinational corporations, seemed to have won back at the global level the degree of freedom they had lost at the national level with the advent of the welfare state. At the global level, they did not encounter the equivalent of the state, an entity that can tax them, regulate them, and manage a redistributive process. This resulted in what Richard Falk (1999) refers to as *predatory globalization*.

Eventually, diluting the power of the state undermined professional public management by reducing its regulatory oversight, pressing on it a *businesslike* and *bottom-line* culture, and weakening its traditional values of representing and serving the collective interest. By 2008, the industrial countries and the rest of the world found themselves in the midst of one of the worst economic disasters in modern history. The neoliberal recipes not only proved to be vain but also brought many countries to the edge of financial ruin. In foreign affairs, the consequences were no less tragic: alienation of allies, undermining of international diplomacy, and costly military adventures as the invasion of Iraq in 2003

on false pretexts. Political leaders and their associates of ideologically inclined pressure groups, captivated by the *magic of the market*, sought, with some success, to restrict the role of governance. The recipe of such perspective was a profound institutional restructuring to facilitate implementation of the measures of deregulation, privatization, reduction of civil service, and introduction of business managerial practices in government (Falk 1999; Jreisat 2006; Pierre 2000: 2). The connection between these policies and the subsequent economic difficulties is hard to deny. The huge size of business corporations compromised healthy competition, became impediments to innovation, and exerted corrupting influence in politics (Greider 2009: 11–12). Weakening antitrust laws allowed concentration of economic power under few corporate entities, deemed *too big to fail*, and thus has to be bailed out by taxpayers money.

33.3 Arab Spring

33.3.1 Demand for Change

The uprisings of the Arab people against their autocratic rulers in Tunisia, Egypt, Libya, Yemen, Syria, and Bahrain are demands for ending despotic and corrupt regimes and for change of governance systems. Firmly, the activists insisted on freedom, end of corruption, and social justice. The top political leader in each state was accused of various violations and mismanagement of public authority as each ruler unlawfully enriched himself, his family, and his friends while seeking to rule for life, and in the after, by bequeathing the office to a chosen successor. The significance and the magnitude of the results of the Arab Spring are vividly emphasized in the following description by an Egyptian participant activist in the uprising (Ghonim 2012) who said that

We have achieved, in one year, what we never thought could happen. If someone comes in and tells me, 13 months ago, Mubarak is going to be out, his son is going to be in prison, no more Mubarak government, his party's going to be dissolved _ and 27 million Egyptians are going to vote for Parliament members who are actually going to go to Parliament _ I will say, you need to see a psychiatric because this is not happening in Egypt. But the fact is, it happened.

The revolutionary events that constitute the Arab Spring have been assessed, evaluated, and commented on from innumerable angles by many different observers. A sense of pride is coming out of a long repressed resentment, not just among the citizens of the Arab countries but among people outside as well. In reality, these Arab uprisings achieved more than ousting leaders or dramatizing corruption in public offices. The Arab revolts underlined the failure of power structures and the risks of disengaging citizens from governance. The uprisings, also, signify the following:

- The Arab Spring is, perhaps, one of the most remarkable demonstrations of citizens' power in governance in modern history. It is global evidence that people can resist autocracy and despotism and bring about fundamental change and democratic legitimacy to governance. The statement that “the power of the people is greater than the people in power” was given an added value.
- Past initiatives to change Arab politics and administration were primarily by outsiders, with the underlying values of governance reforms mostly those of donors, foreign consultants, or

military occupiers. The Arab Spring effectively brought in the local side and the demand side and even revived the potential of reflecting refined traditional culture and history. The strength of the revolutions in Tunisia and Egypt is that they have been almost entirely homegrown. It has been pointed out that a decade of the US hard power in Iraq (with large numbers of American and Iraqi deaths) has been less effective than a few months of peaceful protests in setting countries on the road toward representative governments.

- The Arab Spring exposed and threatened the underlying power structure in each society and its devotion to representing and serving the privileged few. In a way, the Arab Spring is an empowerment of people everywhere; it is a demand for economic justice to all; and it is a persistent call for accountability of governance.

33.3.2 *After Victory*

After more than a year from the initial dramatic events in Tunisia, doubts and concerns are growing about what is next. Clearly, the Arab uprisings in Tunisia, Libya, Egypt, and Yemen are ushering in dramatic changes in governance. Free elections have already been conducted in Tunisia and Egypt, and various structural changes are in progress. But the transition of the states that experienced popular uprisings, while still work in progress, is raising definite concerns. Ousting dictators from power is only a preliminary step toward building a more just society and more representative governance. Unanticipated problems and challenges continue to emerge and complicate the transition. After more than a year from the beginning of the transition, difficult issues remain without appropriate resolutions such as the following:

- *Economic challenges* of high unemployment, slow economic growth, and budget deficits are some of the current formidable obstacles. In Egypt and Yemen, in particular, the consequences of growing unemployment and slow economic growth can disrupt reforms and increase disturbance and distraction. Wider citizen engagement in setting policies and priorities, better accountability, and competent and committed leadership in a new system of governance promise to moderate the severity of these economic issues and to bring about equitable economic development.
- The *electoral success of Islamists* in Tunisia and Egypt raises questions about whether a pluralistic system is sustainable within a religious regime. At the end of the authoritarian and ostensibly secular governments, how to apply Islamic precepts to more open societies, with specific needs and wide support for democratic governance? More than a year ago, Tunisia overthrew decades of oppression and dictatorship. Will the interim president of Tunisia be able to bridge the division between secular, democratic principles and Islamism? Indications are that the coalition of secular and religious groups is already sharing power and governing within a liberal constitutional democracy with unquestionable pluralistic representation of citizens.

The Islamists won in the first national election for the parliament in Tunisia after the revolution; the liberal Islamist party, *Elnahda*, won a clear victory with the highest percentage (41%) of the votes. Playing by the rules, *Elnahda* appears to have secured 88 seats in the 217-seat Tunisian Assembly, entitling it to lead a new government. It is interesting to note that this main Islamist party was banned under the old regime of Ben Ali; now, it beat, easily, a group of more secular parties, the largest of which won only 14% of the seats. Soon after the election, an agreement was reached in Tunisia for an alliance to govern the country. The alliance of *Elnahda*

(moderate Islamist) and two secular political parties (second and third in election results) constitutes the new political leadership of the country (*Elnahda* nominated the prime minister; the other two secular parties nominated the president and the speaker of the parliament). The coalition of Islamists and seculars in Tunisia is a negation of the preconceptions about Arab and Muslim societies, alleging incompatibility of Islam and democracy, or the affinity between Arabs and authoritarianism.

Islamists of Egypt were the big winners, too, in the three-phase election, starting December 2011. No doubt, democracy and free election may often bring people to power that we disagree with but certainly should not be denied in their legitimate right in the political process. Western mass media repeatedly voiced fear of the end of secularism in Egypt and the transition from despotism to theocracy. “The Arab Spring was a victory for Islam. Should that scare us?” was the headline by Goldberg (2011: 15) in a leading article for the *Bloomberg Businessweek*. But public declarations of the Islamists (*Elnahda* of Tunisia and the *Muslim Brotherhood* of Egypt) were unequivocal about their adherence to democratic principles of equality among all citizens, acceptance of existing laws and international agreements, support of individual freedoms, and commitment to ethical and accountable governance. The *Muslim Brotherhood* is now aiming to develop an image of moderation in dealing with a questioning attitude by the public inside and outside of Egypt. It is not easy to decide whether the leaders of the *Muslim Brotherhood* are shrewd and pragmatic in dealing with a fast-changing political scene or they have genuinely transformed themselves. Once-banned movement recently won nearly half the seats in Egypt’s parliament and has adopted a new, democratic vocabulary. The group announced that it was running a candidate for president and has sent a delegation to Washington, where it has been presenting a moderate-sounding agenda to US officials, journalists, and academics.

Islamists in Tunisia, Egypt, or anywhere else are not one type of politics or values. *Elnahda* and the *Muslim Brotherhood* are distinct from each other and significantly unlike the *Salafis*, a more puritanical Islamists who won 20% of the vote in the recent election for the parliament in Egypt. Moreover, Islamists in the Arab world have a limited experience in actually formulating and executing public policies (Jreisat 1997). Whether they will mature quickly by learning on the job or end up with rigid, dogmatic, and even muddled rule is difficult to predict at this point. Comparison is also made, however, with Israel where similarly religious groups are part of the ruling coalition. In addition, one may point out that courting evangelical votes in the primary campaign election for a Republican Party candidate for the US presidency (2011–2012), some candidates repeatedly echoed Christian evangelical preaching:

- The *role of the military* in future governance in Egypt is a source of public anxiety. The Arab Spring has tested a simple but fundamental view about the role of the military in the Arab society: to defend the country against its enemies or to defend the ruler against his people. In Tunisia and Egypt, the military opted primarily for the defense of the country. In Syria and Yemen, the military evidently has opted for protection of the political ruler. Egypt’s military will be ruling until a new elected government is in place. It is not clear how much of the military power in Egypt’s governance will be encompassed in future governance when they depart, after the election of the new president in June 2012. Reconciling the interests of promoting democratic change with those promoting influence in the future state is another hurdle to overcome in reconstructing governance. The transition to a democratic rule in Egypt is concluding two major actions: one is choosing a council to write the new constitution and to hold a constitutional referendum of ratification; the other is electing a new president.

In the meantime, the supreme military council remains in charge. Tensions have been mounting, and large public demonstrations took place in Cairo, joined by several political groups protesting what they referred to as the hegemony of the *Muslim Brotherhood* on the special committee of 100 members for writing the new constitution. Tensions continue and alliances keep shifting as positions on reform are becoming more specific. As Egypt's ruling generals near the end of their formal reign, the country's main Islamist party is asserting increasing authority over the political system. Liberal and secular political groups vowed to boycott the assembly, and at least eight withdrew from it, accusing the Islamist parties of taking over the process. The move came just days after the *Muslim Brotherhood* said it was considering putting forth a presidential candidate from its ranks, something it had promised not to do. The conflict widened between the *Muslim Brotherhood* and other political groups when the Administrative Court in Cairo ruled (April 11, 2012) against the decision by the parliament to establish the committee of 100, dominated by the *Muslim Brotherhood*, to write the new constitution. The rift between the once-underground *Muslim Brotherhood* and other political groups as well as the military burst into the open and raising concern over Egypt's transition to a democracy as the revolution aimed the following:

- Political associations with broad public appeal and reliable commitments to freedom and civic virtues are essential ingredients of democracy. The current reality of political associations in most Arab countries shows small membership, weak representation, and discord among their leaders. Secular and liberal political parties in Egypt, Tunisia, and other countries have been ineffective and unable to offer citizens believable strategic visions and true channels of engagement in governance, as evidenced by the results of the recent elections in the two countries. Fragmented, disorganized, and with limited popular appeal, the many political groups that emerged after the revolutions in Tunisia, Egypt, Libya, and Yemen have not been able to evolve into more viable and cohesive associations, able to offer credible alternative policy choices to citizens. In Egypt, for example, during the last election, 33 secular political parties competed for seats in the parliament. Not surprising, the results were a defeat for the liberal parties and a victory for political Islam with better organization and more resources. Further, by the deadline (April 8, 2019) for registration as a candidate for president of Egypt, 23 persons have filed their applications. It seems the political groups, lacking a political culture of negotiation and developing a pluralistic consensus, continued the politics of fragmentation and splintering rather than the necessary alignment during a critical historical period.

Throughout the Arab countries, one finds a poor tradition of effective opposition parties mainly because of dominance of autocratic political systems. During the Cold War Era, in most of these countries, liberals, socialists, communists, and nationalist political parties were persecuted, and their leaders often spent time in jail or were not visible. Their publications and support groups among students and labor unions were also subjected to harassment by police and *muckabarat* (secret police). In Jordan, for example, during the 1950s and 1960s, owning or circulating literature *advocating* or *promoting* communism could land a person in jail for 14 years. Much harsher measures were enforced in other Arab states such as Saudi Arabia. Moreover, independent journalism, human rights organizations, and union organizers were scarce and subject to harsh measures by the state.

In the countries that ousted their political leaders so far, a genuine concern prevails that outside meddling would attempt to subvert the ultimate objectives of the revolution. Thus, 16 offices for nonprofit groups in Cairo were raided in December 2011 and were summoned to face prosecution for operating illegal foreign agencies. This issue became a grim problem in United

States–Egypt relations. Although a compromise was reached, the issue indicates distrust and concern on both sides.

If current transient conditions in many Arab countries persist, fear of social and political chaos, disruption of economic activities, rising crimes, and uncertainty about the economic future would generate lasting societal damages. In Yemen, for example, the departure of Ali Abdullah Saleh after a long bloody confrontation with the opposition left the country on the verge of chaos, facing a serious economic hardship. In Libya, human rights groups and some members of the Libyan government acknowledge that after over a year from the start of the revolution, Libya remains without effective police, prosecutors, courts, and prisons, as well as the wherewithal to protect judges, lawyers, or witnesses from potential retribution by armed militias.

The uprising in Syria so far is becoming further complicated beyond what other Arab states experienced:

First, the Syrian opposition is fragmented and has no coherent and known identity or program for the future of the country, beyond deposing the president. They have been able to carry out acts of violence against the government and noncombatant civilians alike. An editorial in *The New York Times* (March 21, 2012) and a report by Human Rights Watch point out that the “Syrian opposition is seriously hampered by internal divisions and confusing messages ... The Free Syrian Army and other smaller entities have engaged in human rights abuses including kidnapping, detention and executions of security forces and pro-government militia members.”

Second, Assad’s regime is autocratic and oppressive but still enjoys considerable support from Kurds, Christians, Alawites, business class, and some Sunnis.

Third, advocating military intervention or supplying weapons to the opposition by the United States and other countries, as many US politicians and journalists encourage, has weakened the case for the opposition in the minds of the public and strengthened the resolve of the regime.

Finally, current efforts by the UN envoy have the prospect of what has been called *soft landing* in Syria where change of regime can take place short of civil war and destruction of the country.

Certainly, the Arab Spring cannot erase all residues of years of autocratic rule in few months nor develop political and administrative leaders who can mediate the various contextual hurdles. Rewriting a constitution for a country is no guarantee of effecting social change or implementing constitutional change and institutional reforms. Simply removing a political leader is unlikely to create the positive economic, political, and social transformation that the Arab Spring sought to achieve. In addition to having new leaders with visions, competence, and professional integrity to pursue these visions, a profound political and administrative reform and modernization entail significant attitudinal, cultural, and value changes (Dwivedi 2005: 21). Cultural factors that perpetuate organization and management practices of command and control and blind obedience to authority do not change easily, within a short time, nor can be replaced impulsively by a creative and risk-taking management. Over time, traditional cultural norms and habits have penetrated the whole society. Whereas behavioral and educational reorientation of public service is costly and time consuming, it requires competent and committed leadership. In addition, democratization will be a hollow process without the genuine infrastructure of openness to new ideas, transparency, and appropriate administrative and political culture and values.

33.3.3 Imperatives of Effective Change

Demographic new realities, socioeconomic conditions, and unfolding global developments rendered traditional administrative and political processes in the Arab states inadequate and requiring

new capacities. In the absence of reliable and regular assessments of results, it is difficult to evaluate policy outcomes or ensure accountability. Arab public bureaucracies in general are known to be overstaffed, underpaid, low producing, fraught with red tape, and enduring scarcity of proficient leaders (Ayubi 1992; Jabbra and Jabbra 2005; Jreisat 2006; Palmer et al. 1987). The road map for the transformation needed has to incorporate carefully developed reform strategies that identify and define vital reform imperatives in the political and administrative domains for reaching the contemplated visions of free, democratic, and progressive governance. These political and administrative reform imperatives include the following:

1. *Leadership succession* has been a major cause of political crises and instability in the Arab states. In their transition to a post-revolution order, succession has to be explicitly defined and constitutionally specific as to whom and for how long a political leader may govern.
2. *Checks and balances* and separation of powers need to be built into the constitutional order to protect against tyranny of authoritarian-inclined leaders. Relevant US experience informs us that public administration has at least three highly developed legal dimensions: the constitutional separation of powers, administrative law, and individual constitutional rights (Rosenbloom 2011: 368). The Arab transition regimes can benefit from experiences of other countries and devise effective mechanisms that prevent reemergence of despotism in governance.
3. *Civil liberties*. Reformed governance has to set limits on state powers to ensure basic freedoms of the press, speech, religion, and assembly. Independent and reliable judiciary, free from political interference, is one of the most widely trusted institutions to provide essential safeguards and protections against arbitrary decision making by the other branches of governance.
4. *Building administrative capacity and professionalizing public administration* are very much associated with increasingly universalized concepts and practices such as responsibility, accountability, transparency, ethics, citizens' service, leadership, empirical assessment, efficiency and effectiveness, and measurement of performance. Administrative reform, therefore, has to incorporate and integrate many of these administrative processes in the new governance. Always, a civil service that is effective, fair, consistent, and merit based is indispensable for managing public affairs. Through comparative administration, these ideas have acquired imperative eminence in the theory and practice of public administration nationally and internationally. Comparative analysis provides insights on administrative ideas that worked or did not. The new Arab governance has to adopt true and tested administrative concepts and practices as foundations for building an effective administrative state (Jreisat 2011a,b; Manning and Parison 2004).
5. *Leadership* is vital across cultures and for all organizations. The Arab uprisings underline a critical need for leaders with strategic vision and professional competence to change management culture and to harmonize management values with those of democratic politics. Professionalizing the new Arab public administration systems has to involve internal improvement of operational methods and outwardly focus on improving public satisfaction through greater responsiveness to public needs and demands. This requires citizens' engagement far more than what has been attempted in the past. As the Arab Spring heightened peoples' awareness of the failings and shortcomings of their governance, it also increased their demands to be heard and represented.
6. *Citizens' engagement in public affairs*. Beyond opposition to autocratic leaders, public disillusionment with the governance system and its underlying power structure that benefited the

few in each country was also a major factor inspiring the Arab uprisings. Citizens have often expressed dissatisfaction with many public policies and with the general performance of public institutions. Public agencies such as police, security, and intelligence have particularly been distrusted mainly for sustaining discredited leaders in office and regularly abusing civil rights of citizens. The crowd in *Al-Tahrir* Square in Cairo, for example, repeatedly boomed slogans demanding *isqat al-nizam* (the fall of the regime/system). A prominent Egyptian writer points out that “The main initial tenet of the revolution was that people wanted the regime to fall down. This simple and brief verdict was quickly executed, and with that was the defeat of all public policies that oppressed people during the dictatorial rule.” In the end, citizens had no viable linkages with governance, and leaders were isolated from the public except for the few favored.

7. *Effective anticorruption measures.* The Arab Spring effectively and dramatically illustrated with evidence the extent of corruption in the countries that faced the uprisings. Although corruption charges are common, some recent specific revelations have been astounding. The case of privatization in Egypt is one illustration of how corruption and exploitation of public positions enriched the few and damaged national economic development. The uprising in Egypt revealed that the son of the former president and secretary general of the then ruling party, in partnership with senior colleagues, have squandered public properties by selling public lands and government-run companies at a fraction of their real value as part of a dramatic restructuring and privatization. These individuals are currently in jail, charged with sales of public assets that netted only \$10 billion, about \$90 billion less than their estimated worth (Grimaldi and O’Harrow 2011).

Autocracy, corruption, and immovability of leaders from office ignited the revolutions and personalized its targets (be it Ben Ali of Tunisia, Mubarak of Egypt, Saleh of Yemen, or Gaddafi of Libya). In Tunisia, the head of the special committee for investigating *bribery and corruption* of the toppled regime announced that the committee is investigating over 9000 cases of corruption and bribery mostly reported by citizens and representatives of civil society groups. In Egypt, the attorney general requested from 120 countries to freeze and return to Egypt all funds and assets for 150 Egyptian officials, their families, and some business people. The list includes the former president and his wife, his two sons and their families, former prime minister, and several cabinet members and their families. The economic picture in Egypt began to change in the early 1990s, when Egypt agreed to make the types of structural reforms that were sweeping the world, after the collapse of Soviet communism, and became known as *the Washington Consensus*. The World Bank also encouraged the restructuring, declaring in 1997 that “The macroeconomic stabilization efforts that Egypt undertook in the early 1990s have been a success, and long-term structural reforms are underway” (The World Bank Group 1997: 1). Privatization in Egypt was championed by political elites, including the president’s son and his political cronies who became very rich.

Similarly, charges of corruption are frequently leveled against governments in Kuwait, Morocco, Jordan, and other Arab states. In Jordan, charges are also connected to privatization decisions that 60 members of the House of Deputies (parliament) signed a petition demanding from government to formulate an investigative committee to examine privatization decisions by previous governments at largely below market prices in communication, cement, potassium, and phosphate mining. These charges seem to imply a great risk to the government because they are also repeatedly made by opposition leaders and the press who accuse previous governments in Jordan of selling off public enterprises at low prices under clouds of suspicion.

33.4 Conclusion

The Arab Spring is a powerful citizens' movement to get rid of autocratic leaders in government and to build better systems of governance that are representative and democratic. Whereas the first objective (ousting leaders) has been fairly successful, the second objective (building better governance) is in transition and proved to be far more challenging. After weeks of steadily escalating public demonstrations across Tunisia, President Zine El Abidine Ben Ali lost power and fled the country on January 14, 2011. This overwhelming event became the start of a powerful wave in several Arab states, demanding governance that serves citizens, not only the autocrats in power. Almost simultaneously, what appeared for a long time as public apathy was transformed into citizens' revolutions in many Arab countries. The objectives of these public uprisings include end of corruption and reforms that democratize the system of governance. Certain basic changes have already been achieved. Heads of the states of Tunisia, Libya, Egypt, and Yemen have been expelled. Free elections have been conducted in Tunisia and Egypt for starting new governance systems, and constitutions are being revised.

The Arab Spring signifies an attempt by people taking action for themselves led by the young generation propelled by the desire for free society that is able to realize its potential and serve all its citizens fairly. The uprisings across the Arab world represent a profound shift of public attitudes by overcoming fear and indifference in the search for better governance: effective, representative, and honest. The Arab Spring is a different revolution than those in the past led by military officers who simply replaced one dictator with another. In a way, these popular uprisings are a frontal attack by the young and the disadvantaged in the society who realized that they represent a massive social movement for change.

But success in removing an autocratic leader from office is not the same as dismantling the system of dictatorship. As the revolutionary forces succeeded in changing the regime in Tunisia, Egypt, Libya, and Yemen, other Arab countries continue to battle entrenched traditional forces and corrupt and ineffective political leaders. The status quo powers, particularly the elites of autocracy, shaped the current political and administrative systems into their images to protect their privileges and to perpetuate attributes that sustain their rule. Without a strategy of political alignment to restore and realize the objectives of the revolution, the risk of capture and misdirecting the public action increases. The needed overall strategy of realignment has to be firmly anchored in the values of participatory democracy and directly connected with the new social movement prevalent in the new Arab societies.

The United States and most European countries offered sympathies and verbal support of the change with different degrees of enthusiasm. Western countries, mindful of their previous involvement with the deposed regimes, mainly took the high ground expressing hopes for expansion of political and social freedoms and building a stronger foundation for future with economic, social, and political reforms. In Libya, it was a different approach employing a military intervention to *protect citizens* from the military grip of Muammar al-Gaddafi who was killed at the end. In Syria, weapons have been smuggled, and many countries are suspected of being behind the revolution, which took a bloody turn and seems to be turning into protracted conflict that no one is sure of how it will end.

The transition of the Arab governments that ousted their leaders and in the process of building new systems has been subjected to trials, pressures, and even acts of sabotage. As in many developing countries, governance in the Arab states is learning that "regardless of how lofty the goals of the regime or how adept it is at generating enthusiasm for its programs, policy decisions are not self-enforcing" (Palmer 1985: 270). Professional management that is able to transform concepts and ideas into reality

has been in short supply. This is why proposed activities, described earlier as *imperatives of effective change*, have to be key elements in the current and future strategies for realignment and reform.

After independence, the growth in administrative functions and responsibilities prompted massive increases in administrative financial costs and expansion of the powers of bureaucracy (Jreisat 2006). The significant growth in numbers and cost of public employment, however, did not translate into improved administrative performance in meeting expanded responsibilities. Constrained within centralized, autocratic, and nonrepresentative political contexts, Arab bureaucracies could not balance contradictions and synthesize incompatible traditions and values of governance. The inherited command-and-control models of administration may have served well the autocratic rule but performed poorly in dealing with the complexities of modernization and socioeconomic development. All these underline the importance of the still-unfolding transition processes in several Arab states and the ability to resolve their crises of governance permanently.

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Chapter 34

1989 Rail Disaster at Clapham in South London

Francis R. Terry

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34.1 Safety-Critical Industries

Passenger transport industries, by their nature, are potentially dangerous to users as well as to the employees. Movement at speed through the air or on the surface carries with it the perpetual risk, however small, of a collision or impact that is harmful or threatening to the lives of those concerned. Yet the demand for travel has never been greater (Department of Transport 1993; Kinnock 1997), and the standards of safety expected are consistently rising (UK Health and Safety Commission 1993). The boundary between the risks that individuals are presumed to be voluntarily incurring by embarking on a journey and the risks that it is the responsibility of the transport operator to minimize or eliminate is continuously shifting in favor of the passenger. In the eighteenth century, the traveler by ship or stagecoach placed his life in the hands of the pilot or coachman and could only pray for safe deliverance; today, an ever-extending panoply of regulation and legal rights is aimed at providing reassurance to travelers.

Modes of transport differ greatly, of course, in the levels of risk that are characteristic of them: travel by motorcycle carries far higher risks than travel by rail or air. There is also considerable variance in the degree to which levels of risk are tolerated by the members of the society. Most of us have long ago accepted the trade-off between the convenience of the automobile and its relative lack of safety, in statistical terms, compared to other modes. That does not diminish, however, the constant pressure from consumer bodies and regulators to contain risks and protect transport users. The campaign to increase safety may rest from time to time, but with each new disaster, it takes another push forward.

Passenger transport industries are thus essentially different from many other manufacturing or service industries. Where the object of a particular industry is the creation of consumer durables, for example, concern for safety is met by effective research and development, by supervision of the production processes, and by regulatory control imposed from without. In the case of the passenger railroad, however, participation by members of the public is a necessary element of what the production process is seeking to achieve. Consequently, public expectations of safety demand completely different standards and practices from other industries where safety is a largely internal matter for management and workers, overseen by external regulators. I describe industries like the passenger railroad as being *safety-critical*, meaning that if the standards of performance by management, staff, and customers are not consistently maintained above certain levels, injury or death will result.

While there is a well-known literature on the causes and consequences of industrial accidents, much of this is essentially plant focused. It deals with relationships between management and workers in the context of manufacturing organizations, and it seeks broad explanations in terms of the psychology and sociology of work in society (Gouldner 1954; Nichols 1975). In this chapter, an attempt is made to explore how accidents occur that do not have any immediate physical consequences for members of the work force themselves and which workers, as a result, may have less direct (or at any rate different) incentives to avoid. How should safety-critical industries seek to avoid accidents and what happens when they fail?

34.2 Background to the Clapham Disaster

The long-term trend of safety on Britain's railroads had been steadily improving during the 30 years up to 1987 (Department of Transport 1995). Prior to that, two very serious accidents had occurred in 1952 and 1957, at Harrow and Lewisham (both in the London suburbs), involving antiquated rolling stock and human error (Rolt 1966). Major changes in signaling and working practices had followed. Then, on December 12, 1988, at the height of the morning peak hour, a disastrous collision occurred close to one of the world's busiest railroad junctions at Clapham in south London. Thirty-five people died and nearly 500 were injured, 69 of them seriously. The Clapham crash has been selected for discussion in this chapter because it illustrates a series of lessons about how crises occur in safety-critical industries as a result of flaws in organizational and individual behavior, often far removed from the immediate event.

The causes of the Clapham accident were, on the face of it, clear enough, but the British secretary of state, Paul Channon, MP, decided to set up a special court of inquiry under an eminent lawyer, Anthony Hidden, QC. The appointment of a special court was an unusual step, because railroad accidents are normally investigated by the UK Railway Inspectorate. The inspectorate has been in existence since the passing of the Regulation of Railways Act 1871 and had previously handled investigations equally serious or involving greater loss of life. The style of the inspectorate,

traditionally, had been to examine the facts of an accident, hear testimony of those concerned, identify the cause, and attribute responsibility. It often made recommendations for changes in equipment and working practices, which railroads were not necessarily obliged to follow, though in the end, they usually did. Sometimes, reluctance on the part of railroads led to a new legislation designed to prevent a recurrence of a particular type of accident.

The scope and tone of the hidden inquiry was different in a number of respects. Although it ranged over many of the issues that a railway inspectorate inquiry would have done (and indeed had the cooperation of the inspectorate in its work), it also examined the deeper institutional and behavioral factors connected with what proved to be a crisis in railroad safety management. To understand this crisis, we need first to look at the circumstances of the Clapham accident.

34.3 Circumstances of the Accident

There are four rail tracks approaching Clapham Junction from the direction of Wimbledon, on the southern edge of London. They run in a cutting, on a curving alignment, with trains passing at intervals of less than 2 min in the peak periods. The signaling equipment is designed to ensure that these intervals can be maintained with complete safety. A train, for example, that is stationary in the platform at Clapham Junction station is automatically protected by a red signal light some distance behind it and by an audible warning system sounded inside the driving cab of any other train that might inadvertently try to pass such a signal.

On the morning of Monday, December 12, 1988, just after 8:00 a.m., three trains were running toward the cutting in accordance with their normal timetables. Two passenger trains, packed with commuters, were heading into London one behind the other; a third train was running empty in the opposite direction on an adjacent line. The first of these trains, driven by driver (engineer) H, received an unexpected and very abnormal warning when the signal closest to Clapham Junction station suddenly changed from green to red at the moment he was about to pass it. He had thus unwillingly become involved in an incident known in railroad parlance as signal passed at danger (SPAD). He reacted in accordance with the *British Railway Rule Book*, Section C, which says that “If the train inadvertently passes a signal at Danger, the Driver must stop immediately. He must not then proceed until authorised....”

He applied his brakes immediately, bringing the train to a stand beside the next signal post, from where he was able to speak by telephone about the irregularity to the signal controller. He had stopped his train confident in the knowledge that the automatic signaling system would protect his own train in the rear by detecting its presence on the track and showing a red aspect to the following train. The engineer of the following train, having passed a succession of clear signals, entered the cutting on the approach to Clapham Junction and, rounding the curve, saw immediately ahead of him the rear of H’s train. It was on the same track, stationary, and within a distance in which he could not possibly stop. Despite full emergency braking, this second train collided heavily with H’s train before forcing it out to the offside, where it struck the third train running out from London in the opposite direction. A fourth train, also approaching Clapham from the south, managed to stop only 20 yards from the wreck. An appalling accident had occurred.

The telephone calls of people nearby brought a response from the emergency services, which the inquiry inspector commended for its speed and efficiency, though there was a difference of view subsequently about whether the fire brigade was correct in assuming overall command of the incident, rather than the police (Flin 1996). The first fire engine was on the scene within 5 min of

the accident, just as local police were arriving. The first ambulance came 4 min later. An intensive rescue operation then began to locate and evacuate those who were injured, trapped, or shocked as well as those who were unscathed and to remove the fatalities. The rescue work was hindered by the steep walls of the cutting, and it was many hours before some semblance of normality was restored.

34.4 Terms of the Inquiry

In investigating what had gone wrong, Mr. Hidden focused on three questions (Department of Transport 1989). First, how had the accident happened? His conclusion was, simply stated, that the signaling system designed to be totally safe had in fact failed. Second, how had it failed? The answer to this question was that during technical alterations to the signaling system, a wire should have been removed. In error, it was not. Instead, the wire continued to feed current into a circuit; this had the effect of preventing the signal to the rear of H's train from showing red and thereby protecting it from a collision.

The third question was the most interesting from the point of view of our wider understanding: how had the situation been allowed to happen? To find the answer, we need to consider the following factors as they apply in a safety-critical context:

- The organization and planning of maintenance work among the signal engineering personnel
- The practice of supervision
- Management, communications, and information

34.5 Organization and Planning

Over the weekends before the accident, a program of major renovation and improvements to the signaling system had been under way to replace signaling installed in the late 1930s. In the Clapham area, some of this work was carried out by a senior technician, Mr. M. During a Sunday morning, 2 weeks before the accident, M had correctly installed some new wiring, but he had left an old wire still connected at the fuse end; at its other end, he did disconnect it, but left it close to and in a position where it was in an imminent danger of making contact with its old terminal. He should, of course, have disconnected both ends and, in addition, cut the wire back so that it could never make a false contact. The conclusion of the inquiry was that M had been interrupted in the course of his work, and although he had intended to complete the task properly, he had subsequently omitted to do so. A further work nearby, 2 weeks later, had the effect of nudging the redundant wiring back into contact with the terminal, leading directly to the signal indications that caused the accident.

M had worked for British Railways for 16 years, including work on large resignaling schemes. He was held in high regard by his colleagues and superiors, who believed in his own professional competence, and was partly instrumental in translating the intentions of the railroad design office into electrical wiring layouts that were entirely satisfactory from a conceptual point of view. He felt fit and ready for work on the Sunday morning before the accident and did not feel under pressure in discharging a series of straightforward tasks. Nevertheless, M had been in the habit of voluntarily working 7 days per week in order to maximize his income through overtime payments. Although M was not prone to lapses of concentration, the inquiry found that constant work without any refreshing break had probably blunted M's attention to detail at a crucial moment.

The situation was part of a wider organizational problem. Plans for the resignaling scheme had been drawn up 2 years previously, when staffing levels were higher. The reduction in staff by 1988 meant that weekend work had to be carried out by volunteers who were prepared to put in extra hours. They came from various grades and levels of experience, and no attempt was made by the management to relate the size and composition of the work force to a work program that had been decided somewhat arbitrarily 2 years before and not reviewed since. During Mondays to Fridays, signaling staff worked in regular teams and knew the abilities of their colleagues; at the weekend, no teams existed. As a result, bonds of trust, as well as the mutual understanding of colleagues' competences and limitations, were not present. Work became slower and less efficient.

For working at weekends, staff were paid premium rates. A man such as M could double his salary by continuous voluntary weekend work. In the 13 weeks prior to the accident, 28% of the work force had worked 7 days in every week and another 34% had worked 13 days out of every 14 (Department of Transport 1989). The pay system, therefore, gave perverse incentives in a safety-critical context. It is clear (with hindsight) that such sustained periods of work were not good for morale, for enthusiasm for the task, nor for clearness of thought and sharpness of action.

34.6 Practice of Supervision

A good practice demanded that on such a job as M was engaged, an independent check—known as a wire count—should take place. The wire count should first have been made by M himself at the conclusion of the job and again by his supervisor or the engineer responsible for testing and commissioning the modified signal installation. M, however, had never been taught the importance of a wire count, while his supervisor, Mr. B, had spent his time out on the tracks, leading a gang doing manual work. B had worked long and hard over the weekends before the accident, often carrying out tasks alongside other members of his gang, but he was acting like a technician rather than a supervisor and consequently had neglected crucial aspects of his duties.

It appears then that although B was energetic and well intentioned, his effort was pointed in the wrong direction. As a result of the limited numbers available to work on the tracks and with his good opinion generally of M's work, B had never even entered the relay room where M had been working, let alone checked out his technical work. B's style of leadership may have helped to motivate the track gang, but it had distorted his view of his own role and his priorities. He had had no instructions as to the importance of wire counts during the progress of the resignaling project and had never known one to be carried out prior to testing of a modified installation.

There had in fact been a departmental instruction entitled *Testing New and Altered Signalling*, drawn up some months previously, which should have been circulated to all staff down to supervisor level, including B. One of its internal testing requirements stated: "Carry out a wire count on all free-wired safety relays and terminations..."

B, like a number of other supervisors, had not received a copy of this instruction. That did not of course exonerate him from carrying out the quality check, which, as a supervisor, he should have made, but it removed another line of defense against fatal or injurious accidents.

Similar deficiencies affected the work of the testing and commissioning engineer, Mr. J. He had reluctantly been moved to his present post after his existing job was abolished. He did not like his new job and tackled it with low motivation; he had received no induction training and little

advice from his predecessor. Although he had seen the new departmental instruction (*Testing New and Altered Signalling*), he believed it to be a consultation draft and was not aware that it was in force. Had he studied and implemented that document, he would have realized that a wire count (together with other tests) was mandatory. Similar misapprehensions and ignorance affected J's two colleagues, who might have drawn his attention to the departmental instruction but who had not read it or at any rate not understood its significance.

This omission was all the more remarkable because there had been a series of *wrong side* failures of signaling equipment in other parts of the railroad system over the preceding 3 years, which had arisen from similar causes. Fortunately, no injury or loss of life had resulted. The internal inquiries undertaken by the railroad had recognized that a revision of testing procedures was urgent, and this had led to the decision to issue the new departmental instruction. There was also a recognition of the importance of staff training. In practice, however, these good intentions did not translate into effective action.

34.7 Management, Communication, and Information

In a safety-critical context, management must set up lines of communication that are reliable and robust. It must not only issue instructions but also ensure that information actually reaches staff; for their part, staff must be taught how to interpret information received and how to put it into effect. These three aspects—clear definition of instructions, effective communication, and comprehensive training—enable the management to ensure that the work force performs as intended.

The contrast with the actual situation leading up to the Clapham accident is striking. Toward the end of 1982, the need for instructions on testing procedures for new and altered signaling was recognized; in July 1984, the issue of a possible interim instruction was considered at a management team conference but not proceeded with. A year later, it was agreed that provisional copies of the draft instruction should be issued on an advisory basis to staff carrying out testing, and following a number of *wrong side* failures, the instruction was given official authority. It was recorded by the management team that the "... need for a full testing procedural document was more urgent than ever, but the resource difficulty is recognised." It was not until May 1987 that the full document was actually issued. Over the same period, not one single training course was carried out, despite the need identified by the internal inquiries into *wrong side* failures.

The impression gained is that while registering the importance of safety-related documents, the management failed to give them the necessary priority or adequate resources. There was no monitoring of progress, the distribution of copies was haphazard, and their importance was not understood by the work force. Supplementary checklists to enable the instructions to be carried out were never produced. Yet management continued in the false belief that their commands were being implemented, at least in spirit.

There was a second important area in which the management was defective, and that was the planning and control of the whole resignaling project. As previously explained, the schedule of works had been drawn up 2 years before works in the Clapham area were actually undertaken. In the meantime, there had been staff reductions, including the loss of technicians in particular categories of skills. This was a result of expansion in the electronic communications industry more widely, with a number of potential employers able to offer higher rates of pay and more sociable working hours in competition to the railroad. The program for carrying out resignaling works was very tight, requiring continuous weekend working, and no individual manager wanted to be the first to admit that targets could not be met.

If one looks at the major aspects of a resignaling scheme, they break down into

- Control of finances
- Control of design work
- Control of installation work by railroad employees
- Control of work carried out by external contractors

The correct model would have been to appoint a project manager to coordinate the four aspects through an overall plan of works and to take the strategic decisions. Such a person would have ensured that deadlines were realistic and progress was regularly reviewed. He could also have considered the competing claims of the drawing office that was under pressure to produce modified drawings and the requirements of the installation staff to have accurate specifications of work to be done. In reality, responsibility was diffused and divided at the start of the scheme and was complicated further by a succession of reorganizations that took place through the 1980s on British Railways.

34.8 Trust, Habit, and Confidence

Why did such obvious organizational flaws and failures of management persist in the British railroad industry? The explanations developed in the remainder of this chapter are partly at the corporate level and partly at the interpersonal level. They draw on the work of industrial sociologists such as Nichols (1975), Gouldner (1954), and others. At the corporate level, British Rail was subject to strong financial pressures from the government, which had imposed tight ceilings on investment and tough performance targets (Harman et al. 1995). Although these pressures made the planning of resignaling schemes difficult, they do not in themselves explain the failure to review programs regularly and ensure that they could still be achieved with reduced numbers of staff.

On the other hand, the emphasis given by the government to cutting public subsidy for railroads had led the senior management to raise commercial objectives much higher in their list of priorities during the 1980s (Green 1993). This switch in emphasis represents a sharp contrast with the situation in many European railroads, where public service and the protection of employment tend to be valued more highly than commercial objectives. The switch had status implications for the British railroad work force, in that engineers and technicians no longer enjoyed the traditional widespread respect they were accustomed to. In consequence, the culture of the signaling department became fatalistic and demotivated. The perpetual demands from the top management and from the business side of the organization to hasten forward with the Clapham area resignaling had blunted the technicians' attention to detail and led to *cutting corners*, as we have seen, in both work and supervision.

This malaise was compounded by a collective belief that the signaling department was actually behaving in a safety-conscious way, even when it was not. The series of incidents (SPADs) in which signals were passed at danger was being investigated internally and efforts being made to prevent them. Unfortunately, the same attention was not being paid to *wrong side* failures, which were almost as prevalent and potentially just as dangerous. The focus of safety efforts was thus misplaced—a familiar factor in understanding the causes of disaster in safety-critical industries.

At the working level, the ability of technicians and supervisors to perform at their best and most vigilant was undercut by the corporate pay policy, which over-rewarded weekend work and

discouraged staff from taking necessary rest days. It also led to the creation of ad hoc teams at weekends who had not worked together before and did not know each other's professional competences at first hand. This drawback was concealed by the strong sense of mutual trust among technicians from similar backgrounds and with similar experience behind them. It led to an assumption that *people who know what they are doing should be left alone to get on with the job*, thus undermining the importance of ensuring that designs were properly worked out and new installations thoroughly checked.

Faith in experienced colleagues was no safeguard against procedures that were incorrect. As we have seen, M had never been properly trained in the first place, he had not read official instructions, and his mistakes had never been pointed out to him. In the signaling department, there was instead a powerful sense of trust between fellow professionals and a pride in long-established ways of working. Many signaling technicians identified themselves as experts in signaling first and foremost and only secondarily as workers in a safety-critical industry. Supervision and strict application of instructions from railroad management were forms of social action that tended to cut across the technicians' belief in themselves and in each others' professional competence; consequently, instructions from above were given less weight than they should have been.

Pressure on resources and failures at management level had also prevented regular training for technicians in safety-relevant areas. The management's intentions were clear enough: they recognized the importance of training, but meetings and proposals were not transformed into action on the ground. By using the rhetoric of *absolute safety* and *zero accidents*, the management had generated a completely false sense of self-confidence in current methods of working. In parallel, frequent reorganizations had sought to produce more rational and efficient structures, but within these, roles and responsibilities were left poorly defined. One consequence of this was that individual managers and supervisors, unsure of their positions and lacking in morale, were reluctant to speak out when they thought that project time scales were no longer realistic and training was inadequate.

In particular, it was crucial for the stages of design, installation, and testing to be separately carried out. M, as an installer, had adjusted and interpreted the overall design of the wiring scheme as he had gone along; this in itself was liable to cause errors and uncertainties for those who came after him. But his work had not been rigorously examined by B or tested in the prescribed way by J either. As the testing and commissioning engineer, J had trusted M's professional competence and abbreviated the process of checking out the signaling modifications. Thus, a multilevel system of design, installation, supervision, and testing had degenerated into a series of individual errors, producing ultimate disaster.

34.9 Conclusion

In safety-critical organizations, there is an almost impossible balance to be struck between slavish adherence to the rule book and reliance on individual initiative and judgment. An over-bureaucratized organization is a prey to inefficiency and stagnation; on the other hand, too much reliance on individuals' own choice of design, method, and procedure introduces unacceptable risks. It is clear from the Clapham accident that under the burden of proof management, repeated reorganization, and professional complacency, the balance had shifted too far in favor of the individual. The aftermath of the hidden inquiry was a radical overhaul of virtually every aspect of railroad safety in Britain. New technology, new working procedures, fresh training, and strong leadership from the top were all introduced to prevent a recurrence of Clapham.

Even so, anxieties about safety have not disappeared. The privatization of British Rail has involved a separation of responsibility for the infrastructure of track, signaling, and power supplies from the provision of rolling stock and the operation of train services. Yet, railroads are integral systems: the relationships of train to track and signals to train are but two obvious examples of how the system needs to be treated as a whole. The implications of privatization for safety management became the subject of a major report by the UK Health and Safety Commission (1993), and it is by no means clear that all the issues have been satisfactorily resolved in the view of the regulators. One thing is certain however: as a result of the Clapham accident, our understanding of the wider ramifications of running a safe railroad—beyond the performance of the frontline technicians—has been greatly improved. But it has been at a terrible cost.

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Chapter 35

Mitigation versus Prevention

A View from the Local Government Level

Frances L. Edwards

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35.1 Introduction

Emergency management is usually defined as having *four phases*: mitigation, preparedness, response, and recovery (FEMA, 2013, 1–11). Local government emergency managers have used these four phases to plan for, develop, and manage community capability to withstand emergencies and disasters. The programmatic work has evolved since World War II through a civil defense emphasis, to an all-hazards emphasis, and to a time when terrorism prevention was taking center stage, although the post-Katrina legislation created a more balanced perspective for emergency management (S. 3721, 2006).

The current challenge for local government emergency managers is to balance the Department of Homeland Security (DHS) grant programs' emphasis on terrorism prevention with the demand for maintaining capability for natural hazard mitigation and response (DHS, OIG, 2009). In the last 35 years, there have been three terrorist attacks of note within the borders of the United States: 1993 World Trade Center, 1995 Murrah Building, and

November 9, 2001 attacks, yet, as shown in Table 35.1, there have been hundreds of damaging floods, dozens of significant hurricanes, and eight major earthquakes within the United States in that same period.

35.2 Mitigation versus Prevention

Federal Emergency Management Agency (FEMA) defines mitigation as follows: “Mitigation refers to activities that are designed to: Reduce or eliminate Long-Term Risk to persons or property, or Lessen the actual or potential effects or consequences of an incident” (FEMA, 2011). Examples of mitigation actions could include the use of engineering, construction, urban planning, and population training to lessen the impacts of future disasters on a community. Actions taken could include the construction of flood control structures, the prohibition of construction in a flood plain, the requirement for using specified building codes in the construction of homes and commercial and industrial buildings that include special strengthening for earthquakes or wind, and the development of a Community Emergency Response Training (CERT) program for all residents and businesses in the community.

Mitigation applies to all hazards, whether natural, technological, or human caused. Modification of the built environment can be multipurpose, as seismic resistance also achieves a level of blast resistance (Hamburger and Whittaker; Baumann). Winter proofing a home makes it a more secure location for sheltering in place against a chemical accident or terrorist attack using a chemical weapon, because double-paned windows and weather stripping limit the amount of exterior air that can enter a home. Other successful mitigation steps include raising homes within a flood plain (Tibbetts), securing the foundation and reinforcing cripple walls in earthquake-prone areas, and creating a safe room in tornado-prone areas.

Mitigation also recognizes that while it is impossible to prevent natural phenomena, such as earthquakes or hurricanes, it is possible to lessen the loss of life and property and hasten economic recovery through public education that leads to personal preparedness. The development of CERT* places trained community members in a leadership role within their own neighborhoods. Trained CERT leaders can encourage neighborhood preparedness through the development of specialized response teams at the neighborhood level, such as search and rescue and medical, and the development of caches of response materials, such as cribbing and medical supplies. During the Northridge earthquake, for example, the CERT teams provided significant emergency response activities within their own neighborhoods. They conducted 203 searches, 17 rescues, 57 medical treatments, 4 patient transports, 5 fire suppressions, and 156 utility control operations (FEMA, 2002).

Prevention, on the other hand, is designed to stop something from happening. While you cannot prevent natural events, you can prevent crime through proactive surveillance and intelligence efforts. Wildland–urban interface fires can be prevented through weed abatement, house clearances, and fire-resistant roofing. Urban and small stream flooding can be prevented through storm drain construction and maintenance, installation and maintenance of creek levees, and annual creek cleanup before the rain season. Prevention, however, presumes some human activity that either causes the events or can intervene to stop an event before it unfolds.

* See <https://www.citizencorps.gov/cert/> for a detailed discussion of the program with its 20 h of classroom training.

Table 35.1 Selected Disasters in the United States, 1971–2006

Type	Name	Year	Loss Estimate
<i>Terror Attacks</i>			
Only events inside the United States	World Trade Center Bombing	1993	\$510 million
	Oklahoma City Bombing	1995	\$80 million
	World Trade Center Bombing	2001	\$30 billion
<i>Hurricanes</i>			
10 highest losses	Hugo	1989	\$7 billion
	Andrew	1992	\$26.5 billion
	Allison	2001	\$5 billion
	Charley	2004	\$15 billion
	Frances	2004	\$9 billion
	Ivan	2004	\$14 billion
	Jeanne	2004	\$3 billion
	Katrina	2005	\$80 billion
	Rita	2005	\$9 billion
	Wilma	2005	\$14 billion
<i>Earthquakes</i>			<i>(in 2000 dollars)</i>
1971–2006	San Fernando	1971	\$2.2 billion
	Imperial Valley	1979	\$70 million
	Coalinga	1983	\$18 million
	Whittier Narrows	1987	\$522 million
	Loma Prieta	1989	\$10 billion
	Petrolia	1992	\$80 million
	Landers	1992	\$120 million
	Northridge	1994	\$46 billion
	Nisqually	2001	\$2 billion
<i>Flooding</i>			
Costliest	Midwest Floods	1993	\$1.7 billion
	Tropical Storm Alberto	1994	\$544 million
	Red River Valley	1997	\$731 million

(continued)

Table 35.1 (continued) Selected Disasters in the United States, 1971–2006

<i>Type</i>	<i>Name</i>	<i>Year</i>	<i>Loss Estimate</i>
Over \$100 million	Northeast Coastal Storms	1992	\$100 million+
	Arizona Floods	1993	\$100 million+
	California	1993	\$100 million+
	Houston Floods	1994	\$100 million+
	California	1995	\$100 million+
	Mid-Atlantic	1996	\$100 million+
	Pacific Northwest	1996	\$100 million+
	Ohio River Valley	1997	\$100 million+
	California	1998	\$100 million+
	Texas	1998	\$100 million+

Sources: Terror attacks: <http://www.cnn.com/2003/US/Northeast/02/26/wtc.bombing/>, <http://news.bbc.co.uk/1/hi/world/americas/1319772.stm>; <http://www.insurancejournal.com/news/national/2001/09/21/14327.htm?print=1>; Hurricanes: <http://www.factmonster.com/ipka/A0778285.html>; Earthquakes: <http://www.consrv.ca.gov/cgs/rghm/loss/> and http://www.amre.com/content/home/news/quake_compare.htm; Flooding: http://www.fema.gov/library/df_7.shtm.

Emergency response agencies have experienced significant successes within the past decades in lowering the crime rate in large cities through prevention measures like the creation of gang diversion programs and the use of *security by design*.^{*} They have lowered the incidence of house fires through the mandatory installation of smoke detectors in bedrooms, laundry rooms, and garages of private homes. However, natural hazards cannot be prevented. Only their effects can be moderated. Thus, mitigation and prevention are quite different, and not interchangeable, concepts.

35.3 FEMA and Mitigation

After decades of repetitive losses from natural disasters, especially floods, FEMA began a proactive approach to stop losses. First, a portion of all public assistance costs were allocated for postdisaster hazard mitigation work.

The Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented

^{*} See <http://www.securedbydesign.com/> and <http://www.vcnet.com/expert/library/cpted.html> for a discussion of using environmental design as a deterrent to crime.

during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. (FEMA, 2012a)

Projects included the retrofit of fire stations following earthquakes so that the large doors would be less subject to seismic damage and elevating buildings in a flood plain. These mitigation measures are undertaken as part of the overall repair of the building immediately after the disaster event. Hazard mitigation funds can also be used to enhance emergency response capabilities. For example, following severe flooding in March of 1995 on the Guadalupe River, San Jose, California, received FEMA hazard mitigation funds to purchase swift water rescue equipment for the fire department, including Boston Whalers, outboard motors, and floatation devices.

FEMA also has the option of buying property that is subject to repetitive disaster damage.

Acquisition or Buyout projects, while 75 percent funded by FEMA, are administered by the State and local communities. The State and local communities work together to identify areas where buyouts make the most sense. ... Buyouts are an important way to reduce the risk of future disasters. ... States prioritize mitigation programs with input from the communities. (FEMA, 2012b)

For example, Valmeyer, Illinois, was flooded by the Mississippi River in 1993, damaging 90% of the buildings in this community of 900 people. The flood also affected 1600 people living in the surrounding rural area. The community worked with FEMA to select a *total community relocation* option, and the town was relocated to a 500-acre parcel on high ground (Operation Fresh Start, 2006).

Mitigation is an active effort to prevent future damage through actions taken before another disaster event. The success of the postdisaster hazard mitigation programs connected to actual disasters led to the development of a predisaster hazard mitigation grant program within FEMA. The first such program was *Project Impact*, launched in 1997. Since 1997, 250 selected cities across the country have leveraged federal funds with public/private partnership funds to enhance community safety (Perkins). Each community had to raise its own match for the \$1 million seed money 3–1, ending with a \$4 million treasury. In Oakland, CA, for example,

the city's version of Project Impact has served 500 households a variety of ways. The money has been used for a seismic retrofitting grant program for older residents and home owners with disabilities, to publish a homeowner's retrofitting guide, to open and operate a tool lending library, and to run a program of volunteers performing nonstructural retrofitting work, including strapping down water heaters and installing smoke detectors. "We rented out the tools at no cost for home owners who wanted to do the work. Some of those tools are pretty specialized and expensive. The volunteer program cost \$10,000, but it would cost \$150,000 to \$200,000 if you had to go out and hire contractors to do the work," (Renee Domingo said. (Perkins)

Seattle, Washington, credited the work of Project Impact with saving lives and property after the Nisqually Earthquake in 2001.

... when the Seattle area quake began rattling the city, government officials had gathered to celebrate the third anniversary of the Phinney Neighborhood Center. The 86-year-old brick school had been transformed into a recreation center and retrofitted to survive earthquakes. To the tune of \$1 million, Project Impact has helped retrofit all of Seattle's school buildings and some bridges and it trained more than 1,500 homeowners how to seismically strengthen their homes.

Since 1997, along with the hundreds of community partners, 2,500 business partners have participated in Project Impact efforts. Instead of waiting for disasters to occur, Project Impact encourages communities to develop disaster mitigation projects, plans, and programs to reduce damage from potentially devastating disasters. Homeowners receive education and low-cost financing assistance and grants to help them mitigate property damage and destruction, which, in turn, can help save lives. (Perkins)

FEMA's hazard mitigation programs took hazardous sites and turned them into community assets, involving the residential, school, and business community in a way that encouraged continuing improvement in all-hazards preparedness.

35.4 DHS and Prevention

When terrorists attacked the United States on September 11, 2001, the national sense of safety was destroyed. With a 200-year history of relying on the oceans for continental protection from invasion and war, the population was unprepared to face a weapon of mass killing on American soil. The destruction of the World Trade Center buildings and part of the Pentagon galvanized the federal government into action. Unfortunately, instead of building on existing all-hazards disaster mitigation techniques, the catastrophe changed once again the government's approach to hazard mitigation. A series of Homeland Security Presidential Directives (HSPD) designed a new emergency management strategy. HSPD-1 created a White House Homeland Security Council (Bush, 2001), HDPS-5 created the National Incident Management System (NIMS) (Bush, 2003a), HSPD-7 created an infrastructure protection program (Bush, 2003b), and HSPD-8 created the new and broader definitions of first responders and the National Preparedness Goal (Bush, 2003c).

HSPD-5 defined new intergovernmental relationships and the system under which those relationships will operate, NIMS. HSPD-5 went on to mandate a new National Response Plan (NRP). "This plan shall integrate Federal Government domestic *prevention, preparedness, response, and recovery* plans into one all-discipline, all-hazards plan" (Bush, 2003a, 16). The Federal Response Plan (FRP), 9230.1, promulgated in April 1992, had been developed based on the Stafford Act and described how federal assets would be managed and coordinated in support of local disaster response. The FRP represented coordination among 27 federal government departments and the American Red Cross to deliver specified goods and services to the state and local governments in response to a presidential disaster declaration. It was also a supplement to other federal emergency response plans, such as the Oil Spill Plan (FEMA, 1999).

After November 9, the President wanted the disaster response to be understood as a more integrated approach among local, state, and federal partners. To that end, the NRP was defined as follows (Figure 35.1):

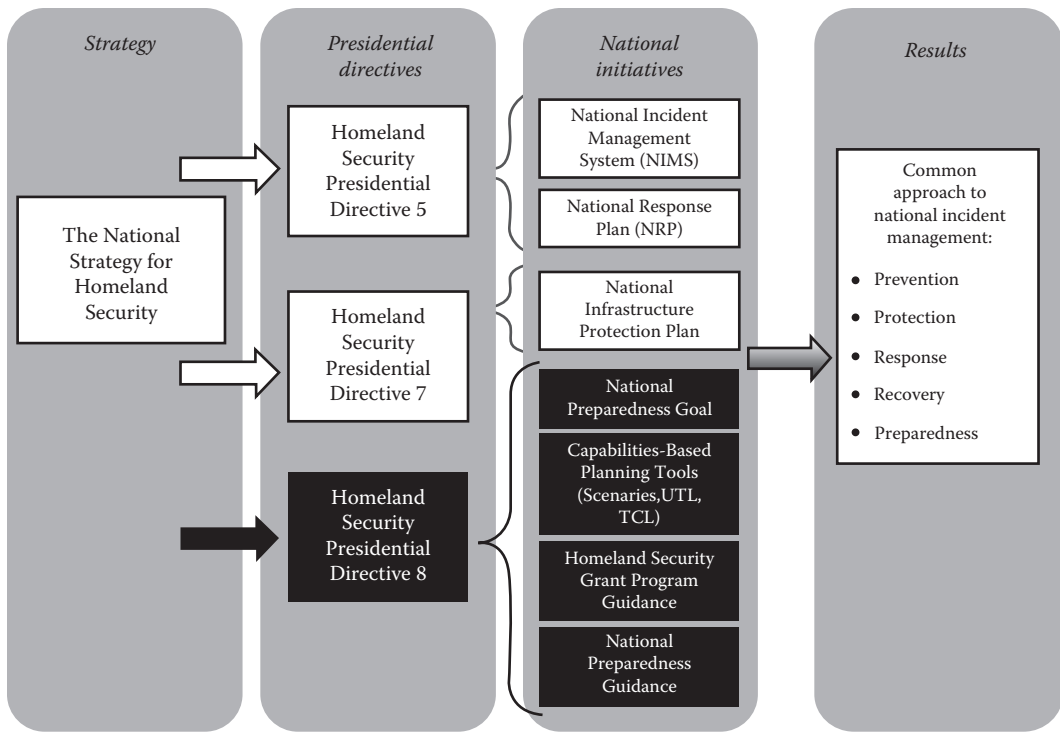


Figure 35.1 HSPD 5, 7, and 8 in context. (From DHS, Interim national preparedness goal, p. 2. March 31, 2005d.)

The NRP, using the NIMS, shall, with regard to response to domestic incidents, provide the structure and mechanisms for national level policy and operational direction for Federal support to State and local incident managers and for exercising direct Federal authorities and responsibilities, as appropriate. (Bush, 2003a, 16(a))

Unique features of the NRP included operational direction for a variety of threat levels, and

... incorporation of existing Federal emergency and incident management plans (with appropriate modifications and revisions) as either integrated components of the NRP or as supporting operational plans; (Bush, 2003a, 16(b))

Aggressive deadlines were set for the development and review of the new NRP.

The DHS described the new plan this way.

The National Response Plan may be implemented for threats or potential Incidents of National Significance to *prevent or intervene* to lessen the impact of an incident. *Prevention* activities may include: heightened inspections; improved surveillance

and security operations; public health and agricultural surveillance and testing; immunizations, isolation, or quarantine; and, as appropriate, specific law enforcement operations aimed at deterring, preempting, interdicting, or disrupting illegal activity and apprehending potential perpetrators and bringing them to justice. (DHS, 2004a, 681)

The plan described the four phases of emergency management in the new terrorism-focused *all-hazards* framework as *prevention, preparedness, response, and recovery*, with mitigation eliminated. While the theory of collaboration was sound, the implementation of and training for the NRP had not yet occurred when the 2005 hurricane season left a tragic legacy along the Gulf Coast. The resulting confusion over roles, together with the 4-year focus on terrorism, resulted in a local, state, and federal response that was too slow to save 2000 lives.

The NRP was replaced by the National Response Framework. By 2008, the scope has been broadened to include “actual or potential emergencies or *all-hazard* events that range from accidents and natural disasters to actual or potential terrorist attacks. Such incidents range from modest events wholly contained within a single community to others that are catastrophic in nature and national in their scope of consequences” (DHS, 2008, 1). However, regardless of the *all-hazard* commentary provided by DHS, the framework itself says, “Incident management refers to how incidents are managed across all homeland security activities, including *prevention, protection, and response and recovery*” (FEMA 2008, 6). Mitigation is only mentioned as a local or tribal responsibility or a part of recovery with no mandate, where jurisdictions should “incorporate mitigation measures and techniques, *as feasible*” (FEMA 2008, 45). Mitigation grants are mentioned as a role of the Joint Field Office, again with no mandate (FEMA 2008, 46) and as part of Emergency Support Function 14 (FEMA 2008, 59).

DHS’s prevention efforts employed a variety of methods. For example, the City of Los Angeles Police Department received research and development funds to create “Project Archangel,” an architecture for handling information about potential terrorist activities to create actionable intelligence (DHS, 2005b). The Buffer Zone Protection Project (BZPP) provided a list of critical infrastructure sites within a jurisdiction that could be vulnerable to terrorism. The law enforcement agency for that site worked with the owner to develop a plan to prevent attacks against the site, with a potential for up to \$50,000 in funding to support the upgrades. As part of the Information Analysis Infrastructure Protection (IAIP) program, the BZPP was intended to protect critical infrastructure from terrorist attack.

This grant program reflects our commitment to continue to protect and defend the security of the United States against the threat posed by terrorism,” said Matt A. Mayer, Acting Executive Director of the Office of State and Local Government Coordination and Preparedness, the office responsible for the Office for Domestic Preparedness. “Through this program, we will continue to work with the nation’s prevention, preparedness, and response community and the private sector in our national effort to combat terrorism and secure our homeland. (DHS, 2005a)

Because terrorism is human caused, prevention is an appropriate approach. Good intelligence, surveillance, and target hardening can all contribute to the prevention of terrorist attacks. However, prevention is only effective against human-caused events. It is impossible to prevent

a hurricane or an earthquake, and while levees can prevent flooding on stretches of a river, the potential for failure and flooding in a large storm persists, as demonstrated in New Orleans during Hurricane Katrina.

The National Preparedness Goal emphasized prevention while ignoring mitigation. Prevention is displayed as one of the four subsets of the National Preparedness Goal in the DHS graphic that follows.

The DHS developed a set of 15 *planning scenarios* that encompass the range of *plausible* events that could pose *the greatest risk to the nation* (DHS, 2005c). Although the Universal Task List (UTL) claims an all-hazards focus, it is based on the 15 planning scenarios, 12 of which are terrorism focused, while the other 3 are catastrophic hurricane, catastrophic earthquake, and pandemic flu.

The National Preparedness Goal uses the UTL to define the steps needed for all-hazards preparedness focused on these 15 scenarios. These 1600 universal tasks are divided into segments under each of the four phases: *prevent, protect, respond, and recover*. The *prevent* phase postulates only activities that will be effective against human-caused events. *Detect threat*, for example, focuses on data collection and intelligence. The next step is *control access*, focused on inspection and monitoring. The third step is *eliminate threats*, focusing on investigating and apprehending the suspect, seizing the evidence, defeating weapons, and prosecuting the suspect terrorists (DHS, 2004b).

The homepage for the National Preparedness Guidelines still states that the UTL is one of the critical elements of national preparedness: “3.The Universal Task List (UTL), which is a menu of some 1,600 unique tasks that can facilitate efforts to *prevent, protect against, respond to, and recover from* the major events that are represented by the National Planning Scenarios” (DHS, n.d.). Regardless of the Post-Katrina Emergency Management Reform Act’s (Post-Katrina, 2006) mandates to include natural hazards in disaster planning, and the inclusion of three natural hazards in the 15 exercise scenarios, the UTL fails to account for meaningful mitigation programs across risks.

The wording of the UTL, which is now a multipage Excel spreadsheet, is unchanged from 2007 (DHS, 2007) and still uses the same four rubrics to describe the desired tasks: *prevent, protect, respond, and recover*. This makes it clear that while the title says all hazards, the focus is on intentional acts that are preventable through human intervention. The concept of physical mitigation against unpreventable natural occurrences has been relegated to part of the recovery effort.

35.5 Community and Mitigation and Prevention

All-hazards emergency management posits that *preparing* for any disaster that has significant community consequences provides a platform for response to any other major disaster. Thus, in California most communities prepare for earthquakes, while in Florida communities prepare for hurricanes, but in both cases a response to an explosion can be managed from the same Emergency Operations Plan and the same Emergency Operations Center.

Likewise in some ways *mitigation* has multiple benefits that are cumulative across the disaster spectrum. For example, community disaster preparedness education creates a population base that is self-supporting for the first hours of a disaster event, regardless of its cause. The creation of a

thorough risk analysis for the community provides first responders with predisaster knowledge of vulnerabilities, such as slopes, poor soil, or fault areas, which may inform their response decisions in all hazards.

While prevention is situationally specific, such as preventing crime or preventing floods, mitigation crosses situations, benefiting response regardless of the hazard. For example, the development of communications interoperability or geographical information system (GIS) maps will serve first responders in any disaster. The emphasis on *prevention*, however, creates the investment limitations of a single disaster focus, while a return to the mitigation philosophy would provide a broader-based use of funding for community protection.

In 2006, DHS revised the Urban Area Security Initiative grant program to make all financial awards dependent on risk assessment and to reposition population as a factor in eligibility only as it related to *human health*. Urban areas will only receive funding if their threat analysis meets federal guidelines for severity. As shown in Figure 35.3, all mention of natural hazards had been removed from the evaluation, even though the 15 planning scenarios include earthquake and hurricane. Threat is defined in the geographic element exclusively as a function of intelligence, not meteorology, seismology, hydrology, or geology.

Most troubling is the initial statement, “(this) risk methodology represents a major step forward in the analysis of the *risk of terrorism* faced by our Nation’s communities” (DHS, 2006). Regardless of the label *all hazards* that appears throughout the documents, the focus of effort remains fixed on terrorism, even years after the Katrina catastrophe.

Perhaps worst of all is the impact such an approach has on the community. Project Impact and the CERT programs brought the business community and the residents to emergency preparedness as full partners. These mitigation-focused programs acknowledge the risk of disasters and invite the community to undertake physical and financial mitigation in advance of a disaster. Capital improvements paid for with local tax dollars and personal kits bought from the family budget combined to lessen the likelihood of catastrophic losses, while flood, earthquake, and wind insurance helped to mitigate the financial losses. Experiences along the nonflooded portions of the Gulf Coast after Katrina proved again the value of these steps.

Terrorism prevention programs have focused on community terrorism awareness training and neighborhood-watch-style surveillance. The Citizen Corps was created as a merger of CERT, Neighborhood Watch, and Volunteers in Police Service programs, as well as creating a Fire Corps, and a Medical Reserve Corps that is evolving.* It also attempted to create a tip program that failed, being viewed as intrusive by many community members.† Most community members do not identify with the surveillance activities, and many fear that Citizen Corps is a ruse for getting neighbors to spy on each other.

Katrina taught observers the importance of conscientious mitigation in businesses, hospitals, schools, homes, and public buildings. It clearly demonstrated the importance of predisaster education of public employees so that they fulfill their disaster duties to the community. It showed the importance of family preparedness, so emergency workers and public employees can stay at work to help the community, while having peace of mind about their loved ones. Fifty New Orleans Police Department (NOPD) employees were charged with dereliction of duty for deserting their posts during the hurricane, most to go home and care for their families. Contrast this with the fact

* For details on Citizen Corps see <http://www.citizencorps.gov/>, accessed January 24, 2013.

† For a private site that expressed the concerns of many, and provides a copy of the now-withdrawn program description, go to <http://www.dojgov.net/TIPS-01.htm>, accessed January 24, 2013.

that 80% of NOPD employees were left homeless by the storm (USA Today, 2006), yet did their duty to preserve public safety (Time Magazine, 2005).

35.6 Conclusion: Mitigation Includes Prevention

While prevention and mitigation are both useful tools in preparing communities for specific disaster resilience across all hazards, prevention has no application in natural hazards, where the goal is the mitigation of the effects on humans and society. Most of the risks experienced by communities are not preventable. Terrorism may be preventable, but the rest of the threats—natural and technological—will come in cycles, with the seasons, or as a result of poorly understood natural phenomena. As Table 35.1 shows, the toll taken by all the other hazards far outweighs the toll of terrorism to date. While researchers speculate about *worst case terrorism*, such as weaponized smallpox or a nuclear bomb, community emergency planners are facing the natural and technological threats that have no season and have no warning.

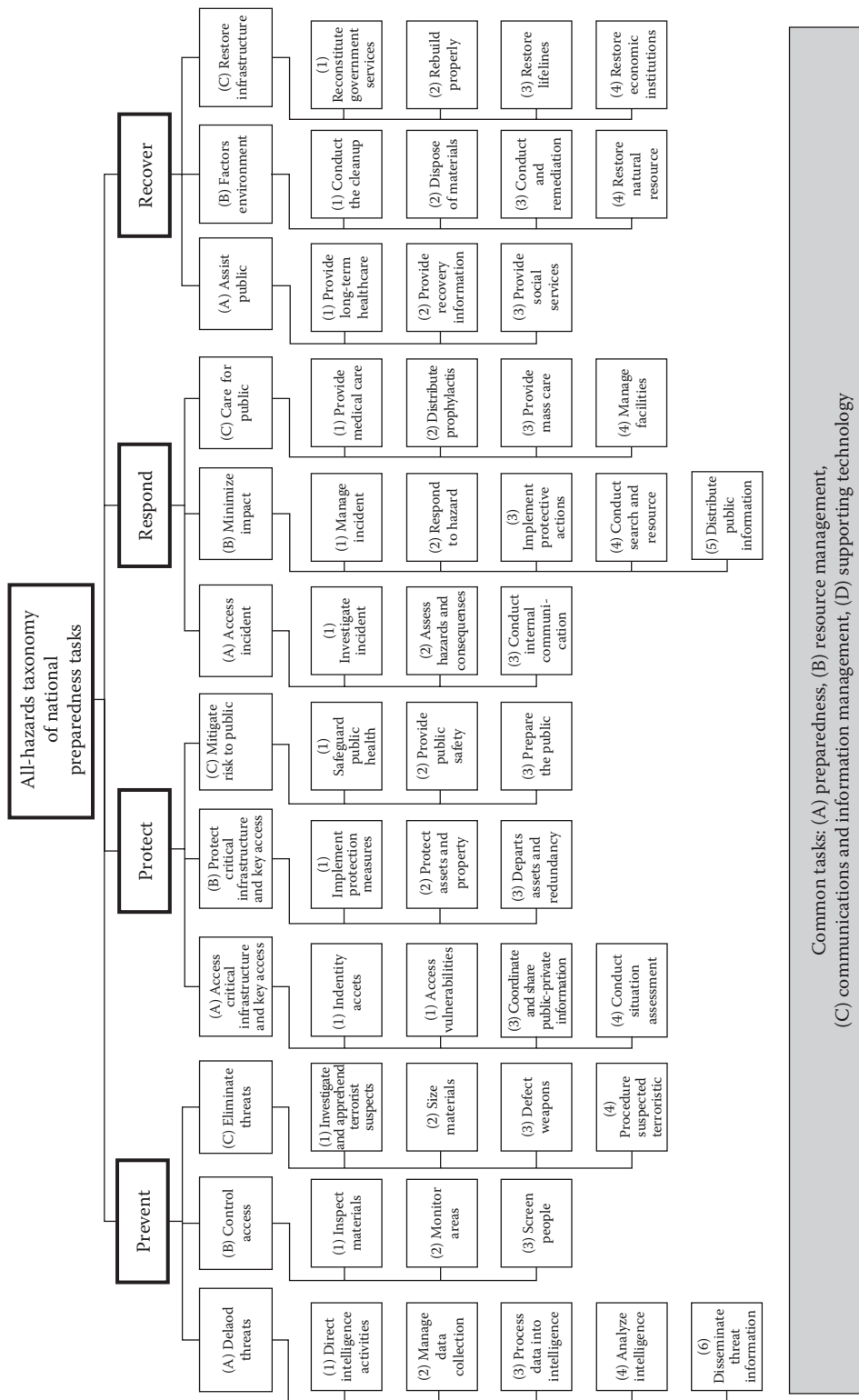
Mitigation includes prevention where possible. Protective public works are built to prevent floods, and safety systems are installed to prevent hazardous material releases. What cannot be prevented must be mitigated through personal preparedness, community planning, and public agency strategies like emergency plans and emergency operation center (EOC).

Likewise, *all hazards* include terrorism as one of many disasters that might befall a community. A terrorist chemical attack is the worst kind of hazardous material event. A terrorist biological attack is the worst kind of medical epidemic. On the other hand, *homeland security* limits capability development to *prevention* of various forms of *terrorism*. Figure 35.2 clearly shows the narrow interpretation of the UTL, while Figure 35.3 shows that the 2006 UASI evaluation technique factors out earthquakes, hurricanes, and floods.

The nation should have learned something from recent disasters. The 2004 hurricane season provided four major disasters, followed by the tsunami in South Asia, the earthquake in Pakistan, and the Katrina/Rita/Wilma storms of 2005. The death and destruction was on a grand, multinational scale. The economic impact on each damaged community was almost irreparable. In each case, it was a failure to take mitigation seriously that caused large-scale loss of life, catastrophic environmental damage, and economic disaster. No amount of prevention was possible.

The two terrorism events abroad during that same time frame did not lend themselves to prevention, either. The bombing of the train in Madrid in March 2004 occurred in a nation where domestic terrorism has been going on for generations, with the Basque separatists against the government. The London subway bombing occurred in a city that has weathered Irish Republican Army terrors for over 50 years and has sophisticated camera systems on its subways and a well-trained public, with a *stiff upper lip*. The Israelis are one of the most thoroughly antiterrorism-indoctrinated populations in the world, yet terrorist acts continue to be a part of the community, occurring in cafes and markets and on buses. One could conclude from these examples that prevention does not work very well, even in societies with a community knowledge base and a long history of coping.

The 2004–2005 cycle of seasons has one lesson. The worst credible terrorist attack cannot wreck the widespread havoc generated by an earthquake, hurricane, or tsunami in an urban area. Federal programs must be realigned to *all hazards and mitigation* to best protect the nation against the most credible threats.



Common tasks: (A) preparedness, (B) resource management, (C) communications and information management, (D) supporting technology

Figure 35.2 National Preparedness Goal, Universal Task List 2.0. (From DHS, Office of State and Local Government Coordination and Preparedness, Universal task list: Version 2.1, p. 3, May 23, 2005.)

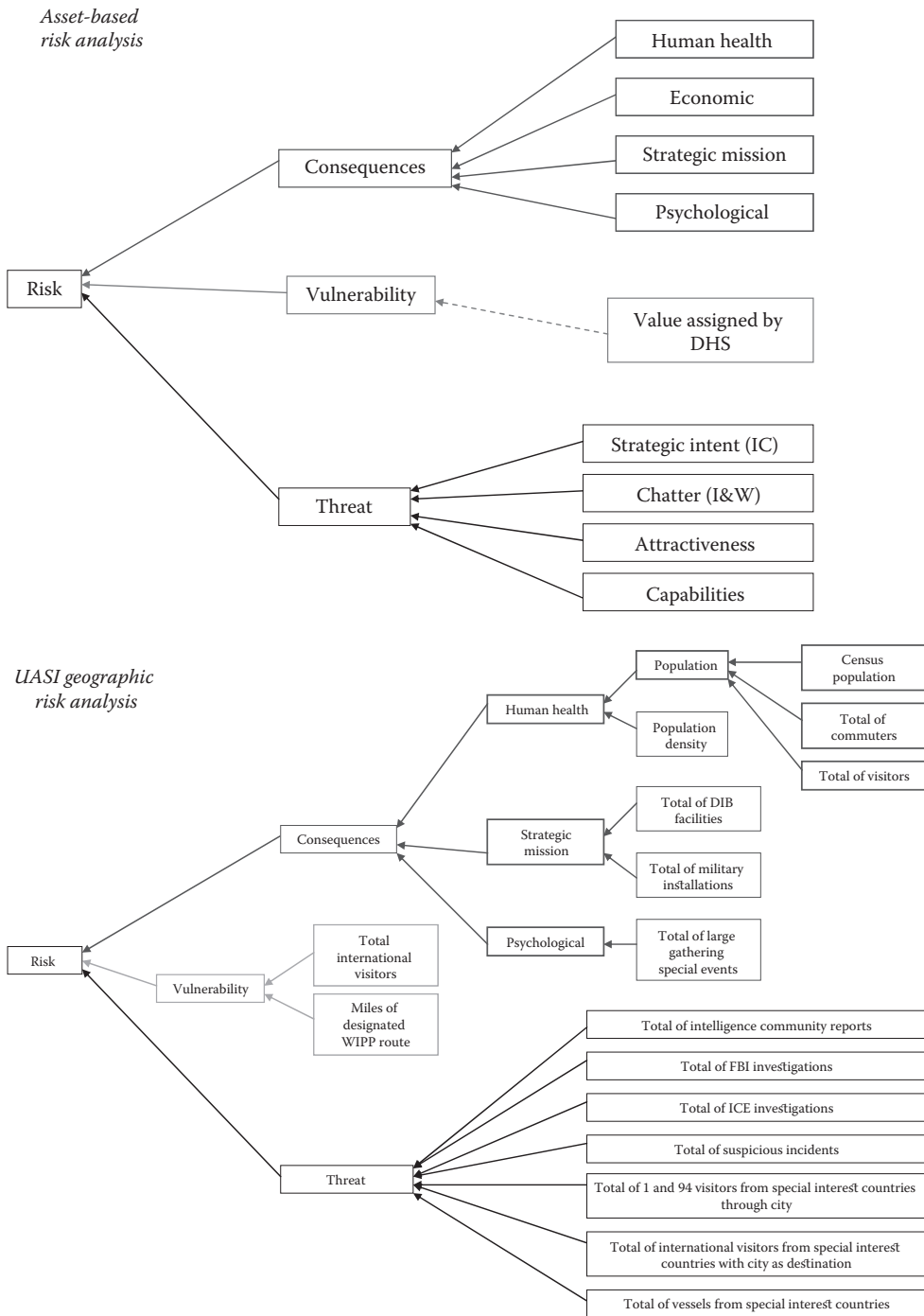


Figure 35.3 Visual representation of FY 2006 UASI risk model. (From DHS, Discussion of the FY 2006 risk methodology and the Urban Areas Security Initiative. Preparedness Directorate, Office of Grants and Training, 2006.)

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Chapter 36

Advancing Community Resilience to Disasters

Considerations for Theory, Policy, and Practice

Rose L. Pfefferbaum

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36.1 Introduction

Community resilience has become part of the lexicon of disaster readiness, response, and recovery. Not always clearly defined, community resilience is a construct that both supports and requires disaster management. This chapter reviews briefly the emergence of community resilience in policy, planning, and practice in recent years. The chapter then explores the meaning of community resilience, its distinction from personal resilience, the focus on adaptation, characteristics of disaster-resilient communities, and measurement issues. Strategies for building community resilience to disasters are proposed. The Communities Advancing Resilience Toolkit (CART)© (Pfefferbaum et al., 2011), a community intervention designed to enhance community resilience, is described to illustrate principles in strategy development and implementation.

36.2 Emergence of Community Resilience in Emergency Management

Even a cursory review of recent US policy related to disasters and homeland security suggests the increasing importance of community resilience in emergency management since Mileti (1999) advocated fostering local *resiliency* and responsibility as one of the six objectives that must simultaneously be accomplished as part of a sustainable hazard mitigation policy. More than a decade ago, the guidebook for Project Impact, a program of the Federal Emergency Management Agency (FEMA), outlined four steps for building a disaster-resistant community (FEMA, 1997). A subsequent publication describing Project Impact, *Planning for a Sustainable Future: The Link Between Hazard Mitigation and Livability* (FEMA, 2000), identified *resilience* to disasters as an essential characteristic of a sustainable community. By 2010, community resilience had become a fundamental feature of public policy and planning, evident in research and reports. For example, the 2010 US Department of Homeland Security (USDHS, 2010) *Quadrennial Homeland Security Review Report* (QHSR Report) identifies resilience at the individual, community, and system levels as one of three key concepts essential to, and part of the foundation for, a comprehensive approach to homeland security. The purpose of this first QHSR Report was to outline the strategic foundation to guide the work of homeland security participants—“all Federal agencies, State, local, tribal, and territorial governments, businesses, and nongovernmental organizations, as well as individuals, families, and communities”—toward a common vision for the homeland as “safe, secure, and resilient against terrorism and other hazards where American interests, aspirations, and way of life can thrive” (p. 3). The 2009 US Department of Health and Human Services (USDHHS, 2009) *National Health Security Strategy of the United States of America (National Health Security Strategy)* is the nation’s first comprehensive strategy for improving the management of major health incidents. National in scope, the *National Health Security Strategy* requires the commitment of

all levels of government, individuals, families, and communities. The vision for national health security—that the Nation and its people be prepared for, be protected from, respond effectively to, and be able to recover from incidents with potentially adverse health consequences—was based on community resilience. The *National Disaster Recovery Framework (NDRF)* (FEMA, 2011), which establishes a national disaster recovery strategy based on the primacy of local, state, and tribal governments in managing disasters, also recognizes the importance of community resilience as part of a successful recovery process.

The 2010 QHSR Report (USDHS, 2010) identifies five homeland security missions: (1) preventing terrorism and enhancing security, (2) securing and managing borders, (3) enforcing and administering immigration laws, (4) safeguarding and securing cyberspace, and (5) ensuring resilience to disasters. In detailing goals for ensuring disaster resilience, the QHSR Report focuses on the four traditional emergency management elements of hazard mitigation, preparedness, response, and recovery. Specifically, the goals associated with ensuring resilience to disasters are to (1) “*Mitigate hazards*: Strengthen capacity at all levels of society to withstand threats and hazards,” (2) “*Enhance preparedness*: Engage all levels and segments of society in improving preparedness,” (3) “*Ensure effective emergency response*: Strengthen response capacity nationwide,” and (4) “*Rapidly recover*: Improve the Nation’s ability to adapt and rapidly recover” (p. 33). The QHSR Report describes several requirements for achieving resilience: it emphasizes the importance of mitigation and preparedness by recommending that US emergency management shift from a primary focus on response and recovery to one that balances the four elements; it advises incorporating a comprehensive understanding of risk in establishing priorities and informing decision making; and it advocates the engagement of all stakeholders in the emergency management process instead of top-down management. The QHSR Report recognizes that since disasters occur locally, the “first line of defense rests with individuals, families, and communities, who must take responsibility for their own safety and must be prepared to respond to and possibly endure a crisis when disaster strikes” (p. 31).

36.3 Defining, Describing, and Measuring Resilience and Community Resilience

Resilience has been defined differently in various disciplines (e.g., ecology, economics, engineering, geography, health, physical science, psychology, sociology), which use the concept in assorted contexts and for diverse reasons. For purposes of this chapter, resilience may be defined as the process of successfully adapting to, and recovering from, adversity. This simple definition, while similar to others, conceals divergence of opinion among researchers, practitioners, and policy makers, which may be important for measuring resilience and, therefore, for generating evidence-based strategies to enhance it. The following is not a thorough review of definitions but rather a consideration of issues that may be important for understanding community resilience from the perspective of disaster management.

36.3.1 Resilience as an Attribute, a Process, or an Outcome

One distinction in definitions is whether resilience is described as an *attribute* or a *process*, which has been referred to as a difference between *being* and *becoming* (CARRI, 2013, p. 3). The previous simple definition refers to a process (i.e., adaptation and recovery) as compared to definitions that refer to an attribute such as the *ability* or *capacity* of a system to adapt and recover. The definition

of resilience as a process distinguishes it from the attributes that characterize a resilient system. Pfefferbaum et al. (2008, p. 52) adopt a similar definition, describing community resilience as “a process evident in adaptation to threat or attack, stress, disruption, and security concerns,” where adaptation is the *outcome*. Norris et al. (2008, p. 130) define resilience as a process that links a set of adaptive capacities (resources with dynamic attributes) “to a positive trajectory of functioning and adaptation” following a disturbance to a system. According to their theory, resilience emerges from the adaptive capacities (economic development, social capital, information and communication, and community competence) and leads to adaptation (an outcome) characterized by wellness.

In contrast to a process definition, Bruneau et al. (2003, p. 735) define community resilience in the context of earthquakes as “the ability of social units (e.g., organizations, communities) to mitigate hazards, contain the effects of disasters when they occur, and carry out recovery activities in ways that minimize social disruption and mitigate the effects of future” events. They elaborate by identifying four properties of resilience: (1) *robustness* which refers to strength, the ability to withstand stress and continue functioning effectively; (2) *redundancy* which refers to the substitutability of elements and systems with respect to functional requirements; (3) *resourcefulness* which refers to the ability to identify problems, define priorities, and bring resources to bear to address threats and disruptions; and (4) *rapidity* which refers to the ability to meet priorities and accomplish goals in a timely manner so as to limit losses and prevent future disruption. The *NDRF* (FEMA, 2011, p. 81) makes a similar reference to attributes, indirectly incorporating some of these properties in the definition of resilience as the “ability to adapt to changing conditions and withstand and rapidly recover from disruption due to emergencies.”

For Butler et al. (2007, p. 403), resilience refers to recovery and the means and mechanisms of that recovery. They thus link process with outcomes. Masten and Obradovic (2008, p. 2) merge process, attributes, and outcomes, defining resilience as “the processes of, capacity for, or patterns of positive adaptation” in the midst of, or following, adversity.

36.3.2 Differences between Personal Resilience and Community Resilience

Community resilience is not merely a collection of personally resilient individuals responding individually to a particular adversity. Community resilience involves collective activity. Thus, a community consisting of personally resilient individuals would not necessarily be resilient (Brown and Kulig, 1996/1997; Pfefferbaum et al., 2007, 2008; Norris et al., 2008). For the community to be resilient, individuals must be able to work together in ways that support response and recovery for the whole. Brown and Kulig (1996/1997, p. 43) maintain that, at the very least, a community should be viewed as a dynamic interactive set of relations between given individuals so that individuals “in communities are resilient together, not merely in similar ways.” Individual and collective action also must be supported by physical and social conditions and structures that permit resilience to emerge in the face of disaster (Brown and Kulig, 1996/1997; Pfefferbaum et al., 2007, 2008).

For many adversities in which survivors contribute to response and recovery efforts, the presence of personally resilient individuals will likely benefit others in the community. These benefits are less likely to materialize during a disaster that affects many members of the community if individuals are forced by circumstances to focus primarily on themselves and their families, thereby leaving them with little to offer others. It is in this, as well as other ways, that disasters overwhelm a community.

Just as the collection of personally resilient individuals does not guarantee resilience of the community, the converse is also true: a resilient community does not guarantee the resilience of individual members. Community resilience may address behavioral and functional problems at the individual level (Pfefferbaum et al., 2007), thereby perhaps strengthening the personal resilience of some members. Nonetheless, the resilience of a community does not ensure the resilience (or survival) of individual members. Communities may recover from disasters even when individual members do not.

36.3.3 Stability versus Change

In materials science, resilience typically involves the capacity of a material to maintain or return to the same state after a disturbance. In ecological systems, resilience focuses on change, adaptation, or adjustment following an adverse event in order to maintain or regain essential functioning (Holling, 1996; Moser, 2008). Community resilience generally reflects a capacity to change and adapt (Longstaff, 2005; Cutter et al., 2008; Norris et al., 2008) and, for some authors, the potential to grow from a crisis (Brown and Kulig, 1996/1997; Kulig, 2000; Pfefferbaum et al., 2007, 2008). Pfefferbaum et al. (2007, p. 349) describe community resilience as “grounded in the ability of community members to take meaningful, deliberate, collective action to remedy the effect of a problem, including the ability to interpret the environment, intervene, and move on.”

36.3.4 Characteristics of Resilient Communities

Pfefferbaum et al. (2008) drew on the community competence and capacity literatures (Cottrell, 1976; Gibbon et al., 2002; Goeppinger and Baglioni, 1985; Goodman et al., 1998; Labonte and Laverack, 2001a,b) to identify characteristics of resilient communities. Eight community resilience factors were identified and are described later: (1) connectedness, commitment, and shared values; (2) participation; (3) support and nurturance; (4) structure, roles, and responsibilities; (5) resources; (6) critical reflection and skill building; (7) communication; and (8) disaster management.

36.3.4.1 Connectedness, Commitment, and Shared Values

Connection to a place or a group of people with shared history, laws, values, interests, and customs is the cornerstone of a *community*. One's sense of belonging and commitment to a community may be intensified by the perception that community members are treated fairly and that one's personal well-being derives from membership in the community. Relationships epitomized by mutual concern and benefit may foster cooperation and consensus building. When diversity among members is supported, communities should be better able to address the needs of its members during and in the aftermath of disasters.

36.3.4.2 Participation

Participation in community activities and organizations can contribute to a sense of belonging and feelings of ownership, leading to increased personal contribution and commitment to community life. Communities that value and encourage participation may find their members more actively engaged and invested in civic roles. When opportunities for involvement are extended to all members of the community and are sensitive to the interests and demographics of those

members, communities should be better able to identify and address concerns that arise in conjunction with disasters as well as those that derive from other sources.

36.3.4.3 Support and Nurturance

Communities can bolster personal and collective resilience by attending to the needs of their members regardless of socioeconomic status, ethnicity, experience, and background. Supportive and nurturing communities ensure that basic human needs are met, provide opportunities for members to be heard, help members to overcome problems and achieve goals, promote member well-being, empower individuals and groups, and instill hope. Communities that become adept at identifying, acquiring, and equitably allocating resources should be better able to provide support and nurturance. In resilient communities, support mechanisms provide early and ongoing assessment of, and assistance to, potentially vulnerable members before, during, and in the aftermath of disasters. Support must be sustained through crises if it is to buffer the personal, social, and economic losses that accompany these events.

36.3.4.4 Structure, Roles, and Responsibilities

Resilient communities reflect an appreciation for equity in establishing community standards, rules, and procedures that foster social interaction and governance. Members are able to navigate the complex reciprocal links and overlapping networks among the entities (e.g., individuals, groups, organizations, agencies) that comprise their community. In resilient communities, interactions are frequent and supportive, with individuals and groups identifying and addressing common concerns. Solutions may emerge from formal or informal associations that arise to establish priorities and resolve issues. Strong and responsive leadership, able teamwork, transparent organizational structures, and well-defined roles, responsibilities, and lines of authority facilitate readiness, response, and recovery. Reducing adverse secondary consequences of disasters requires structure, roles, and responsibilities that create the capacity for prevention, mitigation, and preparedness as well as decisive and timely response to crises. In a highly uncertain, all-hazards environment, structural elements must be flexible in addressing unforeseen vulnerabilities and threats.

36.3.4.5 Resources

A community's resources include natural, physical, financial, human, and social assets belonging to members as well as those attached to the community itself. In addition to land and other raw materials, resources include the built infrastructure and machinery and tools used in production. Money and credit constitute financial resources that facilitate the acquisition of other resources, the production and distribution of goods and services, and exchange within the community and across communities. Human resources include a workforce, expertise, and leadership for community and personal development as well as member qualities such as hope and the will to improve community well-being. Social resources include relationships and support systems within a community and characteristics such as cohesion. In resilient communities, redundancy in some resources is supported to maintain essential functions. Resilient communities acquire, mobilize, allocate, invest in, and use their resources effectively to serve members and meet community goals. Ongoing investment in physical, human, and social capital, such as improvements in schools and health facilities, job training, and neighborhood development, may be necessary to create resource infrastructures and systems that can endure and respond to a wide variety of potential disasters and threats.

36.3.4.6 Critical Reflection and Skill Building

Resilient communities establish structures to collect, analyze, and use information; identify and address local issues, needs, and problems; recognize and frame collective experiences; and plan, manage, and evaluate programs and activities. Critical reflection regarding values, their history and experiences, and the experiences of others should permit formal and informal community leaders to reason, establish goals and objectives, make decisions, and develop and implement strategies for the benefit of the community and its members. Resilient communities assess their performance, study their successes and failures and learn from adversity, and support skill building at individual and systemic levels. Learning, accommodation, and growth may lead to enhanced capacity and improved disaster resilience.

36.3.4.7 Communication

Community resilience requires, and is reinforced by, clear, timely, accurate, and productive communication among members, between authorities and community residents, and with other communities and the larger society. Productive communication requires common meanings and understandings and the perception of honesty and openness. Community members and groups should have opportunities to identify and articulate their views and their needs, and they should be encouraged to participate in community problem-solving, especially if diversity is to be embraced. Open and effective communication can foster trust in leadership, and in the face of disasters, it can enhance preparedness, compliance with directives, effective response, and successful recovery. Communication also can call attention to, and promote the resolution of, existing and emerging unmet needs as well as those that accompany disaster. Resilience to disasters depends on sufficient redundancy in communication channels to ensure timely resource mobilization and deployment.

36.3.4.8 Disaster Management

Community resilience to disasters requires the adoption and implementation of measures to prevent and mitigate, prepare for, and respond to disasters, thereby limiting adverse consequences and setting the stage for reconstruction and recovery. Prevention and mitigation include activities to avoid or control an incident, to lessen risks to people and property, and to reduce potential or actual adverse effects. Mitigation measures, implemented prior to, during, or after an incident, are designed to decrease the likelihood of hazardous incidents and limit exposure to, or potential loss from, such events. Preparedness is an ongoing process that assesses threats, identifies vulnerabilities, and determines resource requirements. Preparedness involves efforts to prevent and mitigate adverse consequences and to amass resources for response and recovery. Response addresses the direct, short-term effects of a disaster. In addition to emergency assistance, disaster response includes efforts to lessen further damage during or in the immediate aftermath of a disaster; to support basic human needs; and to maintain the social, economic, and political structure of an affected community. The relatively short-term response phase transitions into a longer period of recovery during which survivors begin to rebuild their lives and their community.

36.3.5 Measuring Community Resilience

Whether conceptualized as a process, an attribute, or an outcome, resilience cannot be fully understood in isolation from the threat or adversity that gives rise to its manifestation. An entity may be resilient in the face of some threats or crises and not others. Granted, some of the attributes

associated with resilience surely affect resilience to multiple threats and tragedies, and it is likely that resilience to certain adversities will have beneficial effects with respect to other adversities. Nonetheless, efforts to measure community resilience must reckon with the difficulty of disentangling resilience from the threat.

In practice, measurement most likely involves assessing the attributes that define (in the case of definitions that focus on attributes and outcomes) or describe the construct. These attributes typically will be measured at a single point in time as though one were taking a snapshot of a community. The dynamic nature of communities and their attributes can be captured, to some extent, by a series of such measurements over time. One design for a study of a community's resilience would be longitudinal and prospective, with a baseline assessment describing the community prior to an event and repeated measurements during and post event. Selecting the appropriate times for taking such measurements is complicated by the change in a community's functioning as it moves across time from the disaster through recovery as well as by concerns for rapidity as a property of resilience.

The Community and Regional Resilience Initiative (CARRI) provides an example of current efforts to assess community resilience with indicators that can be used to compare communities, identify vulnerabilities, and develop strategies for enhancing resilience (CARRI, 2013; Cutter et al., 2008). CARRI (2013, p. 10) defines community resilience as "the capability to anticipate risk, limit impact, and bounce back rapidly through survival, adaptability, evolution, and growth in the face of turbulent change". CARRI has identified four sets of metrics for creating a baseline assessment of a community's resilience and suggests candidate variables for each: (1) social vulnerability, (2) built environment and infrastructure, (3) natural systems and exposure, and (4) hazards mitigation and planning (Cutter et al., 2008). Each of these four components is represented within a geographic information system as a separate data layer that, when combined, illustrates a composite pattern (Cutter et al., 2008).

36.4 Community Resilience Strategies

Community resilience has emerged both as a vision for, and as a mechanism to accomplish, disaster readiness, response, and recovery. Both require professionals and policy makers to generate strategies for building disaster-resilient communities as part of disaster management efforts. Seven general strategies are offered here. In that community resilience can be conceptualized as a process, these strategies focus on methods as much as outcomes. The guiding methodological principles are to involve a breadth of community stakeholders as appropriate, to build awareness and consensus when possible, and to empower community members to take action when feasible. The seven strategies, described later, are to (1) foster economic development, (2) stimulate strengths-based community development, (3) know the community and share that knowledge, (4) bolster connections, (5) adopt a holistic wellness focus, (6) undertake effective disaster management, and (7) create a consciousness of community resilience.

36.4.1 Foster Economic Development

Economic development is a concern for virtually all communities. It is of particular importance in resource-poor settings. Given similar environmental vulnerabilities and threats, poor communities lacking individual and communal resources, a solid economic base, and capable transitional leadership generally will be less able than communities that are better endowed

to mount an effective disaster management program consisting of prevention and mitigation, preparedness, response, and recovery (Pfefferbaum et al., 2008). Communities characterized by significant inequalities in income and wealth also may be at increased risk for adverse disaster effects. Cutter et al. (2008, p. 3) describe the “social vulnerability of communities” borne of inequalities. Morrow (2008) maintains that it is unreasonable to expect large segments of the population who are impoverished and living with danger and insecurity on a daily basis to be able to anticipate and respond effectively to external threats without assistance. When compounded by the destruction that accompanies disasters, such populations and communities are particularly vulnerable. Norris et al. (2008) recommend that economic and social resources, which are essential to disaster readiness and response, be acquired and shared to reduce risk and address the social vulnerability associated with disasters. Policies and programs that speak to resource inequities across and within communities must be a feature of comprehensive state and federal approaches leading to disaster-resilient communities within a disaster-resilient nation. Given the sizeable public expenditure of disaster management resources devoted to addressing the needs of the most vulnerable segments of the population who are likely to be severely affected and without the personal means for response and recovery, such policies and programs are as practical as they are moral (Morrow, 2008).

36.4.2 Stimulate Strengths-Based Community Development

Communities need not, indeed they must not, wait for public policies to usher in a more egalitarian society or for an infusion of external resources. Community resilience can be fostered by community development based on local input and engagement (Pfefferbaum et al., 2008). Kretzmann and McKnight (1993) recommend capacity-focused community development as an alternative to the traditional, needs-driven approach. They maintain that a needs-based approach teaches people about their problems and the importance of services, often resulting in environments in which residents’ behavior is affected by their perception of themselves as service recipients in need of assistance from those outside the community. These individuals come to think of themselves not as producers but rather as consumers. Many will become unnecessarily dependent, and some will try to outwit the system in an effort to increase their personal bounty. Asset-based development, as compared to a needs-based approach, focuses on identifying, linking, and capitalizing on the capacities, skills, and assets of individuals and their neighborhoods. Kretzmann and McKnight (1993) maintain that a community is enriched and becomes more self-reliant when residents join with each other to address problems and when organizations collaborate to take collective action. Community members who believe in their ability to solve problems have increased capacity for self-direction. Kretzmann and McKnight (1993) make a strong case for engaging community members who are marginalized as a result of age or label since these individuals may ask new questions, perceive roles and responsibilities differently from the majority, and bring fresh energy and insight to the development process.

36.4.3 Know the Community and Share That Knowledge

Community assessment is an integral part of building community resilience. Ideally, this assessment identifies community assets as well as weaknesses that are particularly important in a strengths-based approach to development. Community assessment should identify vulnerabilities and threats related to disasters and other potential crises. In recommending the involvement of community members in reducing vulnerabilities, Morrow (2008) recognizes

that community members and organizations possess local knowledge, skills, relationships, and networks that can be vital resources in building resilience. Clearly, information provided by indigenous groups will need to be augmented with risk assessment data available through emergency management channels. Additional sources of information include studies conducted by public agencies, universities, foundations, newspapers, and other private sector organizations and groups. Ideally, information will be gathered systematically through the auspices of an emergency management office at the local or state level that will share responsibility for disseminating that information to the community, for interpreting the findings and identifying implications, and for formulating recommendations and strategies to address problems. Principles of effective communication must be employed to foster understanding of, and compliance with, official recommendations and directives.

36.4.4 Bolster Connections

Relationships and connections among individuals and organizations are the cornerstone of resilient communities and are essential elements in the execution of effective disaster response and recovery. Increased communication, information sharing, and collaboration among various sectors of a community (e.g., business, cultural and faith-based groups, education, first responders, health providers, leadership, the media, social services) with respect to crisis-related roles, responsibilities, and resources can improve efficiency in disaster management by helping a community to gain awareness of local needs and strengths, identify and fill service gaps, avoid unnecessary duplication, reduce interagency conflict, create a sense of shared ownership, and build respect and trust.

36.4.5 Adopt a Holistic Wellness Focus

The *National Health Security Strategy* (USDHHS, 2009, p. 6) recognizes that “community resilience is supported by the promotion of healthy lifestyles; disease prevention; access to culturally informed, timely and high-quality health care; and a robust public health system.” This argues for a holistic wellness approach with formal and informal services and systems that reinforce effective coping and health-seeking behaviors, attend to the maintenance and restoration of healthy mental and physical functioning, provide for those who suffer serious physical and psychological illnesses, guard against adverse physical and psychological consequences of disasters, and serve the injured (Pfefferbaum et al., 2008).

36.4.6 Undertake Effective Disaster Management

While it is likely that community resilience can itself contribute to improved disaster outcomes, disaster resilience also requires effective emergency management. The federal disaster management approach establishes a hierarchy of responsibility based on an understanding that disasters are local and that response and recovery require the involvement of people who know, and will remain in, the community long after federal and state response operations have ceased (USDHHS, 2010). The *NDRF* (FEMA, 2011) identifies effective citizen engagement and public participation as factors that are likely to stimulate successful recovery from disasters. The *National Health Security Strategy* (USDHHS, 2009, p. 20) recognizes public engagement in local decision making as one of the necessary capabilities for achieving national health

security, calling for the implementation of “civic engagement strategies as part of routine practice to ensure that community members have a voice in decisions about local social services and support systems, thereby fostering resilience.”

36.4.7 Create a Consciousness of Community Resilience

Resilience requires resources that can be acquired and developed, and it necessitates skills that can be taught, cultivated, and practiced at personal (American Psychological Association, n.d.; Reissman et al., 2004) and community levels (McGee et al., 2009). Creating a consciousness of the community resilience process can galvanize community members and organizations. A consciousness of the process may highlight shared values, provide a focus for critical reflection and skill development, and reinforce the concept of resilience as a process that must be sustained over time and across adversity. An appreciation of community resilience also can help to accentuate community characteristics that advance or detract from the identification and resolution of problems as well as emergency management (Pfefferbaum et al., 2008).

In considering community capacity building, Labonte and Laverack (2001b) recommend that program planners ask a series of questions regarding program planning, implementation, and evaluation. Table 36.1 adapts, adds to, and organizes these questions in accordance with the eight community resilience factors identified by Pfefferbaum et al. (2008). A deliberate review of existing and planned programs and activities can help raise consciousness of community resilience. Addressing relevant issues through program design or modification can contribute directly to community resilience.

36.5 Communities Advancing Resilience Toolkit (CART)

CART (Pfefferbaum et al., 2011, 2013a, 2013b) is a publicly-available, theory-based and evidence-informed community intervention designed to enhance community resilience to disasters and other adversities through assessment, group processes, planning, and action. Created by the Terrorism and Disaster Center (TDC) of the National Child Traumatic Stress Network (NCTSN), the community-driven CART exemplifies several of the aforementioned strategies for enhancing community resilience by prompting and facilitating strengths-based community development based on community assessment, by initiating and reinforcing community connections, by contributing to disaster management, and by creating a consciousness of community resilience.

CART includes a survey questionnaire and other assessment and analytic instruments that have evolved through key informant input and field testing. The CART process engages community stakeholders in collecting and using assessment data to develop and implement strategies for building community resilience. Stakeholders typically include a mix of community leaders, neighborhood members, selected professionals, and/or representatives of community organizations convened by local partners that sponsor a CART application. The CART survey and other assessment information are used to generate a community profile reflecting the perspective of the participants. The profile provides information for consideration in developing community resilience-building activities. The CART process is displayed in Figure 36.1.

Early versions of the CART survey instrument were based on the eight community resilience factors identified by Pfefferbaum et al. (2008) in their review of community competence and capacity literatures (Cottrell, 1976; Gibbon et al., 2002; Goepfinger and Baglioni, 1985;

Table 36.1 Program Review Based on Community Resilience Factors

<p>Program planners and managers may want to determine if and how specific programs and activities address the following issues related to the eight community resilience factors identified by Pfefferbaum et al. (2008). In doing so, all phases of programming, from planning and implementation through evaluation and refinement, should be considered. It is unlikely that any given program or activity will address all issues, but it may be possible to deal with relevant issues in all categories through multiple programs.</p>
<i>Connectedness, commitment, and shared values</i>
In what ways does or could the program or activity
<ul style="list-style-type: none"> • Connect individuals and families to the community?
<ul style="list-style-type: none"> • Reveal commitment of the community to its members?
<ul style="list-style-type: none"> • Enhance commitment of community members to the community?
<ul style="list-style-type: none"> • Reinforce community values?
<ul style="list-style-type: none"> • Advance equity in relationships among community members?
<ul style="list-style-type: none"> • Demonstrate fair treatment of community members?
<i>Participation</i>
In what ways does or could the program or activity
<ul style="list-style-type: none"> • Foster individual and family involvement in community activities and organizations?
<ul style="list-style-type: none"> • Provide opportunities to engage people of different backgrounds?
<ul style="list-style-type: none"> • Involve children and families in community life?
<ul style="list-style-type: none"> • Increase benefits associated with community participation?
<ul style="list-style-type: none"> • Improve community participation?
<i>Support and nurturance</i>
In what ways does or could the program or activity
<ul style="list-style-type: none"> • Address basic human needs?
<ul style="list-style-type: none"> • Enrich existing support systems for individuals and families?
<ul style="list-style-type: none"> • Create new support networks for individuals and families?
<ul style="list-style-type: none"> • Develop child- and family-friendly human services?
<ul style="list-style-type: none"> • Empower community members?
<ul style="list-style-type: none"> • Build caring relationships among community members?
<i>Structure, roles, and responsibilities</i>
In what ways does or could the program or activity
<ul style="list-style-type: none"> • Elucidate community processes?
<ul style="list-style-type: none"> • Strengthen community links among organizations and individuals?

Table 36.1 (continued) Program Review Based on Community Resilience Factors

• Develop community leadership?
• Create relationships that support equitable opportunities for individuals and families?
• Increase community influence in program management?
• Build empowering organizational structures?
• Support meaningful interaction with other communities?
<i>Resources</i>
In what ways does or could the program or activity
• Improve community resource mobilization and utilization?
• Build social capital?
• Provide opportunities for training and employment across education, experience, and skill levels?
• Develop expertise for personal, family, and community development?
• Enhance the resource base of the community?
• Support community development?
• Contribute to the long-term productive capacity of the community?
• Instill hope among community members?
<i>Critical reflection and skill building</i>
In what ways does or could the program or activity
• Foster the establishment of community goals and priorities?
• Recognize, and help members frame, collective experiences?
• Increase community assessment capacities?
• Contribute to a community database?
• Support the identification, analysis, and use of data for community evaluation and improvement?
• Encourage community members to be inquisitive?
• Promote skill building among community members?
• Foster community improvement?
<i>Communication</i>
In what ways does or could the program or activity
• Enhance communication among community members?
• Improve communication between community members and service providers?

(continued)

Table 36.1 (continued) Program Review Based on Community Resilience Factors

• Encourage community leaders to listen to community members?
• Strengthen community information channels?
• Promote the timely delivery of information?
• Increase the accuracy and effectiveness of community information systems?
• Provide opportunities for community members to solve problems?
<i>Disaster prevention and mitigation, preparedness, response, and recovery</i>
In what ways does or could the program or activity
• Contribute to disaster prevention and mitigation?
• Enhance disaster preparedness among individuals, families, businesses, and organizations?
• Improve the disaster response capacity of families, organizations, and the community?
• Foster recovery from disasters?

Source: Adapted and expanded from Labonte, R. and Laverack, G., *Crit. Public Health*, 11(2), 130, 2001b; Pfefferbaum, R.L. et al., Factors in the development of community resilience to disasters, in M. Blumenfield and R. J. Ursano (Eds.), *Intervention and Resilience after Mass Trauma*, Cambridge University Press, Cambridge, U.K., pp. 49–68, 2008.

Goodman et al., 1998; Labonte and Laverack, 2001a,b): (1) connectedness, commitment, and shared values; (2) participation; (3) support and nurturance; (4) structure, roles, and responsibilities; (5) resources; (6) critical reflection and skill building; (7) communication; and (8) disaster management. Because these eight attributes overlapped and contained substantial interactions, they were refined through exploratory factor analysis performed after each of four field tests. These analyses identified four interrelated domains that represent the foundation for the current version of CART: (1) connection and caring, (2) resources, (3) transformative potential, and (4) disaster management (Pfefferbaum et al., 2013b). Table 36.2 displays the four domains and their relationships to the original eight attributes.

The CART model assumes that communities with higher levels of the four domains may be more effective at mitigating detrimental consequences of disasters or other adversities. Figure 36.2 depicts community resilience in the disaster context, illustrating the potential effect of the resilience domains on the four disaster management elements (prevention and mitigation, preparedness, response, and recovery). The figure also illustrates the effect of each of these elements on the others and on community resilience.

CART is designed to strengthen and empower communities, not to compare or rank them though comparisons may be legitimate when samples and methodology are analogous. CART provides avenues to information and a structure to guide analysis of community concerns from a resilience perspective. The intervention is designed to stimulate communication, critical reflection, analysis, and action. While time and labor intensive, community member participation in the CART process contributes to the development of human and social capital, both of which are essential to community resilience. The collaboration, skill building, resource sharing, and meaningful action that are part of a successful CART experience should increase the transformative potential of a community.

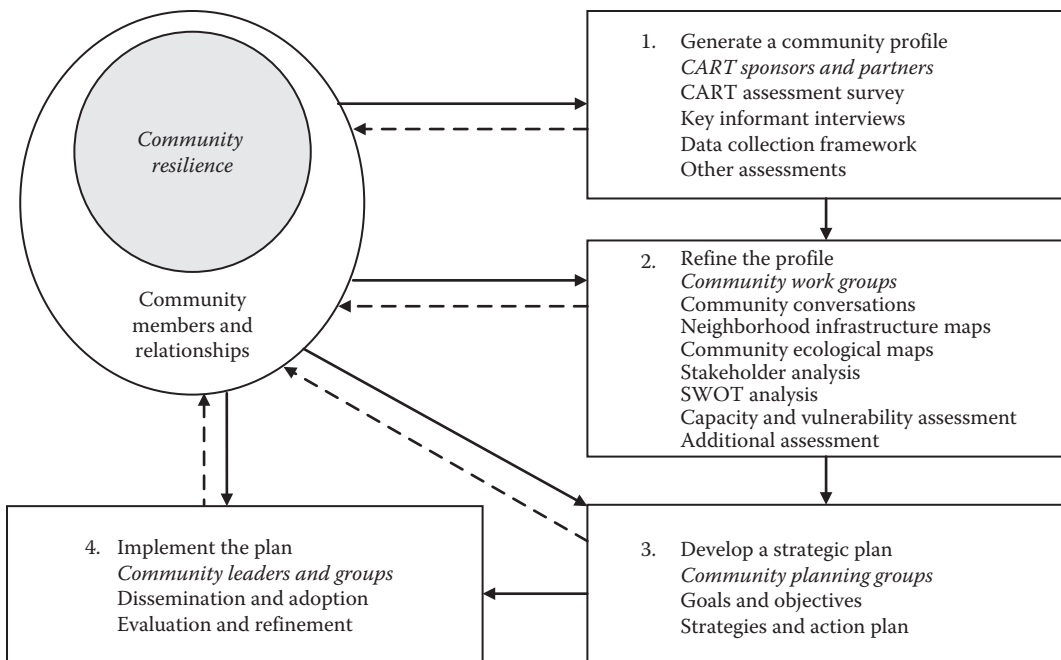


Figure 36.1 The CART process. The solid lines show data and information flows. The dotted lines show potential changes in, or effects of the CART intervention on, community resilience characteristics. (From Pfefferbaum, R.L. et al., *Communities Advancing Resilience Toolkit (CART)*, Terrorism and Disaster Center, University of Oklahoma Health Sciences Center, Oklahoma City, OK, 2011.)

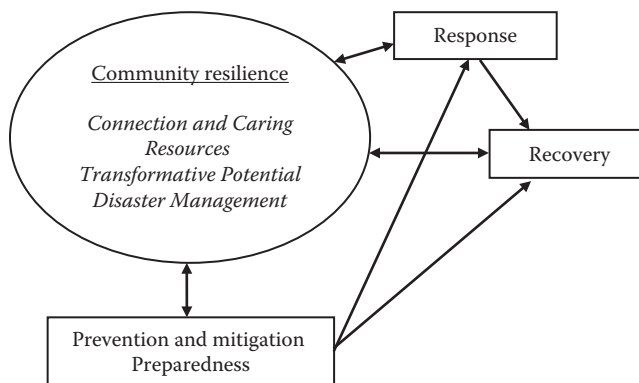


Figure 36.2 The relationship of the four CART domains to disaster management.

36.6 Summary

Community resilience has emerged over the last decade as a construct in emergency management that is viewed alternatively as a goal or as a mechanism for achieving readiness, response, and recovery. Community resilience may be defined simply as the process of successfully

Table 36.2 Description of the Four CART Domains and Their Relationship to the Eight Community Resilience Factors

<i>Four Domains</i>	<i>Factors That Map to Each Domain</i>
<i>Connection and caring:</i> Community members feel connected to a place or a group of people with shared history, laws, values, interests, and customs. They are committed to the community, feel like they belong, have hope, and believe the community treats people fairly.	<ul style="list-style-type: none"> • Connectedness, commitment, and shared values • Participation • Support and nurturance • Communication
<i>Resources:</i> The community effectively acquires, mobilizes, allocates, invests in, and uses natural, physical, financial, human, and social resources to serve the community and to meet community goals.	<ul style="list-style-type: none"> • Structure, roles, and responsibilities • Resources • Communication
<i>Transformative potential:</i> Community members can recognize and frame collective experiences. They engage in deliberate, meaningful, collective action involving critical analysis, intervention, and resolution related to community issues.	<ul style="list-style-type: none"> • Structure, roles, and responsibilities • Resources • Critical reflection and skill building • Communication
<i>Disaster management:</i> The community takes effective steps to prevent and mitigate, prepare for, respond to, and recover from disasters.	<ul style="list-style-type: none"> • Disaster management • Communication

Source: Pfefferbaum, R.L. et al., *International Journal of Emergency Mental Health and Human Resilience*, 15, 15–30, 2013a.

adapting to, and recovering from, adversity. It involves purposeful, collective activity on the part of community members that supports response and recovery of the whole. Eight factors associated with community resilience (connectedness, commitment, and shared values; participation; support and nurturance; structure, roles, and responsibilities; resources; critical reflection and skill building; communication; and disaster management) have been refined through exploratory factor analysis into four domains thought to reflect and contribute to community resilience: (1) connection and caring, (2) resources, (3) transformative potential, and (4) disaster management.

The frequent references to community resilience in public policy make it increasingly likely that emergency managers will be called upon to develop strategies for building community resilience to disasters. General strategies include (1) fostering economic development; (2) stimulating strengths-based community development; (3) knowing the community and sharing that knowledge; (4) bolstering connections among individuals, between individuals and organizations, and among organizations; (5) adopting a holistic wellness focus; (6) undertaking effective disaster management; and (7) creating a consciousness of community resilience. In implementing these strategies, emergency managers should engage community stakeholders, build awareness and consensus, and empower community members to take action. The potential benefits are clear:

Where local civic leaders, citizens, and families are educated regarding threats and are empowered to mitigate their own risk, where they are practiced in responding to events, where they have social networks to fall back upon, and where they have familiarity with local public health and medical systems, there will be community resilience that will significantly attenuate the requirement for additional assistance (USDHS Presidential Directive 21, 2007, Item 20).

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Chapter 37

Global Resilience to Enhance Crisis and Emergency Management

Clifford R. Bragdon

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37.1 Introduction

A sustainably resilient biosphere is an absolute necessity to support the world's growing population, now exceeding 7 billion persons (Population, 2012), as well as a means to enhance crisis and emergency management. However, sustainability alone will not provide total protection to our biosphere. Resilience is preferred, since it addresses four interrelated attributes: sustainability, safety, security, and health. By considering all four resilient attributes, communities can properly address natural and man-made disasters impacting physical infrastructure including cybersecurity. Community infrastructure must collectively support the resilient movement of people, goods, and information by air, land, sea, and space. A climate positive community, with an on-site CO₂ emission near zero (representing a sustainable green environment), does not mean the population is totally protected from both natural and man-made disasters, as evidenced by Japan's earthquake–tsunami in March of 2011 (Bragdon, 2012b). Effective neoteric, or new, planning of our biosphere is also essential because it involves spatial, temporal, and sensory aspects of the earth's habitat and infrastructure. 2D planning is a titanic approach since it only addresses the surface/land (x and y axes), thereby omitting aerial and subsurface features. A 3D approach is needed, involving the combination of the x, y, and z axes, in order to be spatially comprehensive (i.e., air, land, sea, and space). The process of creating resilient infrastructure becomes an economic development generator, bringing together diverse aspects including private finance, law enforcement, cybersecurity, public health, and environmental and social justice. Planning for resilience therefore is critical for the future economic, social, and physical well-being of our global community.

Our personal transportation-based mobility system, along with its accompanying infrastructure, has resulted in a drive-thru society that is becoming supersized. Urban obesity in terms of modes of transport and today's living environment has resulted in McMansions, and mega-vehicles have created an energy demand that if unchecked could create a Carhenge by the year 3000. Personal vehicles could become relics of the past because of their vast number, size, weight, their supporting infrastructure network, and the total vehicular energy consumption rate. Infrastructure gridlock contributing to global warming is costing the world's economy, approximately 6% of the gross domestic product (GDP) (Bragdon, 2008). Impaired global mobility, which logistically threatens the optimization of our biosphere, is estimated to cost approximately \$2.5–\$4.0 trillion dollars annually. There are solutions that can insure resilience but only if society collectively addresses natural disasters, human disasters, and smart sustainable resilient infrastructure and our transportation system. The ultimate goal is to preserve and enhance the physical, economic, and social integrity of the United States and the entire global community.

37.2 Resiliency

The concept of resilience is growing in popularity and importance as a way to address comprehensive protection from potential threats, whether natural or man-made risks, to an individual, family, community, or a society. Within the United States, the Port of New York and New Jersey Twin Towers became an infrastructure source of terrorism, beginning with the first attack on February 26, 1993 (Wright, 2006). An unsuccessful effort was made to collapse these towers by detonating an underground parking garage bomb, using a Ryder truck rental van as the carrier. This terroristic attempt failed to collapse the foundation; however, six people were killed and vehicles were destroyed. Eight years later on September 11, 2001, Al-Qaeda-affiliated hijackers succeeded at this site, causing the tragic loss of 2753 lives in the tower complex along with the total

destruction of the two towers. The suicide hijackers diverted two commercial Boeing 767 aircraft and crashed them into the buildings in a catastrophic event that was part of a planned multifaceted series of incidents perpetrated by a Middle Eastern-led terrorist's organization.

Due to the global rise in terrorist events reported by the National Commission on Terrorist Attacks on the United States (National, 2004) as well as a rise in natural disasters (Bragdon, 2012b), including hurricanes, tsunamis, tornados, and earthquakes, there has been a ground swell of interest and activity to establish resilient plans for response, recovery, and prevention globally. Initiatives have occurred at all levels of the government and the private sector, beside nonprofits and academia. Governmentally, the United Kingdom has created a cabinet position referred to as the Office of Resilience and is now establishing a new Global Resilience Action Program (Ashdown, 2011, 2012) made in response to the Humanitarian and Emergency Response Review (HERR). The area of cyber resilience has been getting increasing attention. President Obama signed on July 6, 2012, a National Security and Emergency Preparedness Communications Executive Order to insure the federal government maintains resilient communications nationally and internationally (Federal, 2012).

Information technology networks are becoming a major conduit creating hacktivists that are now even using terrorist tweets for broad-based communication purposes (World Economic, 2012). As a result, the World Economic Forum has established a partnering program for cyber resilience, publishing *Risk and Responsibility in a Hyper-Connected World: Principles and Guidelines*. The World Bank Group has also initiated an environmental strategy for the next decade (2012–2022). Their goal is to create a green, clean, resilient world for all and disaster risk management is a major area of focus being examined (World Bank, 2012). Cities that have experienced threats and disasters impacting their urban infrastructure also are becoming more active, including San Francisco, California. In 2008, the San Francisco Planning and Urban Research Association (SPUR) established the Resilient City Program in an effort to improve disaster planning policies, primarily due to the earthquakes and ultimately preparing for the *big one*. The academic community has also demonstrated proactive leadership in resilience. At the Florida Institute of Technology, this author in 2008 took the lead, establishing a Global Center for Preparedness and Resilience™ (GCPR) and offering annual conferences to address the problem (Bragdon 2008, 2009a,b, 2010, 2011). Dr. Bragdon is now developing a Global Resilient Cities™ program (Bragdon, 2012a), whose ultimate goal is to create a resilient certification process for cities throughout the world with competencies in four areas, as shown in Figure 37.1.

37.3 Neoteric (New) Planning Principles

In order for a resilient earth to optimize its potential by protecting our global society, it needs new physical planning principles that must be effectively implemented. The earth's biosphere including human, plant, and animal life requires collective protection, and neoteric planning principles must be introduced (Figure 37.2). This neoteric planning approach should represent an integrated spatial, temporal, and sensory approach to our planet.

A spatial approach uses a 3D perspective, incorporating aerial, surface, and subsurface features, rather than just *land* itself. Property, rather than land, mandates a 3D examination of our spatial planes: aerial (e.g., air rights), surface (e.g., land and water), and subsurface attributes (e.g., belowground and underwater). It also must examine our ecosystem temporally, on a continuous 24 h, 7 days a week basis. Lastly, all human senses must be explored and utilized (i.e., visual, auditory, tactile, olfactory, and gustatory), rather than the reliance on one sense, such as vision.

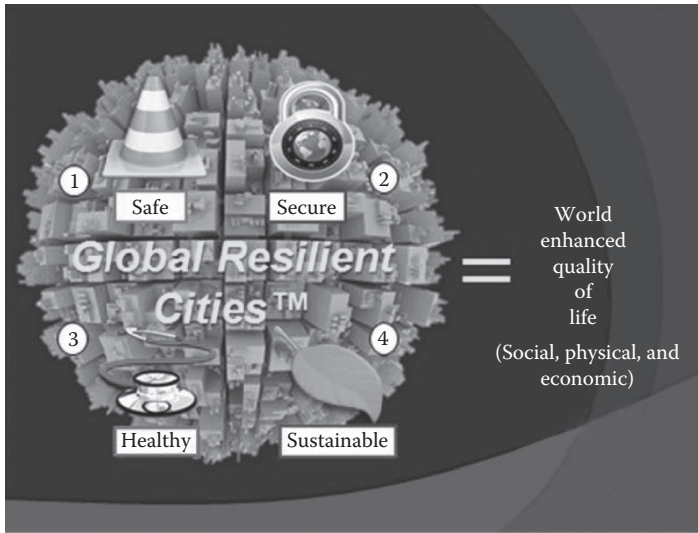


Figure 37.1 Global Resilient Cities and their four components.

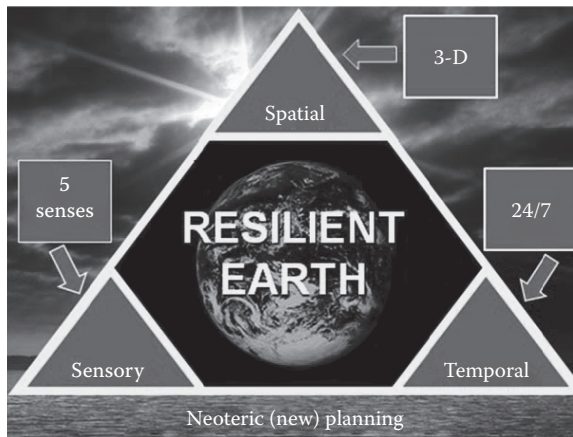


Figure 37.2 Neo (new) planning for resilience.

37.3.1 Spatial Planning

Space is a finite resource in which all human, plant, and animal life must coexist, within our combined lithosphere, hydrosphere, and atmosphere. Our world is rapidly becoming urbanized. As of 2012, the majority of the earth's population, 51% for the first time, now resides in urban areas while rural living continues to decline (Population, 2012). In the United States, 80% of the population now resides in urban settlements. The number of large world cities, with over 1 million people, now exceeds 400, and there are 19 cities that number over 10 million persons each. Another trend is the increasing pattern of megacities and urban agglomerations in higher population areas of the world. Compounding this density is that more than half of all world urban settlements are occurring within 50 miles of water bodies (i.e., seas, oceans, rivers, and lakes).

Population patterns and land-use vulnerability make spatial planning a high priority for crisis management, risk assessment, and response. Effective spatial planning and protecting population settlements require a resilient planning process. However, space is not as yet considered a strategic and finite resource that must be compatibly developed. For this to happen, aerial, surface, and subsurface space volumetrically should be thoroughly inventoried and strategically planned.

All property has these three components, but rarely do we address all three spatial plains, when we do planning, engineering, and design. Metes and bound legal descriptions of personal property found in real estate deeds are typically written in two dimensions. They typically describe property land area in terms of two dimensions, length and width (i.e., x and y axes). Rarely do residential mortgage deeds consider height ownership along with length and width of residential property (i.e., x, y, and z axes) as illustrated in Figure 37.3. Furthermore, most zoning ordinances and master plans deal with land two-dimensionally, as opposed to also considering subterranean and aerial uses. This creates a myopic perspective, referred to as titanic planning or 2D surface thinking (Figure 37.4), rather than 3D cubic thinking. Attention solely to what is on the surface in this illustration will restrict the discovery of the 300,000,000 tons of ice that are in a subsurface location, potentially a threat to logistical navigation. A 3D world permits us to explore and consider new spatial arrangements such as eco-rooftops, subterranean development, utilidors, air rights, vertiports, water-based communities, and aquatic highways.

We have also failed to comprehensively examine our aerial space or property (air rights, roof tops, etc.) consistently in 3D (Bragdon, 2008). So we are not in the proper spatial mode to perform sustainably based planning, engineering, and design to enhance crisis and emergency management. Furthermore, space, especially in North America, is considered nearly a limitless resource, the wide open spaces, rather than a finite resource found in Europe and Asia. Growth management is discussed but is not aggressively practiced and implemented in most states; consequently, we are in the mode of planning and developing single buildings for single purposes. This contributes to sprawl and the mismanagement of space as a limitless resource.

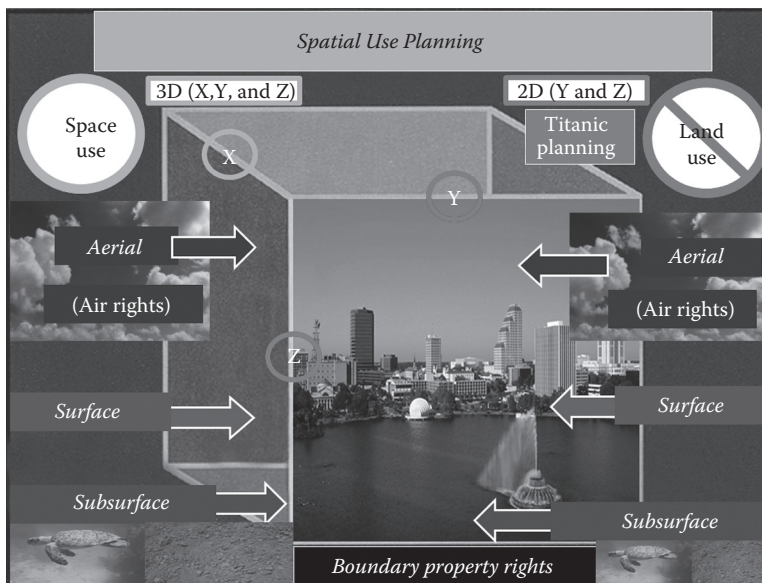


Figure 37.3 Spatial planning.

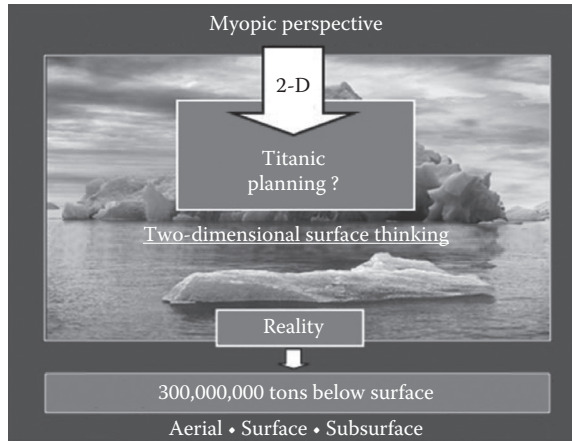


Figure 37.4 Myopic perspective—2D surface thinking.

History has shown that multiple use of space can be an effective management tool in addressing urban uses, thereby maximizing the potential of property as a finite resource. A flagrant spatial excess problem is water towers that typically have one functional purpose, the storage of water. However, Figure 37.5 demonstrates that a water tower can possess several additional compatible uses, making it more spatially and economically efficient. A water tower can incorporate multiple-use activities including a public observation deck, observatory, museum, microwave relay system, and restaurant, in addition to performing its primary function, that is, storing water for distribution purpose into the community. Certainly, a water tower design can have many additional attributes, such as being a geographical reference point as well as a tourist attraction.

In Gaffney, South Carolina, their municipal water tower is shaped like a peach, signifying Gaffney as the *peach capital* as seen by people driving nearby on Interstate 85. During the growing

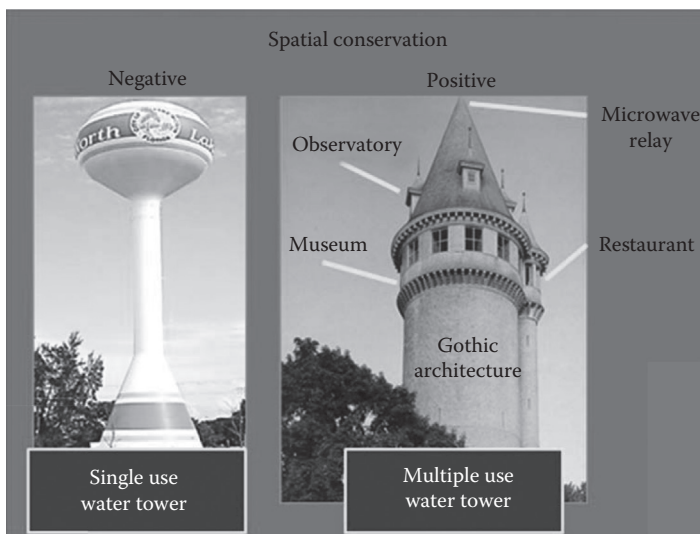


Figure 37.5 Spatial conservation comparisons: a water tower.

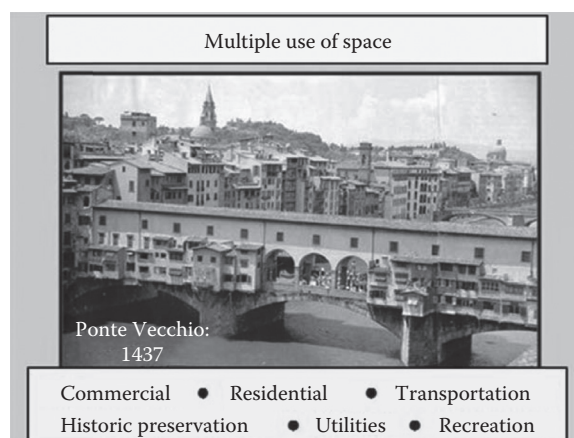


Figure 37.6 Ponte Vecchio: multiple use of space.

season, motorists frequently stop to purchase these South Carolina peaches and associated by-products, harvested in this region of the state. Their water tower also appears as the logo on official city of Gaffney, South Carolina, stationery.

Bridges have also been primarily designed for the transport of vehicles, and/or rail systems, which again represent one or possibly two uses. This means that our built environment and today's infrastructure are not optimizing their spatial potential. Florence Italy's Ponte Vecchio (translated as the *old bridge*) was initially constructed over the Arno River in 1437. It represents one of the best examples of multiple-use bridge design. This bridge (Figure 37.6) historically has supported at least five uses of activity for over 575 years. Included are lower-level commercial uses (e.g., originally butcher, later silver, and leather guilds, now transformed into jewelry and fine leather specialty shops), second story residences for the shop owners whose businesses are at street level, recreation and transportation (at the ground level for pedestrian walking and bicycles), and at the top level (third story), a corridor for sundry purposes including private access to and from the Uffizi Art Museum. Added later were utility systems put in place to connect the two sections of Florence, divided by the Arno River, for handling communications, power generation, and wastewater management; lastly, historic preservation and tourism have become important economic assets to the region.

It is interesting to note that the Ponte Vecchio is one of the top two most popular tourist attractions in all of Florence in part because there are multiple things to do at this one location. This site conserves space, time, and resources. When multiple-use features are designed, in place of single uses, there are additional savings in resources including

1. Property or space that is committed to joint uses replaces a multitude of individually isolated uses, thereby enhancing convenience and conserving time and resources
2. Associated parking that is required for each individual use is merged into a singular joint use system
3. Capital savings in infrastructure, building, and operational costs
4. Time savings in terms of travel distance and energy consumption
5. Reduction in sprawl, creating a more focused area of interest
6. More enjoyable tourist stop since it combines so many features in one location

37.3.2 *Multisensory Planning*

Although humans are born with five senses (i.e., visual, acoustical, aroma, tactile, and taste), our urban environment is primarily examined and designed in terms of the visual, or what the human eye can see. It has become the dominant sense and our vocabulary reinforces this *visual dominance* with words and phrases used in our language:

1. Insight
2. Foresight
3. Visionary
4. Hindsight
5. Insightful
6. Seeing is believing
7. I am from Missouri show me
8. A picture is worth a thousand words

This approach is very limiting since we should perceive our environment through all our senses, not just through sight alone. As a result, our sensory world of design is visually biased by the disciplines of architecture, landscape architecture, interior design, urban design, and urban planning. Frequently their professional end products for buildings, interior spaces, mixed use complexes, neighborhoods, communities, and public and private developments can be described as visual solutions: *What you see is what you get*. The other four senses are given little or no attention. For example, the sense of acoustics is extremely important because hearing acuity is the only sense that operates 24 h a day, never shutting down (Bragdon, 1971). A person with normal bilateral hearing has a 360° perspective of their environmental sound experience, and today's urban setting is generating a high decibel levels of unabated noise pollution, or unwanted sound, thereby creating noise impacted uncomfortable and potentially hostile environments. This acoustical invasion in our schools, medical facilities, offices, parks, recreational facilities, and residences can have an adverse biophysical impact, affecting communication, causing sleep loss, and generating irritability, increased stress, and reduced health and welfare. Environmentally, noise is ranked as the number one problem among residents trying to enjoy their neighborhoods. In New York, their city hall receives over 1000 formal noise complaints a day. Similarly when the sense of odor or aroma is not properly addressed in our built environment, the outcome is also environmentally unpleasant and sometimes unhealthy to the exposed population.

People working on emergency response, recovery, and redesign need to consider the total sensory environment, since all senses, if not mitigated, can adversely affect the physical and emotional well-being of the individual, family, neighborhood, and community. Figure 37.7 describes a multisensory process that we must employ when we design our built environment. It depicts what a more desirable urban sensory pallet could and should be in the human setting.

Consequently, unwanted noise should be replaced by sound, aroma supplanting smell, and tranquility replacing shock and vibration. The result will be a more sensory balanced (Kansai) and mitigated urban environment in which to live and enjoy.

Our predominantly based visual perception process must change to incorporate the remaining four senses. The *sensory-impaired population* (i.e., visually impaired and hearing impaired) have sensory insights that can improve the physical environments planned by sighted architects, planners, urban designers, landscape architects, and engineers. These special individuals should be actively recruited and consulted to assist these planners and designers. Mechanisms should

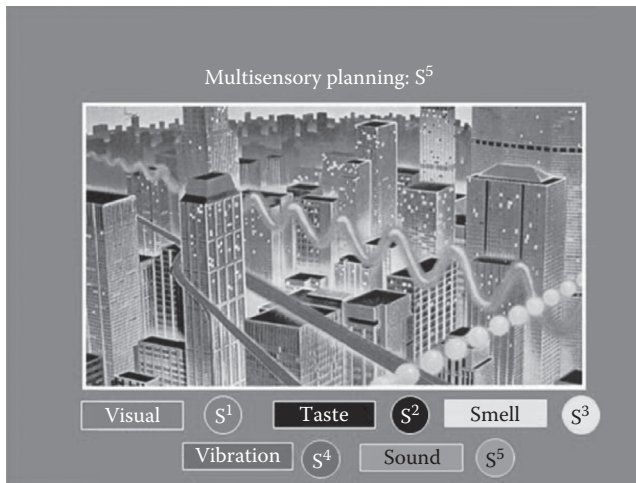


Figure 37.7 Multisensory planning.

be put in place to gain the insights of the sensory impaired during the design process, as well as enrolling them into design degree programs. Finally, design professionals must become involved in multisensory planning and their associated attributes, so that they employ a comprehensive sensory pallet, making our living spaces safer, healthier, happier, and ultimately more resilient.

37.3.3 Temporal Planning

Temporal or time-based planning (Figure 37.8) is an invaluable ingredient as our cities expand into 24 h centers of activity. Work days are no longer typically 9–5, now with demand for services expanding evening and nighttime employment. Historically, most city plans were based on daytime activity patterns, because of the daytime workforce, including traffic demand and other modes of transport and logistics (e.g., morning rush hour and evening rush hour). Most private businesses and even governments now operate on a 24 h basis, with employees becoming part of different shifts throughout the entire 24 h time period. Information technology, medical, security



Figure 37.8 Temporal planning.

services, entertainment, media, financial, transportation, shipping, goods movement, food and beverage, utilities, and building/custodial services are increasingly part of the *off-peak* evening and nighttime hours. Government services are expanding their hours of operation beside fire, police, and medical. Many entities use 24 h service lines addressing utilities, medical, vehicular, transportation, and retail services, natural and man-made disasters, and emergency response and command control centers. Some cities have instituted an ombudsman to handle off-peak inquiries and related answering services on a live responsive basis.

Two of the best nocturnal business examples are the Federal Express Super HUB in Memphis and United Parcel Service (UPS) World Port in Louisville, which support their respective air cargo worldwide operations (Cosmas, 2007). The UPS World Port is the City of Louisville's largest employer, with over 43,000 jobs for employees. Their heaviest time of the day occurs between 10:00 p.m. and 4:00 a.m. when air cargo is logistically sorted and then assembled for nighttime air departures by no later than 3:30 a.m. so they can arrive primarily the next day. Over 5 million air-based packages are processed daily at these facilities. Memphis is the world's busiest air cargo airport, with one-third of the FedEx employees (over 14,000) working the nighttime hours.

Cybersecurity has become a 24 h threat, particularly involving databases, information, and records management. Supervisory control and data acquisition systems (SCADA) associated with utilities, airports, seaports refineries, traffic control, and military-related operations all are continuously vulnerable to threats and *hacktivists* (Marsan, 2012). Surveillance is now a standard 24 h responsibility requiring a deployment of labor throughout all time periods of the day. Logistical operations associated with cargo and business delivery require large-scale evening and nighttime operations to insure that early morning guaranteed deliveries are properly executed.

Because of these changing activity patterns, some cities that are becoming temporally inverted, or nocturnal, are now classified as predominantly nighttime oriented. Casino-based cities (e.g., Las Vegas, Reno, Atlantic City) offer gambling, food, beverage, and entertainment 24 h a day, with a large percentage of customers using these facilities at night, requiring associated support staff. Nocturnal cities are on the rise, particularly outside of the United States. Seven of the top ten cities are located in Europe, and Cairo, Egypt, is ranked number one, based on social media interactions (Badoo.com, 2011).

The temporal planning of all cities will require an increasing emphasis on 24 h-based activities and physical infrastructure, since employment is no longer limited to daytime hours. Consequently, the health, safety, security, and sustainability of our population, their physical assets, and associated infrastructure will also require continuous 24/7 surveillance. Such activities and operations need to be cognizant of all human senses, including noise propagation affecting human activity patterns (i.e., communication and sleep).

37.4 Risks Impairing Resilience: Urban Lifestyle

There appear to be societal trends that are beginning to impinge on the effectiveness and efficiency of our supporting infrastructure, due to the choices we are making in terms of human mobility. The passenger car is becoming an inseparable part of our lifestyle to the point that it is now influencing the shape of our cities, to the exclusion of alternative forms of mobility. Unlike Europe in particular, the United States has adopted a drive-thru society lifestyle that in turn influences our global resilience, since the automobile is the resounding personal choice of conveyance (Figure 37.9). It impacts energy independence, global warming, and human fitness. Personal vehicles are available in all phases of our lives, from birth to weddings, divorces, and even with death (car burials are

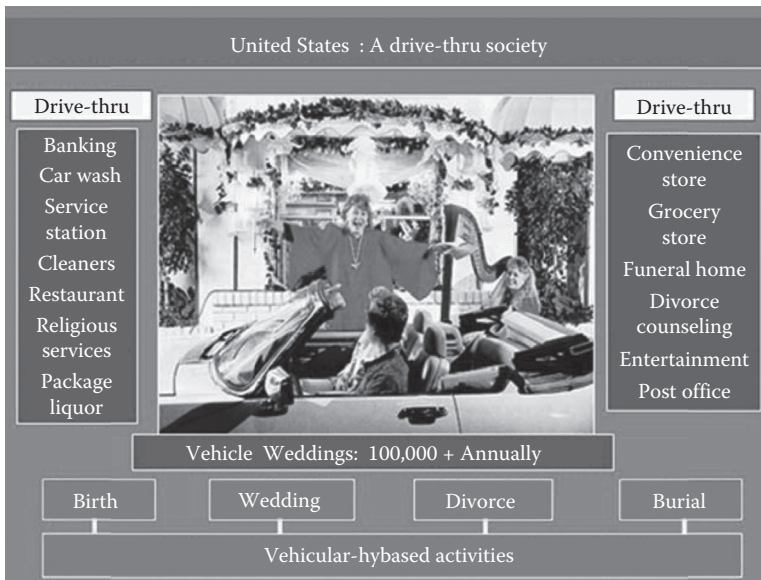


Figure 37.9 The United States—a drive-thru society.

permitted in many states). The desire to be married in your car is increasingly popular and convenient with Las Vegas being the nuptial epicenter. The Little White Chapel annually performs over 100,000 weddings, with Valentine's Day as the most popular day (Bragdon, 2008). Temporal or time-based planning plays a major role since the wedding ceremony can be performed in as little as 10 min. In close proximity to the chapel, you can contact a lawyer to annul the ceremony if needed. If you prefer, divorce counseling services are available, even in a drive-thru mode (e.g., Atlanta, Georgia). Funeral establishments are now offering a convenient drive-thru option for those desiring to view loved ones while sitting in their cars (e.g., Montgomery, Alabama). Mortuaries with this type of drive-thru are now found in over a dozen states.

The United States is the only country in the world that has more vehicles than licensed drivers. Currently, there is an average over 1.10 vehicles per driver (Bragdon, 2008). Germany is second, averaging 0.50 vehicles per driver. Private vehicle growth is having an adverse impact on global warming, air quality emissions, noise generation, and expansion for roads and parking facilities. It also creates a general disinterest in alternative intermodal transportation scenarios.

We need to curb both human obesity as well as urban obesity, by putting our cities on diets, along with our citizens. Houses are becoming supersized, like most automobiles and trucks. Supersizing is contrary to the resiliency benefit of being healthy and the conservation of resources associated with sustainability. The average single-family house size has grown to 2434 ft² (2005), from 1645 ft² (1970). This represents an expansion per household of 789 ft², or a 32% increase between 1970 and 2005.

Single-family residential excess has reached astronomical proportions in certain housing markets. The Ira Rennert residence, built in the Hamptons on Long Island, New York, contains 66,000 ft² (main house) while the total 65 acres compound contains 110,000 ft² of built space. This Sagaponack home is considered the largest in America (Berfield, 2012). Built at a cost of \$198 million, it has 29 bedrooms, 39 bathrooms, and an 18-car garage for a family of five. Not to be outdone, the Siegel family of Orlando, Florida, have a house under construction that, when finished, will

surpass the Rennert house as the largest at 90,000 ft². It will have 13 bedrooms, 22 bathrooms, and 9 kitchens. The Siegel's have eight children and their property consists of 10 acres. Towering 65 ft in height, their home will be nearly twice the size of the White House. In both of these houses, the residential features and accessories are enormous in size. The Siegel's great room measures 7200 ft² capable of accommodating 500 guests (Berfield, 2012), while their wine cellar will contain 20,000 bottles with major space for wine tasting. The home will include two movie theaters, one modeled after the Paris Opera House. The Rennert property, already completed, has a basketball court, a bowling alley, two tennis and two squash courts, and a \$150,000 hot tub among other amenities.

All of this contributes to increased land consumption, sprawl, excessive use of finite space, higher residential consumption rates, and expanded traveling distances and travel time, with sustainability being compromised. The goal of a resilient-based urban society becomes compromised under these conditions. Southampton Town ultimately passed an ordinance restricting the maximum size of single-family homes in the future, after approving the Rennert 110,000 ft², 65 acres family compound.

There are some important trends that hold promise in reducing the carbon footprint with the greening—sustainability movement supporting improved energy consumption for automobiles and trucks. Transportation accounts for over 60% of all fuel generated. Combustion-based vehicles (i.e., gasoline and diesel) are improving their average miles per gallon. Hybrid passenger vehicles in particular are advancing with their improved plug-in technologies. Three automobile manufacturers have announced they will be achieving over 100 miles/gal with some of their 2013 electric-powered passenger cars. However, to avoid a *Carhenge* (circa 3000), combined hybrid electro-hydrogen-powered vehicles need to grow dramatically by 2020–2025 (Figure 37.10). Reliance on petroleum for vehicular transportation will decrease therefore expanding the world's finite oil supply, along with increasing supplies of shale-based natural gas (due to advanced fracking technology occurring in the United States). The Utica Shale found in an eight-state region, beneath the Marcellus Shale, is considered one of the world's richest natural gas reserves estimated to contain 38 trillion cubic feet of undiscovered natural gas and 940 million barrels of oil (Zucker, 2012).

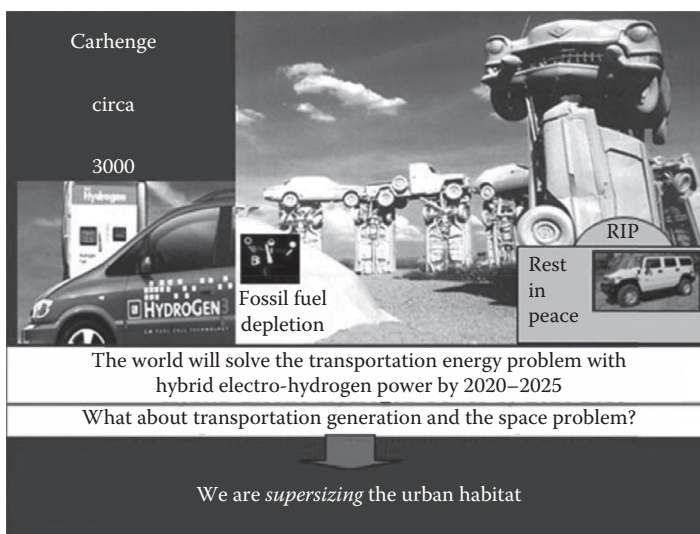


Figure 37.10 Carhenge circa 3000.

These are very promising trends in energy-based transportation conservation that will reduce America's demand for petroleum resulting in improved resiliency. However, our problems in the United States, and globally as well, will be complicated by the growth in the number of vehicles and associated infrastructure. Consequentially, space and traffic management will be compromised, accelerating a gridlock condition. The enemy is within, and it is bigger than petroleum generation. The absolute growth in the number of vehicles is already supersizing our urban habitat. As this condition continues, the cost of this gridlock will keep escalating, exceeding more than the current 6% of our GDP (Bragdon, 2008).

Despite this impending forecast of increased congestion, many developing countries are ignoring these warning signs and are following the US model by purchasing vehicles, at the expense of more sustainable and spatially efficient transportation modes. China is the leading example of this shift away from nonmotorized transport alternatives (bicycles and walking). In Shanghai, where historically the bicycle reigned supreme, automobile consumption is the new wave, along with a demand for more highway infrastructure. Shanghai has also increased the restriction or elimination of bicycles on their previously dedicated rights of way. An undesirable by-product of this nearly logarithmic growth of private automobile ownership is the decline in air quality. The cities of Shanghai, Beijing, and Tianjin now rank as the most polluted urban areas in all of China. At one time, there were over 6 million bicycles (commonly referred to as the Flying Pigeon) registered in Beijing, with a street system supporting bicycle access. Like Shanghai, Beijing has become more enamored with automobile ownership, as China's middle class grows. Decreased air quality and rising urban temperature (global warming) are undesirable by-products, exacerbating human health and well-being.

37.5 Management of Risk and Threats to Resiliency

Both natural and man-made threats are a significant challenge to resiliency, especially in terms of transport modes. Air transportation has received the leading attention from the federal government with regard to mitigating the security threat to passengers. Fewer financial resources (less than 20%) are given to security for vehicular, transit, rail, maritime, and intermodal security and safety; therefore, they collectively constitute the highest risk (Figure 37.11).

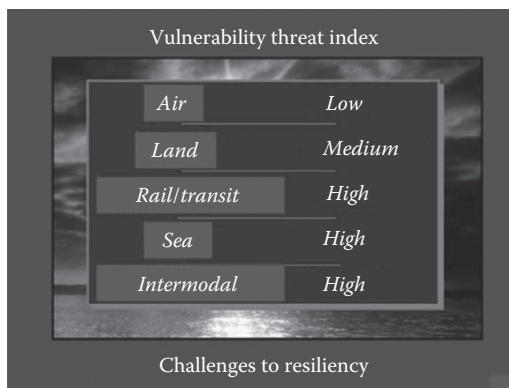


Figure 37.11 Vulnerability threat index—challenges to resiliency.

The threats to our biosphere is a combination of natural disasters (e.g., hurricanes, tornados, cyclones, earthquakes, fires, tsunamis, and associated flooding) and man-made terrorists activities. Globally, these combined disasters result in a total direct and indirect cost of \$2.75–\$3.75 billion, on a daily basis (Bragdon, 2008). Sustainable solutions must be combined with resilient measures to adequately protect our biosphere. A zero carbon footprint is a desirable sustainable goal; however, safety, security, and health must also be included.

This was the case in Japan, which in 2010 had the lowest carbon footprint of any major country in the world and was considered a leading example of resiliency. However, with the onset of the fourth largest earthquake ever recorded and associated destruction to the failed nuclear power facilities in 2011, the country is no longer a model of resiliency. Japan incurred a large number of human fatalities, a significant injured population, lost homes and structures, and a major land area that is a restricted nuclear exclusion zone, presently devoid of human habitation. The resiliency index of safe, secure, sustainable, and healthy has fallen sharply. Japan is examining an alternative to nuclear power for their country (33% of energy generation in Japan is nuclear based), along with improving the accident potential of nuclear power. Presently, 51 of the country's 53 nuclear reactors are shut down, and there is a major movement to eliminate nuclear power in Japan over the long term.

37.6 Resilient Solutions

A new paradigm must be utilized that integrates all these problems and creates a framework for action. One such mechanism is the GCPR, which integrates human disasters that are both accidental and intentional, combined with natural disasters, along with smart sustainable resilient infrastructure (Figure 37.12). It is a global-based think tank dedicated to integrating the preparation for and response to man-made and natural disasters as well as promoting sustainable and resilient infrastructure (Bragdon, 2008, 2012a). The GCPR is focused on a network of private and semiprivate entities (businesses and nonprofits) working collectively with the government and academia to bring integrated solutions based on a series of ten missions, which includes best professional practice (Bragdon, 2008, 2012a). There is a series of technologies for envisioning these habitat problems and developing answers. Human disasters cover at least 11 events including cybersecurity, arson, terrorism, and chemical, biological, or nuclear (CBN) incidents regardless of causality (i.e., accidental or intentional). Natural disasters can involve at least 12 different events or combinations, including hurricanes, tornados, earthquakes, tsunamis, CBN events, and flooding. Infrastructure covers at least 11 categories, whether it is below the surface (e.g., underground utilities and tunnels), on land or water (e.g., roads, ports, and dams), and/or in the air (e.g., bridges and elevated transportation systems).

Another area of focus by the GCPR is modeling and simulation. Computer-based simulation is a state-of-the-art technology that can be applied in problem identification, analysis, and solution-based approaches. Visualizing problems using a shared computer-based technology offers a unique way to communicate and establish a means of establishing a dialogue by which ideas can be exchanged and problem solving can occur. It has a broad application to engineering and construction, architecture, urban planning, integrated transportation systems, and infrastructure, zoning, and site design along with conflict resolution issues that need to be seen, understood, and resolved. A 3D visualization was used to simulate a potential Port Everglades category 3 hurricane compared to normal climatic conditions (Figure 37.13). This simulation utilized the congressionally funded Center for Intermodal Transportation Safety and Security (CITTS)

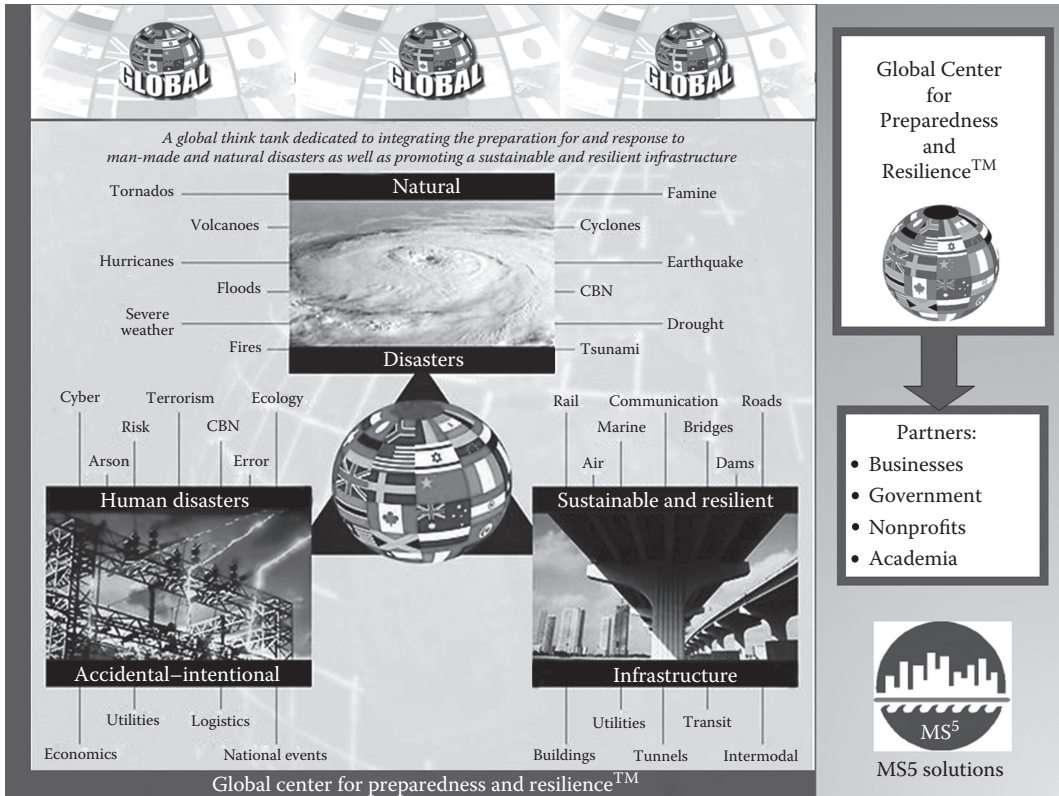


Figure 37.12 GCPRTM.

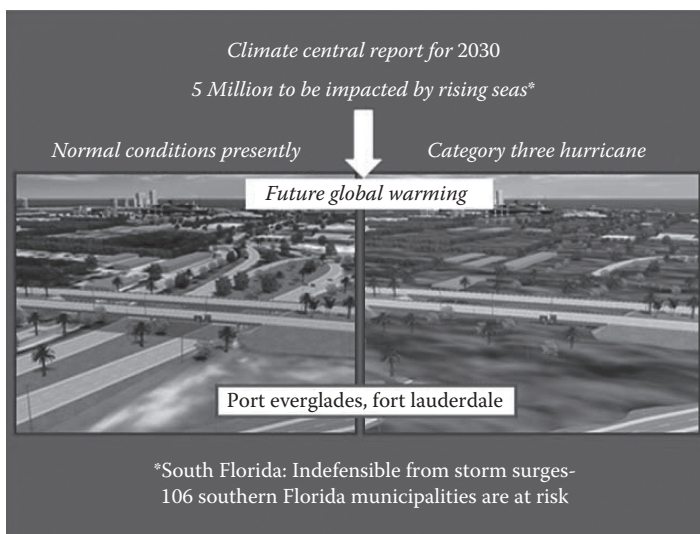


Figure 37.13 Virtual simulation of a category 3 hurricane impacting Port Everglades.

patented system (Bragdon, 2008). Invented by Dr. Bragdon, it was ranked by *Newsday* as the ninth most important new invention for the next 100 years (Williams, 1999). The simulation results shown in Figure 37.13 will address the Climate Central Report for 2030, which indicates that five million people in 19 states will be impacted by indefensible storm surges, from Maine to Texas and Washington to California (Strauss, 2012). Included are 106 South Florida cities that will be continuously threatened by surging seas. Ben Strauss, climate center director of the Program on Sea Level Rise, indicates this represents an ominous impending urban condition.

Maritime protection of over 6,000,000 cargo containers that currently pass through our 347 US seaports is essential, since marine cargo constitutes over 90% of the value of all goods transported in the United States. SeaAway is a Florida-based company developing a resiliency-based approach to maritime assets and infrastructure by concurrently addressing safety, security, sustainability, and health attributes. This company, working with both national and international partners, is developing an advanced resiliency-based maritime infrastructure. Initially SeaAway proposed a prior-to-port protection system utilizing sea sentinel platforms, buoy protection sensors, sea handler cargo retriever, and a hull scan ship information profile system to provide a resilient maritime protection system to avoid piracy and logistical threats (Kroecker, 2010, 2012). Their work and emphasis now is expanding to address an integrated global need for intermodal infrastructure to handle the 25,000–50,000 container capacity ultra large mega container ships that will require sea-connect resilient-based ports. In the future, there may well be a worldwide network of over 35 sea-connect platform structures (superports), each measuring 65 acres in size, costing \$40 billion each, and handling

1. Twenty million containers per year
2. Ship husbandry services
3. Offshore power generating system (4.5 GW or gigawatts)
4. Sixty intermodal self-propelled high-speed ocean container barges
5. Command and control facilities
6. Lodging and hotel facilities
7. Aqua farming operations

These superports are planned to be globally positioned, near world population centers that can utilize major maritime corridors to logistically manage the efficient movement of these increasing number of supersized container ships. The sea-based superports would then feed into the network of the current land-based ports, linked through a network of intermodal self-propelled high-speed ocean container vessels. Our current network of 347 ports in the United States will become feeders from the sea-connect platforms, since these mega containership dimensions and maritime characteristics will outstrip the capabilities of the land-based ports. SeaAway's goal is to begin working on the first sea-connect platform beginning in 2013.

37.7 Resilient Components: Health, Safety, Security, and Sustainability

All four resilient components (Figure 37.14) complement one another, but they each have a specific focus and responsibility to protect our global biosphere: safety, security, health, and sustainability. The area of safety addresses four subject areas including accident reduction and prevention, enhanced worker productivity, social institutional awareness, and interactive community

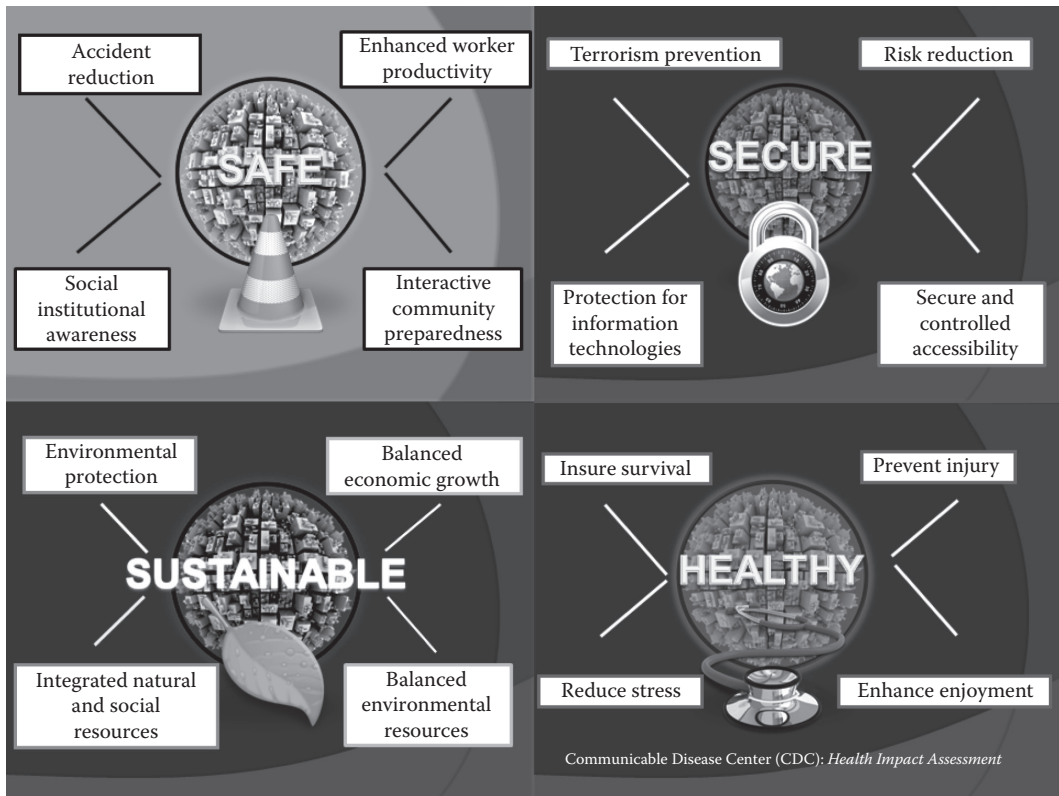


Figure 37.14 Four components of resilience.

preparedness. Security emphasizes terrorism prevention, risk reduction, protection for information-based systems, and secure-controlled accessibility. Health covers the entire range of well-being, beginning with insuring survival, preventing injury, reducing stress, and lastly enhancing enjoyment. Sustainability focuses on environmental protection, integrated natural and social resources, balanced economic growth, and balanced environmental resources.

There are initiatives among each of these four components of resiliency to accomplish their goals of insuring that global resilience can be achieved long term. Figure 37.15 offers a small sample of sustainable solution examples that are in various stages of development. Dr. Bragdon is developing a repository of sustainability-based resilient solutions that can be utilized by urbanized areas in a future book entitled *Diet Resilient Cities*. Five examples of sustainably based resiliency are described briefly in the following.

37.7.1 Kinetic Harvesting

Capturing kinetic energy related to the analytical dynamics of movement is referred to as kinetic harvesting, which can provide electricity through a storage-based system (e.g., lithium polymer batteries) to a grid. The idea of utilizing renewable energy by harnessing kinetic energy as part of flexing (i.e., down force and recovery) associated with walking, vehicular, or rail passage is actively being pursued (Figure 37.15). Three initiatives walking to watts, developed by Pavegen Systems (Harris, 2011), wheels to watts, and rails to watts, developed by SeaAway–GreenWay

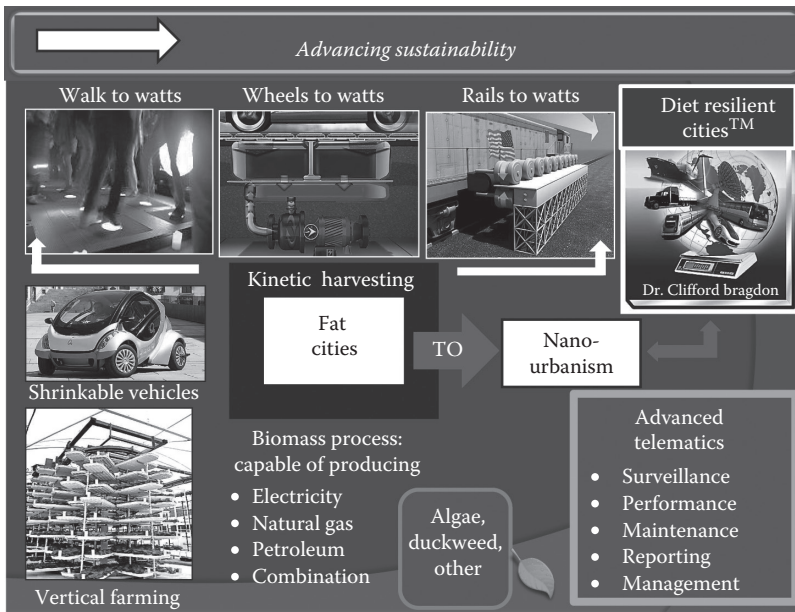


Figure 37.15 Examples of sustainability initiatives for resiliency.

(Kroecker 2010, 2012) are in the development, patenting, and prototyping stages. Utilizing renewable energy associated with movement as part of our transportation-based infrastructure (i.e., sidewalks, roadways (interchanges), rail, and transit corridors) by kinetic energy converted into electricity would be a profound advance in energy management.

37.7.2 Advanced Telematics

Telematics involves any integrated use of telecommunication and informatics, commonly referred to as information and communications technology (ICT). In this instance, our example refers to advanced methods of efficiency and energy management that can be applied to transportation systems, including surveillance, performance, maintenance, reporting, and management. For example, truck fleet behavior can be monitored and modified in real time using ICT to enhance a fleet's operational performance and bottom line. Malone Specialties, Inc., is involved in advanced telematics methods (Sewak, 2012). One such area includes addressing the truck idling requirements that have been passed in 34 states and is being considered by the EPA. Their technology can assess the monitoring of trucks in the field, their idling time signature, emissions, and mileage and make adjustments remotely along with reporting improvements and compliance. These results can be applicable to both improving driver behavior and mechanical behavior, so cost savings and profits can help these businesses.

37.7.3 Shrinkable Car

It is one thing to make a small car; however, even more desirable is one that reduces its size further (folds up) when it parks. This was a dream of Professor William Mitchell with MIT's Smart Cities research group over 20 years ago. Now the Hiriko Driving Mobility Group, located in the Basque

region of Spain, has their fold car in final testing and early production. Deliveries are expected to start at the end of 2012 on an 8 ft long car that reduces to 5 ft when parked. Three folded Hirikos (Basque word for urban) can be parked side by side in a standard parking space. The lithium ion-powered electric car has a driving range of 75 miles with a top speed of 31 miles/h. Their four-wheel steering system makes a tight circle turn, permitting maximum maneuverability in a very small space. It satisfies all current safety and crash tests and the two-passenger Hiriko Fold is to be sold for approximately \$16,400. The company anticipates many markets, especially in more dense urban areas, with strong interest already expressed by municipalities. Many believe this vehicle would be a perfect candidate for the car sharing business (e.g., Car2Go, Zipcar, Autolib, WeCar, and U Car Share). Hiriko appears to have a promising future, addressing urban spatial conservation.

37.7.4 Vertical Farming

The concept of growing agriculture vertically (above or below the ground) in urban environments began to be academically explored at Columbia University by Professor Dickson Despommier and his students well over a decade ago. Initially outlined in Dr. Despommier's book, *The Vertical Farm: Feeding the World in the 21st Century*, lists many benefits including conservation of space, farm products closer to the market, reduced logistics, diversity of produce, convenient processing, greater control over the growing technology and healthier produce for human consumption. This initial teaching and academic exercise has grown rapidly, and now there are vertical farms being planned, constructed, and operating throughout the world. Our global population, now over 7 billion, requires space nearly the size of South America to harvest the necessary food production and horizontal farming cannot be the sole answer. Asian countries have become major believers in vertical farming since their crowded cities and scarce land make this form of agriculture extremely attractive. Japan is examining such farming in the Fukushima region ravaged by the tsunami and nuclear disaster, where land will be cleaned up robotically. VFT Global examined the potential for a vertical farm and educational training center to annually grow lettuce locally (over a million head lettuce) in the Florida Tech Research Park at the Melbourne International Airport (Bragdon, 2011). Strong interest is being shown all over this country; however, attracting financing has been a problem. There are however enough success stories in many countries to validate and stimulate the growth of vertical farming for enhancing global resilience.

37.7.5 Biomass Production for Energy

The utilization of biomass from living organisms to create fuel or power has been initiated in several forms. Bioenergy conversion to electricity, gas, and petroleum is a common practice found throughout this country with varying degrees of success. The rate of yield depends upon the type of biologic material employed, the level of supply, and the production process.

Capital investment varies considerably, depending upon the end product desired and the associated governmental regulations. The creation of petroleum by-products, chemicals, and even pharmaceuticals is some of the more advanced methods being pursued today, with varying degrees of success. Algae and even duckweed are being explored typically as a means to ultimately produce electricity through anaerobic digestion and gas conversion using a generator as part of a closed-loop biologic system. This is a promising technology that could theoretically produce a reduced kilowatt per hour energy cost (estimated to be at 4–7 cents/kW h) as part of an approved utility grid; however, these facilities are still in the development stages currently. Full large-scale production would be essential to create the necessary power generation commensurate with capital investment.

37.7.6 Diet Resilient Cities

All of these sustainable examples described demonstrate that the level of resiliency can be enhanced through these technologies, with the ultimate goal of making our cities more resilient. Kinetic harvesting shows promise, but it must be aggressively applied to our total transportation-based system and supporting infrastructure, along with telematics. Nano-urbanism, the conservation of space in cities, needs to be implemented on a large scale. Vertical farming as well as 4D spatial, sensory, temporal planning is an absolute necessity. Urban obesity must become a thing of the past since remediation represents a high, undesirable cost to society. Diet resilient cities, utilizing the integrating principles of health, safety, security, and sustainability, can then become a planning and management tool ultimately leading to a training and certification process applicable to municipalities on a global basis.

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Chapter 38

Contemporary Community Resilience

Successes, Challenges, and the Future of Disaster Recovery

Sheridan “Butch” Truesdale and Jesse Paul Spearo

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In the wake of the recent rash of unprecedented, high visibility, natural, and human-generated catastrophes, interest in the topics of long-term recovery and community resilience has elevated significantly among government agencies, emergency management practitioners, scholars, and researchers. While the decades-old search for definitive definitions and concepts on these topics has continued, attention is now turning to tangible policy and program changes taking place at all levels of government and to pragmatic preparedness initiatives that are emerging at the community level. This chapter touches briefly on the former but deals primarily with the latter.

38.1 What Is Long-Term Community Recovery?

In *Managing for Long-Term Community Recovery in the Aftermath of Disaster*, Alesch et al. (2008) observe that the term community recovery is often used to mean different things. The diversity of communities and the ever-evolving nature of disaster response have created a recovery kaleidoscope that is as cumbersome as it is complex. However, Alesch, Arendt, and Holly (2008) identify that despite the unique nature of recovery, common perceptions hold that recovery has been achieved when:

- Debris is cleaned up and little physical evidence of disaster remains
- Recovery projects are completed, emergency offices are closed, and Federal Emergency Management Agency (FEMA) and Small Business Administration (SBA) are gone
- Infrastructure has been rebuilt and municipal and public services are back to pre-event levels
- Economic activity is back to what it probably would have been had the event not occurred
- Business activity and profits return to pre-event levels
- People vacate temporary housing and occupy permanent housing

Such traits have become the mark of successful transition through the recovery phase, despite sometimes taking several years to achieve. Yet, achieving some of these common traits is still

relative when comparing the pre- and post-impact of disasters to a community. Alesch et al. (2008) go on to note that the establishment or reestablishment of an *acceptable level of viability* in the present and for the future is the critical variable that defines community recovery. Viability means the community has a developmental trajectory projected to result in continued self-sufficiency and key institutions are coping with and adapting to changed circumstances.

Recovery often emerges as the outcome of several activities including restoring basic services to acceptable levels, replacing infrastructure capacity that was damaged or destroyed, rebuilding or replacing critical social and economic elements of the community system that were damaged or lost, and establishing or reestablishing relationships and linkages among critical elements of the community. The extent of recovery should not be measured in terms of how closely the post-event community resembles the pre-event community. He cautions, history suggests that recovery is not a certainty. Some mistakenly believe that full recovery will fall into place naturally after getting infrastructure and local services back to some proportion of pre-event capacity. The amount of damage and the nature of the damage to social, political, and economic relationships will dictate how likely it is that the community will return to something approximating what it was before the extreme event. Recovery is not assured by any means. Neither is there a recovery timetable which to follow—recovery cares little about the calendar.

38.2 Community Resilience in Brief

For decades, scholars, researchers, government agencies, emergency management practitioners, and others have struggled to develop a consensus definition of resilience. While these efforts have produced an impressive body of insightful observations, theories, descriptions, and recommendations as diverse as the disciplines and agendas of their authors, ultimately, this information can only be useful if it is actionable and practical and effectively influences grassroots community pre- and post-disaster plans, policies, programs, and actions.

For simplicity and purposes of discussion in this chapter, we have chosen to adopt the Community and Regional Resilience Institute's (CARRI) default definition of community resilience:

The capability to anticipate risk, limit impact, and bounce back rapidly through survival, adaptability, evolution, and growth in the face of turbulent change.

In short, resilience involves sustained practices, policies, and plans that improve the ability of communities to recover following disasters. Although resilience can be fostered on multiple scales, the community is an appropriate level for building basic resilience (Longstaff et al., 2010). We focus on resilience at the community level because most disasters are local and uniquely affect communities differently. For example, a tornado may affect multiple communities, and the demographics, economics, political structure, and culture of each community will have an influence on its resilience.

To be resilient, a community must have both the necessary resources available and the ability to apply or reorganize them in such a way to ensure essential functionality during and/or after a disturbance (Longstaff et al., 2010). A key component of resilience is adaptive capacity, which is the ability to store and remember experiences; use that memory and experience to learn, innovate, and reorganize in order to adapt to changing demands; and connect with others inside and outside the community to communicate lessons learned, self-organize, reorganize, and/or obtain resources or assistance from outside sources (Mileti and Sorensen, 1987; Gunderson and Pritchard, 2002).

In the National Research Council's 2011 report *Building Community Disaster Resilience Through Private-Public Collaboration*, Hooke and the Committee on Private–Public Sector Collaboration to Enhance Community Disaster Resiliency (2011) suggest that community-level private–public sector collaboration should be a fundamental component of community resilience, particularly disaster resilience. Resilience-focused private–public collaboration ideally should:

- Integrate with broader capacity-building efforts within the community and include all community actors
- Emphasize principles of comprehensive emergency management allowing preparation for all hazards and all phases of the disaster cycle to drive goals and activities
- Function as a system of horizontal networks at the community level, coordinating with higher government and organizational levels
- Develop flexible, evolving entities and establish processes to set goals, conduct continuing self-assessment, meet new challenges, and ensure sustainability
- Institutionalize as a neutral, nonpartisan entity with dedicated staff

38.3 Why Community Resilience and Recovery Matter

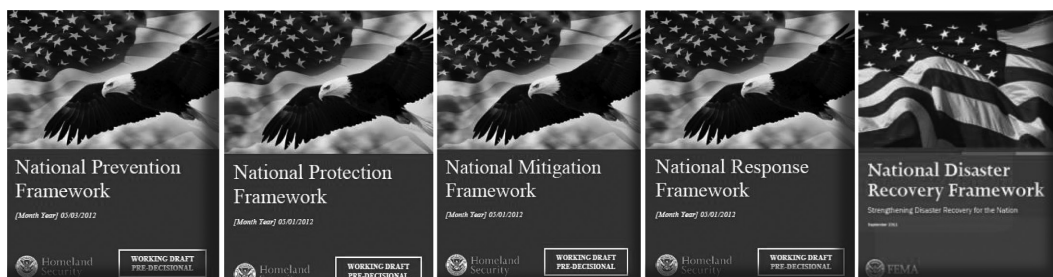
In the first decade of the twenty-first century, the United States has been marked by a seemingly endless string of devastating disaster events. Fierce, destructive hurricanes in the Southeast and Gulf, extensive severe flooding and tornadoes in the country's midsection, the Deepwater Horizon oil spill, drought-fueled wildfires in the West and Central regions, and unthinkable acts of terrorism in the East have exacted a heavy toll on victimized communities and severely tested the nation's crisis and emergency management capabilities at all levels.

Unfortunately, each successive major disaster event reminds us that government-centric response and recovery doctrine and practices are lacking, to say the least. Even more disturbing, John Harrald, director of the Institute for Crisis, Disaster and Risk Management, identified in June 2006 before the Senate Homeland Security and Government Affairs Committee (Harrald, 2006) “the same complaints are heard over and over again... slow, overly-bureaucratic and ineffective policies and processes, painfully slow and fragmented responses and recoveries, frequent communication and coordination breakdowns, perceived cultures of dependency, misplaced senses of entitlement, and lack of community preparedness.” Harrald convincingly enumerated many of the failures that plagued virtually all phases of the Hurricane Katrina emergency management process and went on to offer several cautions:

- The United States continues to be vulnerable to extreme events with potentially catastrophic consequences—nature will not rest after Hurricane Katrina, and terrorists will not stop with the September 11 attacks.
- Little has been done to reduce known vulnerabilities, to adequately prepare for extreme events, or to create the ability to mobilize, deploy, and coordinate an adequate response and recovery to a large-scale event.
- Making our society and economy more resilient to extreme events remains a national priority.

A number of developments suggest that the message may have gotten through at the federal level. In a 2009 proclamation for National Preparedness Month, President Obama stated “Our goal is to ensure a more resilient Nation – one in which individuals, communities, and our

economy can adapt to changing conditions as well as withstand and rapidly recover from disruption due to emergencies” (Presidential Proclamation 8412, September 2009). Building resilience is a clearly articulated national security priority according to numerous policy documents such as the *Homeland Security Strategic Plan 2008–2013*. In the 2010 updated white paper *Protecting Americans in the 21st Century*, drafted by the 21 major public and private national security organizations comprising the National Homeland Security Consortium (National Homeland Security Consortium, 2010), “developing a more comprehensive and coordinated approach in the rebuilding of communities struck by major disasters” was identified as one of the six top homeland security issues requiring near-term policy and strategic action by the nation’s leaders. On March 30, 2011, President Obama issued Presidential Policy Directive 8 (PPD-8) aimed at strengthening the security and resilience of the United States through systematic preparation for the threats that pose the greatest risk to the security of the nation, including acts of terrorism, cyber attacks, pandemics, and catastrophic natural disasters. Recognizing that national preparedness is the shared responsibility of all levels of government, the private and nonprofit sectors, and individual citizens, the directive goes on to order the establishment of a foundation for an integrated, all-of-nation, capabilities-based approach to preparedness. Integral to the process is the development of a national preparedness goal that identifies core capabilities necessary for preparedness and a national preparedness system to guide activities for achieving it. At this writing, significant progress had been made in translating PPD-8 into practical, actionable frameworks and policy documents.



38.4 Breaking the Chain of Flawed Recoveries

There are a number of encouraging signs that suggest things finally may be changing. Time will tell whether these are truly paradigm shifts in disaster management thinking and practice or simply well-intended trial-and-error experiments. Some of the more important changes relevant to community resilience and disaster recovery include:

- A growing recognition and desire at the federal level that government-centric systems and protocols must be modified to expand response and recovery capabilities and accommodate more inclusive, holistic approaches to disaster management
- Implementation of significant organizational program and policy reforms for the stated intention of improving interagency communication and coordination at all levels and simplifying, speeding, and otherwise improving post-disaster response and recovery processes
- The emergence of strategies and initiatives to enhance local, regional, state, and national capabilities and capacity through engagement of private sector resources and capabilities

- An inspired and growing movement at local, regional, and state levels to build more disaster-resilient communities with special emphasis on pre-event disaster recovery planning, the creation of collaborative private–public arrangements, and implementation of innovative resilience-enhancing initiatives

In the US Chamber of Commerce Business Civic Leadership Center’s publication *On the Brink: Reengineering the Nation’s Disaster Response Processes* (US Chamber of Commerce, 2008), Stephen Jordan observed that “Organizations in every sector are taking steps to re-engineer the disaster response process. The Federal government is more collaborative. State and local authorities are starting to adopt new strategies. Voluntary agencies are strengthening their communication and coordination capacity, and companies are considering the most strategic way to help out, from community preparedness to long-term community recovery.” To fully illustrate the progress of long-term planning, the remainder of this chapter will describe some of the more promising initiatives that governments, nongovernmental organizations (NGOs), and communities are undertaking to design and implement resilience policies, programs, and systems to help communities cope with the challenging threats of natural and human-generated hazards.

38.5 Federal Reforms Relevant to Resilience

Since FEMA’s inception in 1979, it has been charged with carrying out activities that enable federal, state, and local governments to address a broad spectrum of emergency management functions. Its pre- and post-disaster mission has focused on providing and coordinating federal post-disaster response to save lives and property, funding the reconstruction of damaged infrastructure and housing, funding and coordinating emergency preparedness activities, and supporting hazard mitigation activities. Despite ongoing organizational and process changes, the agency has drawn considerable criticism. The highly flawed response and recovery following Hurricane Katrina in 2005 served as a catalyst for significant changes in federal policy and organization of the Department of Homeland Security (DHS). Several significant federal reforms are particularly noteworthy: enactment of the Post-Katrina Emergency Management Reform Act, the drafting of a National Disaster Recovery Framework (NDRF) that complements and builds on the National Response Framework, establishment of FEMA Emergency Support Function (ESF) #14 Long-Term Community Recovery (LTCR), and creation of the FEMA Private Sector Division. These initiatives have been significant steps forward in securing resilient communities for the future.

38.5.1 *Post-Katrina Emergency Management Reform Act of 2006*

On October 4, 2006, President George W. Bush signed into law the Post-Katrina Emergency Reform Act. The act significantly reorganized FEMA, provided it substantial new authority to remedy gaps that became apparent in the response to Hurricane Katrina in August 2005, and prescribed a more robust preparedness mission for FEMA. The act directed the FEMA Administrator to develop a national disaster recovery strategy. The Post-Katrina Emergency Management Report Act of 2006 amended the Homeland Security Act of 2002, making extensive revisions to federal emergency management response processes, and, in effect, put a fence around FEMA, giving it the authority to do its job relatively autonomously while keeping the agency within the DHS.

The Post-Katrina Act, along with other laws enacted by the 109th Congress, significantly amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) (FEMA, 2007) by clarifying some sections, waiving several limiting requirements, and reworking or creating new authorities. The changes to the act reflect lessons learned from Hurricane Katrina and the perceived need for legal remedies to make Stafford Act programs more flexible and responsive to events of a catastrophic nature. The act leaves the basic tenets of the Stafford Act such as presidential discretion, need for state requests, and restrictions on eligibility unchanged.

Perhaps most important, the Post-Katrina Act authorizes the president to support precautionary evacuation measures and accelerate the delivery of federal emergency response and recovery aid after issuing a major disaster or emergency declaration. The amendments of the act expand the areas for technical and advisory assistance to address some of the problems of delay and communication identified in Katrina response efforts. The President may now provide federal assistance in the absence of a specific request from state officials. If unrequested assistance is provided, federal officials must attempt to coordinate the delivery of such aid with state officials, but they are not to delay the delivery of the needed aid because of uncompleted coordination efforts. In addition, the act stipulates that agencies using nonlocal firms for debris removal, distribution of supplies, and other recovery and reconstruction activities must justify such use in writing. Where existing contracts are in effect, unless not feasible or practicable, such work is to be assigned to local firms, organizations, and individuals.

38.5.2 National Disaster Recovery Framework

The NDRF is a companion document to the national framework series comprising protection, prevention, response, recovery, and mitigation, establishing a scalable system that coordinates and manages disaster recovery to more effectively deliver recovery assistance to severely impacted communities. It will provide guidance and a flexible structure that will allow disaster recovery managers to operate in a more unified, inclusive, and collaborative manner to address the complexities of the intermediate and long-term recovery processes and to facilitate recovery assistance and activities. The NDRF addresses and clarifies the pre- and post-disaster recovery roles and responsibilities of a full range of stakeholders, including local, state, and federal governments; individuals and families (including special needs and underserved populations); the business community; voluntary, faith-based, and community organizations; advocacy groups; universities; professional associations; and philanthropic foundations.

The framework is intended to promote a process that allows the local community to assume leadership in developing recovery priorities and realistic plans of actions. It advances the concept that recovery encompasses much more than the restoration of the physical structure to include revitalization of the community's social, educational, environmental, and cultural fabric and networks against future disasters and making them more resilient and sustainable in the future. Among the guidance concepts advanced by the NDRF are the engagement of pre-disaster recovery planning and private–public partnerships. The core principles espoused in the NDRF include:

- Local primacy in planning and managing all aspects of community recovery
- Pre-disaster recovery planning
- Inclusive partnerships
- Clear, frequent, and culturally sensitive communications

- Unity of effort
- Timely and flexible coordination and delivery of recovery activities and assistance
- Resilience and sustainability
- Public empowerment

38.5.3 FEMA ESF #14 Long-Term Recovery Community Recovery

Historically, federal long-term recovery assistance has consisted of providing financial resources for disaster assistance to individuals, families, and businesses; public facility reconstruction; physical recovery; and mitigation when local and state capabilities are exceeded. In some situations, particularly involving large, multistate, or unique disasters, the federal government expanded its assistance to include planning and policy-based recovery and redevelopment support focused on regional and community-wide recovery planning and interagency coordination.

This expanded role became formalized in late 2004 when, under the authority of the National Response Plan, FEMA ESF #14 LTCR was created. Its purpose was to promote a community-centric, coordinated, long-term approach to recovery, with a focus on organizing and leveraging federal resources and providing technical assistance to states and communities. The mission and role of ESF #14 were further defined in the ESF #14 Annex to the National Response Framework, which superseded the National Response Plan in 2008.

The mission of the Long Term Community Recovery (LTCR) is to promote successful long-term community recovery working with and through state organizations to identify and coordinate potential sources of recovery funding and to provide enhanced technical assistance in the form of impact analysis and recovery planning support. LTCR's first large-scale implementation was in support of hurricanes Katrina and Rita in the Gulf. ESF #14 efforts are driven by state/local priorities, focusing heavily on permanent restoration of infrastructure, housing, and the local economy. When activated, ESF #14 provides the coordination mechanisms for the federal government to:

- Assess the social and economic consequences in the impacted area and coordinate federal efforts to address LTCR issues resulting from an *Incident of National Significance*
- Advise on the LTCR implications of response activities, the transition from response to recovery in field operations, and facilitate recovery decision making across various ESFs
- Work with state, local, and tribal governments; NGOs; and private sector organizations to conduct comprehensive market disruption and loss analyses and develop a forward-looking market-based comprehensive long-term recovery plan for the affected community
- Identify appropriate federal programs and agencies to support implementation of the LTCR plan, ensure coordination, and identify gaps in resources available
- Avoid duplication of assistance, coordinate to the extent possible program application processes and planning requirements to streamline assistance, and identify and coordinate resolution of policy and program issues
- Determine/identify responsibilities for recovery activities and provide a vehicle to maintain continuity in program delivery among federal departments and agencies, and with state, local, and tribal governments and other involved parties, to ensure follow-through of recovery and hazard mitigation efforts

ESF #14, led by FEMA, is supported by a handful of primary agencies including the Departments of Agriculture and Commerce, Homeland Security, Housing and Urban

Development, Treasury, and the SBA. A number of other federal agencies serve in a support capacity. In its 2011 report *Lessons in Supporting Community Recovery*, ESF #14 provides examples and practical lessons drawn from its first 7 years of service, working with more than 180 communities in 23 states.

38.5.4 Keys for Successful Recoveries

From its considerable experience, ESF #14 offers the following observations and recommendations for successful recoveries:

- *Act quickly*—Communities take advantage of the window of opportunity post-event to assess and determine the future of the community.
- *Actively plan*—Planning maximizes the opportunities for communities to coordinate inter-related elements of housing, infrastructure, environment, and culture and promote design and policy changes for future development.
- *Engage the community*—A successful public engagement process gives all residents in a disaster-impacted community a way to interact and provide their input on future development. It legitimizes the planning process, empowers residents, and gives the community ownership of the process.
- *Develop partnerships, networks, and effective coordination strategies*—A broad and connected network of public, private, and nonprofit entities is needed to support community recovery. Stakeholders should coordinate and leverage resources, capitalize on local knowledge, and incorporate community needs throughout the recovery process.
- *Make decisions and manage recovery locally*—Outside support could be needed to build capacity and support local leadership, but the community must be prepared to take ownership and management of the recovery process.
- *Mitigate*—An effective recovery will reduce risk and improve the long-term sustainability of the community. Hazard mitigation, risk reduction, and sustainability choices should be integrated into the decisions on recovery policy and reinvestment.
- *Prepare for recovery*—It is critical to establish roles and responsibilities for government and the public sector as part of pre-disaster planning. A prepared community recognizes risks and is more resilient and capable of actions to address recovery from future disasters.

38.5.5 Recovery Lessons Learned

- Recovery can be successful only when it is locally driven and the community takes ownership of the process. Recovery assistance should supplement local efforts and build local capacity as needed.
- The community must establish a clear, common vision for the future. The visioning process should be inclusive, reaching out to all stakeholders in the community for input. Existing community networks should be called on to connect stakeholders. This adds credibility to the process and builds existing capacity.
- The community must develop and adopt planning documents to formally establish its path forward. This indicates commitment to and ownership of the recovery process.
- Communities should expect that obtaining funding and project approvals could take several years. Timelines are shorter and success is more likely with local stakeholders who are dedicated to project implementation, with local and state commitment.

- Coordinated efforts among public, private, and nonprofit partners are crucial to successful implementation of recovery plans. It is essential to connect resource providers with community leadership to strategize on potential projects.
- Communities benefit from a sustained and consistent management effort from their leadership. They must be able to maintain momentum and implement recovery plans that could take years to come to fruition.
- States that understand the value of long-term recovery support can maximize state and federal resources in a timely manner post-disaster. State partnership and support of local communities in the LTCR process are vital to successful coordination of all levels of government. With state support to develop leadership, provide technical assistance, and coordinate planning, the timeline for project implementation can be shortened.
- Federal program expertise and resources should be applied effectively to complement state, tribal and local recovery efforts. Communities will greatly benefit from continued efforts to increase federal interagency coordination and communication through the development of the NDRF (FEMA, 2011).

38.5.6 Recommendations for the Future

The following recommendations are based on lessons learned from multiple LTCR engagements, US Government Accountability Office reports, and inspector general recommended actions:

- Build capacity at all levels of government to successfully implement recovery concepts identified in the NDRF—Increase stakeholder capacity by engaging in training, exercises, and planning in advance for recovery support at the local, state, and federal level.
- Prepare for recovery by developing pre-disaster plans and guidance—Develop plans and strategies that include roles and responsibilities to more fully prepare communities to address recovery challenges.
- Encourage and support local ownership, leadership, and management of the recovery process—Recovery must be owned at the local level if it is to be successful. Local involvement provides continuity, fosters trust in the process, and encourages stakeholder participation and investment in recovery.
- Foster and strengthen connectivity between all stakeholders to effectively leverage recovery resources—A systematic method to connect local, state, and federal stakeholders will ensure that resources are optimized and recovery is expedited.

At this writing, ESF #14 functions are being transitioned into the Community Planning and Capacity Building Recovery Support Function established by the NDRF.

38.5.7 FEMA Private Sector Division

In October 2007, FEMA established a Private Sector Division within its Office of External Affairs to help formalize the agency's approach to private sector engagement. In doing so, it expanded its portfolio of initiatives and activities with the private sector and expanded its *whole community* approach to disaster readiness, response, and recovery. The division's overarching goals include improving information sharing and coordination between FEMA and the private sector during disaster planning, response, and recovery efforts. The FEMA Private Sector Division cultivates

public–private collaboration and networking in support of the various roles the private sector plays in emergency management, including that of disaster victim, response resource provider, partner in preparedness, and critical component of the local economy. The division also fosters internal collaboration and communication among FEMA programs that have an interest in private sector engagement. Its stated vision is to “establish and maintain a national reputation for effective support to private sector stakeholders through credible, reliable and meaningful two-way communication.” Its mission is to communicate, cultivate, and advocate for collaboration between the US private sector and FEMA; to support FEMA’s capabilities; and to enhance national preparedness, protection, response, recovery, and mitigation for all hazards. The Private Sector Division’s primary mission includes the following:

- Advises the Office of External Affairs on the impact of DHS policies, regulations, processes, and actions on the private sector
- Creates and fosters strategic communications with the private sector to enhance the primary mission of the DHS to protect the American homeland
- Interfaces with other relevant federal agencies with homeland security missions to assess the impact of these agencies on the private sector
- Creates and manages private sector advisory councils composed of representatives of industries and associations designated by the secretary to (a) advise the secretary on private sector products, applications, and solutions as they relate to homeland security challenges and (b) advise the secretary on homeland security policies, regulations, processes, and actions that affect the participating industries and associations
- Works with federal laboratories, federally funded research and development centers, other federally funded organizations, academia, and the private sector to develop innovative approaches to address homeland security challenges to produce and deploy the best available technologies for homeland security missions
- Promotes existing public–private partnerships and development of new public–private partnerships to provide for collaboration and mutual support to address homeland security challenges
- Assists in the development and promotion of private sector best practices to secure critical infrastructure
- Coordinates industry efforts regarding DHS functions to identify private sector resources that could be effective in supplementing government efforts to prevent or respond to a terrorist attack
- Consults with the various DHS elements and Department of Commerce on matters of concern to private sector including travel and tourism industries

Through public–private collaboration, government and the private sector can:

- Enhance situational awareness
- Improve decision making
- Access more resources and capabilities
- Expand reach and access for disaster preparedness and relief communications
- Improve coordination
- Increase the effectiveness of emergency management efforts
- Maintain strong relationships, built on mutual understanding

38.5.8 Resilience Directorate, White House National Security Council

The concept of resilience has penetrated the highest levels of the federal government. In May 2009, the White House consolidated preparedness, protection, and response policies into the new *Resilience Directorate* of the National Security Staff. The DHS has followed suit by integrating resilience as a core priority into its National Protection and Programs Directorate. Recognizing the panoply of definitions of resilience that has emerged over the last several years in academic papers and policy documents, an interim report released in May of 2011 by the Preparedness, Response and Resilience Task Force, a special task force established by the Homeland Security Policy Institute based at George Washington University, cautioned policymakers and homeland security experts that the term and concept of resilience cannot be meaningful or effective unless they are *operationalized*. Without a clear, unified, actionable vision of resilience, they warn that resilience could remain just a buzzword that is “ubiquitously mentioned in academic papers and Federal policy documents,” but is “not sufficiently tangible to drive decisions on government priorities and resources or to meaningfully influence the behavior of the American public.” It was suggested that it is time for the concept of *resilience* to move beyond semantic definitions and into the realm where federal, state, and local governments—as well as private citizens—take concrete actions to brace themselves for *low-probability* but *high-consequence* disasters. According to the Task Force, it comes down to being able to look at relative risks, evaluating the relative costs of different types of mitigation efforts, and making informed choices. Recent considerations of the Task Force include further clarifying the meaning of resiliency; analyzing the critical junctures that exist between policy and implementation; examining the nexus between preparedness, response, and resilience; and theorizing what the future of resiliency will be as it relates to a diverse and changing operational environment.

38.5.9 Ad Hoc Senate Subcommittees

The Senate Homeland Security and Governmental Affairs Ad Hoc Subcommittee on State, Local, and Private Sector Preparedness and Integration is one of the six specialized subcommittees that have been established within the Senate Committee on Homeland Security and Governmental Affairs (Harrald, 2010). Activities of the DHS related to the integration of the private sector into the nation’s emergency preparedness and response system are one of its charges. A second Ad Hoc Subcommittee on Disaster Recovery and Inter Governmental Affairs, by Senate rules, has jurisdiction over the recovery provisions covered by the Stafford Act and the Long-Term Recovery Annex of the National Response Plan. A third subcommittee, the Response and Recovery Subcommittee, is charged with creating a working group to focus on post-disaster housing.

38.6 State Recovery Roles and Enhancement Initiatives

While the federal government can effectively serve the role of facilitator, it cannot and should not be viewed as the guarantor of resilience. Resilience initiatives necessarily must be implemented at state and local levels. States manage and drive the overall recovery process and play a key role in coordinating recovery activities within their jurisdiction and with other levels of government. As the basis for all legal authority within a state, state governments wield influence over many of the tools that enable disaster recovery through legislation, regulation, and management of state and some federal resources.

States act as a conduit between local governments and several key federal recovery assistance programs. In addition to managing federal resources, state governments may develop programs or raise money (i.e., issue bonds) to help finance recovery projects. Where there are additional needs to be met, states can reassign existing internal resources to streamline and expedite recovery, such as forming new or ad hoc state recovery agencies. According to the NDRF, states commonly serve the following pre- and post-disaster roles relating to disaster recovery.

38.6.1 Pre-Disaster

- Lead statewide pre-disaster recovery and mitigation planning efforts and manage requirements and incentives for pre-event disaster recovery preparedness and planning as well as hazard mitigation actions.
- Identify and perform recovery activities that are either primarily the responsibilities of state government or beyond the capabilities and authorities of local governments.
- Provide technical assistance and training to local governments and NGOs on state plans, programs, and other resources for disaster recovery.
- Implement and enforce applicable laws and regulations to protect the rights of citizens to ensure physical, programmatic, and communication access to preparedness activities and services.
- Establish and aid enforcement of building and accessibility codes and land use standards, which can reduce vulnerability to future disasters.
- Ensure safety and health of state workers.
- Provide advice to employers and workers on worker safety and health.

38.6.2 Post-Disaster

- Coordinate with local, regional, tribal, and federal governments and agencies; private businesses; and nonprofit organizations to coordinate recovery planning and assistance to impacted communities.
- Receive, record, and manage federal grant resources; ensure efficient, nondiscriminatory and effective use of the funds; and enforce accountability and legal compliance.
- Oversee volunteer and donation management and coordinate with federal Voluntary Agency Liaison.
- Facilitate and oversee a case management process that is accessible and inclusive.
- Assist local governments and communities with identifying recovery resources.
- Establish metrics in coordination with the impacted communities to evaluate recovery progress and achievement of statewide disaster recovery objectives.
- Develop and implement strategies for raising and leveraging recovery funds through private investments, charitable donations, and state sources such as emergency funds, tax, fees, and bonds that are within the state's authority to seek.
- Communicate timely information to the public and manage expectations, in coordination with local, tribal, and federal stakeholders.
- Enact new exemptions to existing state laws and/or regulations to promote recovery activities such as home reconstruction.
- Coordinate with federal law enforcement to prosecute disaster-related fraud, waste, discrimination, and abuse and recover lost funds.
- Ensure safety and health of state workers.
- Monitor oversight of worker safety and health.

38.7 Leading Edge State and Regional Resilience and Recovery Initiatives

In recent years, several states have undertaken significant initiatives to promote and guide community resilience programs. These initiatives are designed to advance the tenants of successful, long-term community resilience through a collaborative, proactive approach that is community specific.

38.7.1 Safeguard Iowa Partnership

The Safeguard Iowa Partnership is a voluntary coalition of the state's business and government leaders, who share a commitment to working together to prevent, prepare for, respond to, and recover from catastrophic events in Iowa. Created in 2007 by the Iowa Business Council and representatives from key state agencies, the partnership helps to integrate business resources, expertise, and response plans with those of government during all stages of disaster management.

Safeguard Iowa's stated vision is to "Ensure safe, resilient communities for the residents and businesses of Iowa." Its mission is to "Strengthen the capacity of the state to prevent, prepare for, respond to, and recover from disasters through public-private collaboration." The long-term partnership's goal is to have trained private sector representatives that can operate at county emergency operations centers (EOCs) throughout the state. Special training focuses on understanding the phases of emergency management, the Incident Command Structure used at the scene of emergencies, the roles and responsibilities of the liaison, and being proficient in the WebEOC emergency management software system used at EOCs in the state. The partnership has a seat at the state EOC and county EOCs to ensure accurate and timely information is shared and both private and public organizations are working closely to facilitate safety and priority missions.

38.7.2 Community and Regional Resilience Institute

CARRI began in 2007 as the Community and Regional Resilience Initiative, a collaborative effort of the DHS (Science and Technology Directorate), Oak Ridge National Laboratory, Savannah River National Laboratory, and a number of academic institutions. Early CARRI activities included the engagement of a diverse collection of individuals, organizations, and government entities—with a charge to learn all they could about *the condition and path of community resiliency*. As the body of research grew, the organization was renamed the Community and Regional Resilience Institute. Today, the CARRI is a major affiliate of the Southeast Region Research Initiative (SERRI), supported by the US DHS and operated by the Department of Energy's Oak Ridge National Laboratory in conjunction with a variety of other federal, regional, state, and local partners.

CARRI is dedicated to research and practical application across the full continuum of prevention, protection, response, and recovery for the purpose of enhancing the resilience of communities and regions. It aspires to assisting the nation to develop an accepted, common framework for community and regional resilience that integrates the full suite of community resources into a coherent resilience pathway that can assist victimized communities to get back on their feet as quickly as possible following natural or man-made disasters. The program strives to be the catalyst of a practical community resilience system that will contribute to a national culture of resilience by working with stakeholders to create the structure, processes, and tools to encourage, support, and reward community resilience. Recognizing the need for involvement of pilot communities

into their work, three Southeastern communities were brought into the fold as building block partners. These communities include Gulfport/Mississippi Gulf Coast; the Charleston, South Carolina Tri-County Area; and the Memphis Urban Area, Tennessee. Work continues assisting these communities to implement best community resilience thinking and practices.

38.7.3 Florida's Post-Disaster Redevelopment Planning Initiative

Florida has a storied history of damaging hurricanes, floods, tornadoes, wildfires, and other disasters. The state and many communities have become quite proficient in coordinating response and short-term recovery. Skills for long-term redevelopment following major disasters, however, are not nearly as well developed.

Prompted by the long and costly rebuilding processes following twelve landfalling hurricanes in 2004 and 2005 (seven of which involved major presidential disaster declarations), Florida's Department of Community Affairs, in collaboration with the Florida Division of Emergency Management, decided to launch a statewide program of community-based pre-event recovery and redevelopment planning. Without pre-event preparations and plans and under severe time pressures they recognized, local officials have often been severely challenged in dealing with complex redevelopment decisions and have almost always missed opportunities for significantly reshaping the post-disaster futures of victimized communities. Although one county, Palm Beach County, produced a pioneering Post-Disaster Redevelopment Plan (PDRP) in 2006, the statewide PDRP program was formally initiated in 2007.

Guided by a special statewide, multidisciplinary focus group comprised of recovery professionals and a number of partner communities, in 2010, the state published a *Post-Disaster Redevelopment Planning Guide for Florida Communities*. Guidance was based largely on extensive research and the hands-on experiences of six pilot communities and research into best recovery and redevelopment practices. All Florida counties and municipalities are encouraged to develop PDRPs using the new guidelines. Inland communities are following suit. PDRPs address a full range of recovery topics including, but not limited to, sustainable land use, housing repair and reconstruction, business resumption and economic redevelopment, continuity of government and other critical services, infrastructure restoration and mitigation, long-term health and social services support, environmental restoration, financial considerations, short-term recovery actions that affect long-term redevelopment, and other long-term recovery issues identified by individual communities. Communities are encouraged to capitalize on opportunities for incorporating hazard mitigation and community improvement into their PDRPs, consistent with the goals of local comprehensive plans and inviting full participation of citizens.

It is assumed the PDRP process will promote strengthened recovery processes, clearer assessments of risk levels, and development of redevelopment strategies and plans under *blue sky* conditions devoid of emergency circumstances, compromised budgets and staffing, and political pressures. PDRPs identify policies, operational strategies, and roles and responsibilities for implementation that will guide decisions that affect long-term recovery and redevelopment of the community after a disaster. The principal benefits of well-developed PDRPs include:

- Faster and more efficient recovery through identification of likely issues, clear post-disaster roles and responsibilities, and decision and action support
- Opportunities to build back smarter to reduce future impacts and otherwise improve the quality of life

- Optimizing local control over recovery and the use of local assets as resources rather than victims
- Justification and effective channeling of outside resources and assistance
- Formation of productive partnerships and the development of collaborative resilience initiatives

The state of Florida considers PDRPs to be valuable instruments for developing disaster-resilient, self-sufficient, sustainable communities and for promoting collaborative public–private initiatives. PDRPs are useful for all types and levels of emergencies but are most valuable for major or catastrophic disaster events. PDRP objectives should be consistent with the community’s local comprehensive plan, local mitigation plan, long-range transportation and evacuation plans, comprehensive emergency management plan (CEMP), land development regulations, and other local and economic development plans. PDRPs are expected to be a logical extension in community CEMPs and local mitigation plans.

The PDRP program continues to be supported by the statewide focus group comprised of federal, state, regional, and local governmental organizations, as well as representatives of the academic and economic development communities. The Florida program and several community plans have been recognized and applauded around the country and at all levels of government. Several communities around the country are using the PDRP program and its planning guidelines as models for similar resilience initiatives tailored to their unique needs and resources.

38.7.4 Oregon Partnership for Disaster Resilience

The Oregon Partnership for Disaster Resilience is a coalition of public, private, and professional organizations working collectively toward the mission of creating a disaster-resilient and sustainable state. Developed and coordinated by Community Service Center (CSC) (Community Service Center, 2010) at the University of Oregon in 2001, the partnership employs a service learning model to increase community capacity and enhance disaster safety and resilience statewide. The coalition is a natural outgrowth of Oregon’s Showcase State status and follows the Institute for Business and Home State’s state model. It became officially recognized as the Oregon Partnership for Disaster Resilience in 2001 (<http://csc.uoregon.edu/opdr/about/>). In support of its mission to create a disaster-resilient state, the partnership’s primary activities focus on:

- Community plan and project development support
- Applied research and technical resource development
- Training programs and capacity building
- Development of strategic alliances (public/private partnerships)
- Business and economic recovery
- Pre-disaster mitigation
- Education and awareness
- State hazard planning

38.7.5 New Jersey Business Force at NJIT

The New Jersey Business Force seeks to improve and strengthen the capacity of New Jersey, FEMA Region 2, and its business partners to prevent, prepare for, respond to, and recover from disasters of significant magnitude through a dynamic partnership triad comprising academia, private sector

entities, and government. This program began under the Business Executives for National Security program; in 2009, the New Jersey Business Force transitioned to regional sponsorship under the New Jersey Institute of Technology. A unique resource of the Business Force is the Business EOC (BEOC), a private sector organized, managed, and staffed emergency coordination/operations center focused on *all hazards* disaster prevention, preparation, response, and recovery. Its goal is to make the private sector self-reliant and self-sufficient during emergencies and disasters through information sharing and shared situational awareness. The BEOC supports:

- Business-to-business collaboration and communications
- Interface with public sector EOCs
- Business-to-NGO collaboration
- Prearranged and spontaneous asset and volunteer mobilization

38.7.6 California Resiliency Alliance

The California Resiliency Alliance (CRA), a nonprofit organization born out of the Bay Area Business Executive for National Security (BENS) program, brings businesses and government together in a public–private partnership to strengthen the state’s capacity to prevent, protect, respond, and recover from natural and human-caused disasters. Its purpose is to better prepare for natural disasters, pandemic flu, and terrorism. In previous disasters, the founders note that business–government collaboration had been chaotic—with little or no advanced planning or practice. In order to improve community resiliency, the CRA mobilizes private sector support in advance of events in four categories: cross-sector collaboration, leadership and strategic support, health emergencies, and disaster asset registration. By organizing resources and expertise in advance disaster response, capabilities are improved at the state and local level where they are most needed.

38.8 Community-Level Resilience Initiatives

A number of community-level *grassroots* resilience programs have begun to emerge as a result of state and regional guidance initiatives such as those described earlier. A few self-initiated community programs are also beginning to surface. Since no reliable databases have yet been developed for such programs, it is difficult to estimate with any accuracy how many programs exist or to fully understand and appreciate their makeup, missions, strategies, and activities. For purposes of illustration, we will profile one program intimately familiar to the author, Palm Beach County’s two-pronged strategy for enhancing resilience and facilitating long-term recovery and redevelopment from major events.

38.8.1 Palm Beach County’s Resilience and Recovery Initiatives

Palm Beach County is a large, highly populated coastal county in southeast Florida. Its great appeal as a place to live and work, however, comes at a price. The area has a storied history of disaster events including hurricanes, tropical storms, flooding, tornadoes, and wildfires. The Herbert Hoover Dike, which contains Lake Okeechobee (the second largest freshwater lake within the continental boundaries of the United States), is rated by the International Hurricane Association as second only to New Orleans as a flood threat. The county also holds the uncelebrated records

for hosting the second most deadly hurricane in US history (1928) and the first bioterrorism attack in the United States (anthrax attack in Boca Raton, Florida, in 2001).

Hurricanes present the highest probability for creating truly catastrophic events in Palm Beach County. Between 1920 and 1950, the county was directly impacted by six destructive hurricanes of category 3 magnitude or greater. In 1999, the county narrowly avoided Hurricane Floyd, an immense storm carrying category 5 winds. The historic return period for category 3 or greater hurricanes in Palm Beach County is 15 years. After an extended period of relative calm, in 2004 and 2005, the county was rudely reawakened from its sense of tranquility by three direct landfalling category 2 hurricanes in the span of 2 years. It was against this backdrop and with lingering memories of the devastation caused in Homestead, Florida, by Hurricane Andrew in 1992 that the county was moved to take steps to strengthen its capability to withstand and rebound from future extreme disaster events.

In 2005, Palm Beach County's emergency management staff began discussions with a full range of local, state, and federal public and private sector stakeholders. After extensive deliberation and research into best practices and lessons learned from previous disasters, it was decided to launch two major local initiatives: (1) preparation of a pre-disaster plan to guide post-catastrophic disaster recovery strategies, decisions, and actions and (2) creation of a collaborative mechanism for effectively engaging the county's exceptional private sector resources and capabilities to bolster the county's damage management capacity and capabilities and to help develop and implement innovative resilience-enhancing policies, programs, and practices. The two initiatives are described in the following sections.

38.8.2 Palm Beach County's Post-Disaster Redevelopment Planning Initiative

Florida statutes strongly encourage all communities, particularly coastal counties and cities, to prepare PDRPs and policies that will reduce the vulnerability of private and public property and individuals to natural disasters. Palm Beach County adopted its first PDRP in 1996. It was a very rudimentary countywide plan focusing primarily on post-disaster land use and building codes. Recognizing the limitations of the plan, in 2004, the county, assisted by grant funds secured from the Economic Development Administration (EDA) and the Public Entity Risk Institute (PERI), began a major planning effort to expand the PDRP concept well beyond the existing state guidelines to include a broad range of post-disaster issues and concerns. A multi-sector, multidisciplinary executive committee was established to oversee the project. The services of CSA International, a local mitigation consulting firm, and the Treasure Coast Regional Planning Council were retained to provide topic-specific expertise.

The enhanced PDRP was envisioned to serve as a single source decision and action support reference document for local officials to use in the chaotic aftermath of a catastrophic disaster. It addressed a full range of issues relating to long-term recovery, reconstruction, and economic redevelopment. The planning process drew heavily from extensive research into lessons learned from previous disaster events, best planning practices, and stakeholder inputs compiled from several community and multidisciplinary workshops and meetings. In the midst of the project, Katrina devastated the Gulf region, providing additional, albeit unfortunate, insights and validation of the project team's direction and thinking.

The resulting PDRP, believed to be the first pre-event recovery plan of its type in the United States, was published and officially adopted by the Palm Beach County's Board

of County Commissioners in late 2005. The plan quickly became a straw-man model for a statewide initiative undertaken by the Florida Department of Community Affairs and the Florida Division of Emergency Management to develop a PDRP guideline document for Florida communities (Florida Department of Community Affairs and the Florida Division of Emergency Management, 2010).

Comprising senior-level representatives from major county departments and divisions, municipalities, nonprofit organizations, and the private sector, the PDRP Executive Committee provided oversight, guidance, and technical assistance in the development of the plan's format and content. In the event of a disaster, these same individuals and organizations would likely oversee the recovery and redevelopment process and serve as an advisory committee to the Board of County Commissioners on recovery and redevelopment matters. Community involvement was encouraged throughout the planning process, particularly as it related to issue development and prioritization. Public workshops provided significant inputs and insights, particularly during the issue development and prioritization process.

A special professional workshop, made possible through a supplemental grant obtained from the Public Entity Risk Institute (PERI) and the support of several corporate sponsors, was held in April 2005, focusing on developing strategies for long-term community redevelopment. In all, 178 professionals attended the workshop, including disaster experts fresh from assignments in the Gulf following Katrina; local, state, and federal government officials representing relevant disciplines; NGO representatives; and a large group of invited local and regional business leaders representing select sectors considered especially critical to community recovery and economic redevelopment. Following presentations and discussions by a distinguished panel of experts on the subjects of community disaster recovery, post-disaster economic redevelopment, urban planning, mitigation, and housing, attendees split into breakout groups to tackle five key subjects: (1) balancing pressures to rebuild communities quickly with opportunities to rebuild stronger and smarter; (2) sustaining essential governmental services in the face of a post-disaster economic crisis; (3) business recovery, retention, and workforce redevelopment; (4) strategies for post-disaster repopulation and housing; and (5) sustaining and rebuilding quality of life in the aftermath of a catastrophic disaster.

The PDRP is action oriented and outlines a countywide implementation approach. Through the executive committee, representing county, municipal, nonprofit, and private sector stakeholders, and a flexible working group structure, actions outlined in the plan can be implemented quickly and easily as needed and appropriate, without regard to municipal jurisdictional boundaries and the severe staffing fluctuations anticipated in the post-disaster environment. The hundreds of actions suggested in the PDRP are divided into four basic categories:

- Pre-disaster short-term actions with long-term recovery impacts
- Pre-disaster long-term recovery and redevelopment actions
- Post-disaster short-term actions with long-term recovery impacts
- Post-disaster long-term recovery and redevelopment actions

The format of the plan allows for the inclusion of new actions and new participants through the predesignated working groups described in the following text. The success of the plan depends on the ease of implementation in the aftermath of a disaster and on the participants' commitment to continually strengthen preparation and planning during non-stressful *blue sky* periods. Major post-disaster redevelopment goals and representative issue areas addressed by the plan include the following:

38.8.3 Local Government Recovery Issues

GOAL: Rapid Recovery: *The county and other participating jurisdictions and agencies shall strive to provide services in a manner that speeds the ability of residents and business to recover from a disaster. Intergovernmental coordination and effective communication will be core methods for achieving this goal.*

- Availability of temporary housing/long-term sheltering
- Debris management and disposal
- Critical infrastructure and facility repair
- Fair and equitable distribution of disaster assistance
- Sustaining essential government services in the face of a post-disaster economic crisis
- Avoiding erosion of local control with influx of federal and state assistance
- Municipal insolvency following a disaster
- Use of local business capabilities in the disaster recovery process

38.8.4 Economic and Private Sector Issues

GOAL: Economic Vitality: *Through policy and support of the local business community, Palm Beach County shall work to preserve and restore the industry, agriculture, and tourism that support a high quality of life for its residents.*

- Availability and affordability of property insurance
- Ability of small businesses to stay afloat until adequate financial assistance is available
- Avoiding permanent relocations of core businesses outside of the community
- Rapid restoration of power and other private utilities
- Shortage of contractors/supplies slows repairing of homes and businesses
- Agricultural losses from hurricane damage or Lake Okeechobee dike breach

38.8.5 Social and Environmental Issues

GOAL: Social Justice and Environmental Restoration: *Palm Beach County shall promote social equity and environmental quality in all post-disaster recovery and redevelopment. Prevention of degradation will be the aim.*

- Reducing the incidence of fraudulent and unethical practices
- Individual's role in preparing for and recovering from a disaster
- Restoring educational, cultural, and historic amenities
- Coastal and aquatic restoration
- Water pollution from sewer system failures
- Increased fuels for wildfires on conservation lands
- Unhealthy levels of mold in damaged structures

38.8.6 Redevelopment and Mitigation Issues

GOAL: Disaster Resilience: *Palm Beach County shall endeavor to redevelop in a sustainable manner by institutionalizing hazard resilience and mitigation. Public participation and the efficient use of public funds will be standard features of redevelopment.*

- Ability to rebuild stronger structures
- Ensuring strong code enforcement
- Communicating with and involving the public in recovery and redevelopment issues
- Limiting redevelopment in hazardous areas
- Including mitigation in rebuilding
- Including affordable housing in redevelopment projects
- Disaster-resilient public funding decisions

38.8.7 Activating the Plan

The decision to activate the plan and post-disaster actions will be made by the county's Executive Policy Group (the county's emergency management decision-making body) in concert with the recommendations of the PDRP Executive Committee and the recovery branch chief. Implementation of pre-disaster actions does not require activation of the plan.

The need for PDRP activation either can be anticipated prior to a storm or determined during the response stages in the event of a *no notice* disaster as damage assessments become available. The PDRP can be activated for disasters of any size, but the specific actions required will depend on the nature and magnitude of the disaster. Many recovery and redevelopment tasks are appropriate regardless of the scale of the disaster; however, others may be required only after major or catastrophic disasters. The plan lays out a series of triggers and disaster scenarios that will dictate when the PDRP should be activated. Once the PDRP has been officially activated for post-disaster action, all members of the PDRP Executive Committee will be notified of the activation level by the executive committee chair. Upon notification, the chairs of the various working groups will convene their groups and begin execution of the specific actions assigned to their group.

The decision to deactivate the post-disaster period of the PDRP will be recommended by the PDRP Executive Committee, the county's Recovery Branch Chief, and county leaders serving on the Executive Policy Group. The Executive Policy Group will make the final decision. The post-disaster phase should be deactivated once all applicable post-disaster actions have been accomplished and the working groups feel no additional actions are needed or when recovery and redevelopment has reached a satisfactory end regardless of whether or not all actions have been completed. The length of time the plan is activated will depend on the level of the disaster and the collective professional judgment of the executive committee and the executive policy group.

38.8.8 Implementing the Plan through Working Groups

The PDRP Executive Committee is responsible for coordinating implementation of the plan, including pre- and post-disaster actions. To do this in an efficient manner, a working group structure was created to function under the executive committee's direction. The working group's main purpose during implementation is to accomplish and coordinate actions assigned to it as well as adjusting its actions to emerging needs. Each working group is responsible for overseeing progress in their responsibility areas and reporting it to the executive committee.

The membership of each working group is set up to be flexible, capable of adapting in makeup and size to meet changing task requirements and available staffing. Each working group has a chairperson, who is also a member of the PDRP Executive Committee. The plan lists current chairs and agencies, departments, and organizations pertinent to each working group. Municipal representation in working group activities is coordinated by the County's League of Cities in

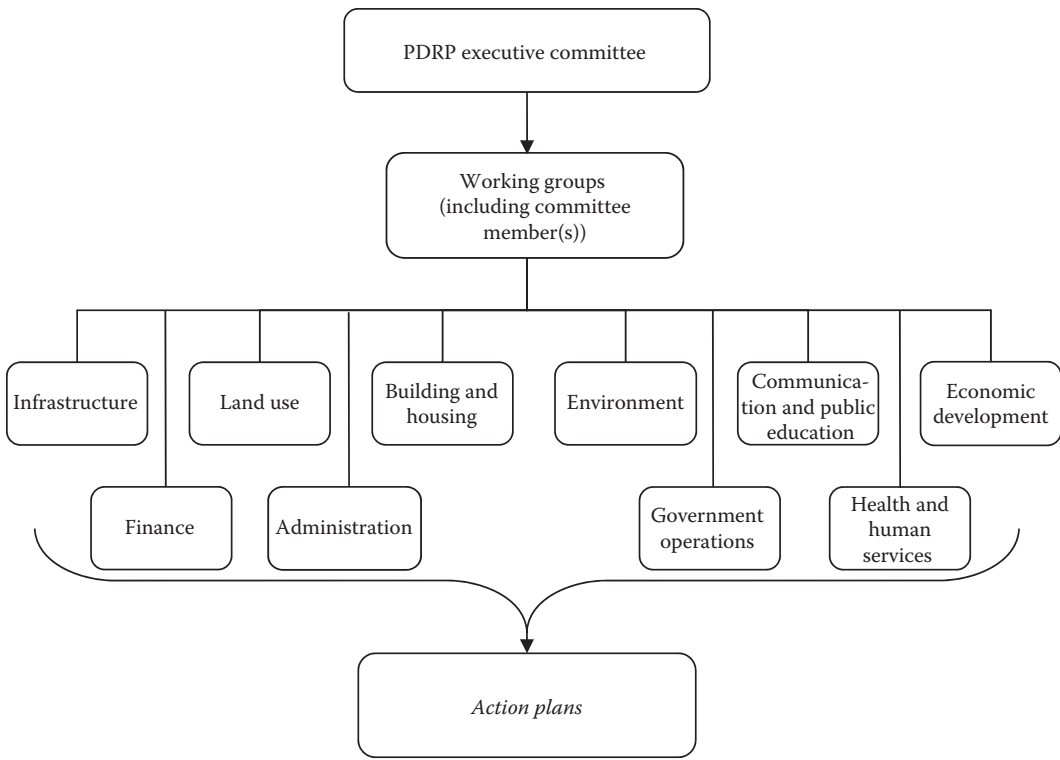


Figure 38.1 Palm Beach County PDRP (2009) Executive Committee and working group organization structure.

concert with working group chairpersons. It is the responsibility of the working group chair to decide when and how often their working group needs to meet. Figure 38.1 depicts the current Executive Committee and working group organizational structure.

38.9 Action Plan

To assist in implementation, actions for post-disaster recovery and redevelopment are grouped and listed in a matrix format. The actions listed in the plan are not considered to be a definitive or exhaustive list and can be easily adjusted as needs unique to the event emerge. Each matrix contains an extensive list of actions with a brief description, categorized by issue topic and indicating the working group assigned responsibilities for their execution. Also included are approximate time frames for implementation along with funding considerations and potential assistance sources. The list of actions is too long for inclusion in this chapter.

Since publication of the Palm Beach County's PDRP in 2006, much has been learned through the state-sponsored PDRP pilot program involving six communities and development of the state's guide document. A multijurisdictional, multidisciplinary focus group was also established by the state to serve as a technical advisory committee on PDRP matters. At this writing, Palm Beach County was engaged in a program to update and further enhance its PDRP in line with this increased body of experience and to bring it into compliance with the state guidelines released in 2010.

38.9.1 Capacity Building through Collaborative Partnerships and Private Sector Engagement

A second key strategy for building a more disaster-resilient Palm Beach County involves capacity building through the engagement of the community's extraordinary private sector resources and capabilities in all facets of the disaster preparedness and management. The county's initial Business and Industry program began in 1999. Emphasis focused on increasing the potential for business survival through continuity planning and awareness. A special guide for survival planning was developed for small businesses; nearly a thousand small, medium-sized, and large businesses were run through workshops using a special curriculum based on the survival guide; 8000 CDs based on the survival guide were distributed to businesses countywide; and a business preparedness website was launched. For several years, the county met with local business and NGO leaders to explore strategies for more fully engaging the private sector in all phases of the disaster management process and experimented with a several partnership configurations.

Based on lessons learned from the previously mentioned experiences and extensive research into successful practices, two major private sector initiatives were launched in 2005. The first initiative involved the establishment of a Business and Industry Emergency Support Function within the county's formal activation structure. Commonly referred to as ESF #18, the Business and Industry Unit ensures business interests are represented in the established, predominantly government-led emergency management process. During activations, the Business and Industry desk on the floor of the EOC is staffed with specially trained business representatives. The unit serves as the primary liaison with local, state, and national business organizations and government agencies on business-related matters during and following disaster events. As with other ESFs, the work of the Business and Industry Unit is incident specific and ceases or scales down its activity when other EOC functions are demobilized.

The second, more ambitious, and innovative business initiative is the county's private-public partnership, established in 2005. The expressed purpose of the partnership is to work collaboratively on *private sector-developed and private sector-led* initiatives dedicated to building a more disaster-resilient community and economy. The partnership will eventually be comprised of a large, diverse group of private sector organizations, government agencies, and NGOs. At this writing, membership was expanding to represent a broad cross section of the community's business base. In addition, several professional and trade associations, universities, health-care agencies, foundations, and other community-based organizations were actively involved. Several state and national business and government organizations have provided invaluable support.

In April 2010, the partnership organized and hosted a comprehensive private sector-led and corporate-sponsored disaster preparedness workshop/symposium attended by 150 current and potential new partners. Invitees included a select cross section of businesses and NGOs representative of sectors considered especially important to community disaster preparedness and recovery. The symposium portion of the forum featured presentations by distinguished experts from the federal government agencies (e.g., SBA and NOAA), private sector organizations (e.g., US Chamber of Commerce), and CEOs recognized for their leadership in past disasters. Special emphasis was placed on government program and policy reforms and on best local community resilience practices. The workshop portion of the forum provided opportunities for business, government, and nongovernment leaders to suggest and discuss a range of resilience issues, strategies, and initiatives specific to assigned topic areas. Breakout sessions dealt with resilience initiatives in three general categories: (1) business-government collaborative initiatives, (2) businesses helping business

initiatives, and (3) businesses coordinating with NGO initiatives. The partnership and its resilience initiatives are founded on the following core beliefs:

- Major disasters require holistic approaches beyond the traditional boundaries of government-centric disaster management doctrine and practices and involvement of a broad range of stakeholders.
- Because disasters are, first and foremost, local phenomena, involvement of local resources in preparation, response, and recovery is critical to building a level of self-sufficiency that will reduce dependence on federal, state, and other outside assistance, facilitating and accelerating post-disaster recovery and preserving and exercising maximum local control over the community's post-disaster destiny.
- As disaster recovery is fundamentally an economic proposition, engagement of the private sector (the community's primary economic engine), in all aspects, is essential.

The Palm Beach County's private–public partnership was built in steps. First, a few influential advocates were identified in the business and government sectors and began to meet on an informal basis to share thoughts and ideas on business engagement. No attempt was made at that point to grow the network. Primary emphasis was on conceptualizing a mission and business plan for the partnership, developing a growth strategy, and brainstorming a preliminary list of business and community resilience initiatives.

It was the group's thinking that the key to attracting and sustaining a productive partnership would be actively involving the membership in ongoing resilience initiatives and projects and building support through partnership *success stories*. The partnership was also viewed as an opportunity for special programs and forums offering preparedness and recovery training and assistance, drawing heavily from resources and expertise within the membership. Gradually, the core group was expanded into a multisector executive committee composed of community leaders representing government, business, and NGOs at the local, regional, state, and national level. The committee possessed skills in a variety of disciplines including economic development, urban planning, housing, social services, community governance, and emergency management. Early accomplishments of the partnership included the following:

- Collaboration with Florida International University on the development of a comprehensive web-based communication system dubbed Business Continuity Information Network (BCIN) capable of facilitating business-to-business and business–government communication and coordination before, during, and after disasters. While designed primarily as an emergency capability, BCIN can serve as year-round service for a variety of business applications. BCIN promises to become a national resource. In Palm Beach County, it is viewed as a natural private–public sector complement to WebEOC and other government emergency management software systems.
- Development and passage of a state bill that requires gasoline stations on major disaster evacuation routes to possess emergency generators to ensure gas pumping capacity during disaster-related power outages.
- Sponsorship and organization of a major private sector–led workshop and symposium on the role of business in community resilience and recovery.
- Development and passage of a partner-sponsored state bill dubbed the *Good Samaritan: Neighbors Helping Neighbors Act*. The bill enables registered citizens (especially families of business partner member organizations) to take in and assist victimized first responders

and their families without concerns of liability. This will hopefully help to reduce personal burdens on first responders and free them to report for duty with some peace of mind that their families are being cared for. The bill has statewide application and is being tracked by advocates in Washington, DC.

Some examples of the more than 50 other resilience initiatives on the partnership's *wish list* are the following:

- Early reentry protocols for businesses that would allow pre-declared, trained business advance teams to enter businesses for the purposes of damage assessment, salvaging and securing of critical assets, and prevention of damage escalation
- One-stop, full-service business disaster recovery centers capable of providing financial assistance services; business counseling; referrals for professional legal, insurance, social, and other services; employee assistance guidance; workforce redevelopment services; etc.
- Accelerated/prequalified financial assistance programs offered through a financial consortium
- Protocols for rapid mobilization of prequalified local and regional professional and business resources and capabilities
- Databases of locally and regionally available recovery resources and services
- Emergency voice and computer-based communication and status monitoring systems for business uses
- Business preparedness and recovery training
- Businesses helping business programs (facility/resource sharing, continuity planning assistance, etc.)
- Temporary business facilities
- Business-provided logistics and technical support for NGO recovery projects
- Regional and association-supported business-provided mutual aid
- Special small-business assistance programs
- Collaborative exchanges and mutual aid arrangements with other public–private partnerships in the region
- Education and awareness forums for members and the community
- Maintenance of a partnership-supported speakers bureau to share lessons learned with other communities at disaster forums around the country
- 501(C) 3 nonprofit status to ensure the partnership is eligible for grant-supported initiatives
- Formalizing the partnership under the direction of a full-time executive director and board of directors

Based on the specific expertise and resources required, each initiative undertaken by the partnership is assigned to members of one of the four work groups: the business work group, the government work group, the NGO work group, or the executive committee work group. While each work group is staffed with functional experts, project teams are encouraged to include representatives from other work groups, sectors, and disciplines. As practicable, the work groups will also recruit ad hoc project team members to tackle an initiative. Each initiative is expected to present unique political, administrative, and financial challenges. Initiatives will be tackled a few at a time over a long period.

The Palm Beach County's private–public partnership model has drawn acclaim and recognition from the likes of FEMA, the US Government Accountability Office, the Business Civic Leadership Center of the U.S. chamber of commerce, and several state and regional resilience programs.

In 2010, the partnership and its initiatives were briefed to the Senior Director for Preparedness Policy and the National Security Staff of the White House. In addition, the partnership has been featured in several books and articles on best planning and preparedness practices.

The Palm Beach County's private-public partnership prides itself on developing and implementing practical *grassroots* resilience-enhancing programs, policies, and practices. In the partnership's view, the tenets of resilience only make sense when they are translated into concrete pre- and post-event actions. At this writing, Palm Beach County's partnership was working with public and private sector interests in Miami-Dade, Broward, and Monroe Counties to form a South Florida Disaster Resiliency Coalition built on many of the tenets described earlier. A board structure has been established and the regional entity has 501(c) 3 status.

38.10 Conclusion

No doubt that community resilience has improved significantly over the last decade. Diverse, inclusive, and significant initiatives have emerged that have changed the way communities prepare and respond to disasters. The Palm Beach County Private-Public Partnership is one model that has drawn acclaim and recognition from the likes of FEMA, the U.S. Government Accountability Office, the Business Civic Leadership Center, and several state and regional resilience programs. In 2010, the partnership and its initiatives were briefed to the Senior Director Preparedness Policy and the National Security Staff of the White House. The Palm Beach County Private-Public Partnership model prides itself on developing and implementing practical "grassroots" resilience-enhancing programs, policies, and practices. In the Partnership's view, the tenets of resilience only make sense when they are translated into concrete pre- and post-event actions. This and other initiatives are steadily taking hold and will no doubt lead to improved resiliency and shorten the time it takes for the community to return to normalcy following disasters.

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Chapter 39

Emergency Managers for the New Millennium

Ellis M. Stanley, Sr. and William Lee Waugh, Jr.

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39.1 Introduction

The history of humanity is inexorably linked to scientific advances, each one built upon the advances of the past, like the levels of a pyramid, with each new discovery spurring a new round of societal growth. However, while technological advances can improve the quality of life, they also create new problems. Just in our lifetimes, we have seen many scientific and technological marvels become commonplace—from polio vaccine to jet aircraft and from cellular phones to desktop computer. Such developments have enhanced both the length and the quality of our lives. In not too many years, we will see cures for some of humanity’s most pernicious diseases; communications on a scale and at a speed almost beyond imagination; a new generation of tough, versatile materials; and intelligent transportation systems, including efficient cars that direct themselves along *smart* highways. To some extent, the fonnns that these changes will take can be surmised by evaluating trends in telecommunications, computing, cybernetics, government, industry, education, emergency management, and other fields. But there will always be surprises inherent in the adoption of new technologies, as well as surprises resulting from the directions new developments take.

It can be expected that technological advances will introduce new hazards. Complex systems are fragile, and to the extent that we become dependent upon them and are willing to entrust our health and safety to them, failure can result in devastating loss of life and property. This is not a

pessimistic view; rather, it is a realistic one. As Charles Perrow (1984) has pointed out, failures in complex systems are inevitable, regardless of the care of operation and the redundancy of safety mechanisms. Conversely, there will be new technologies for the management of environmental hazards and to aid in disaster response. In essence, even as we develop more and better tools to reduce the risks to society, there will be far more hazards to address. The role of the emergency manager in the new millennium is to ensure that risk will be effectively managed and that public health and safety will be enhanced rather than weakened by the coming changes.

As more and more is known about hazards, the risks that they pose can be better addressed. Clearly, recent disasters have provided important lessons concerning natural phenomena and technological failures that are helping shape environmental and emergency management policies. The causes and implications of weather phenomena such as El Niño still challenge scientists, but explanations and solutions are slowly being found. However, the risk to society is increasing. Old hazards are made more risky by the increased exposure of people and property to their potential effects. El Niño storms along the Oregon coast have uncovered the remains of ancient forests buried after cataclysmic earthquakes. The evidence suggests that cycles of earthquakes every 350–500 years wreak havoc on coastal communities from the Pacific coast of North America to Japan and elsewhere on the Pacific Rim (Cain 1998). During the last cycle, much of the coastline was only sparsely populated, but now, large population centers, including Portland, may be vulnerable if the pattern continues. The 1998 prediction of a near miss of Earth by Asteroid 1997 XF11 in 2028 also pointed out dangers that we may face in the future. While the asteroid is only expected to come within 600,000 miles of Earth, rather than the 26,000 originally predicted, the potential for disaster is manifest. Scientists estimate that *house-size* asteroids have struck Earth approximately every 100,000 years, with dire effects on animal and plant life (Nesmith 1998). The probability of a major asteroid strike is relatively low compared to a 100-year flood or even a 1000-year volcanic cycle, but such a strike could wipe out human life on the planet. A smaller asteroid hitting the ocean would cause tsunamis that would destroy communities far inland. Speculation about such dangers should serve to sensitize governments and individuals to the need to prepare and to be flexible in the design of disaster programs.

We will also encounter new hazards wrought by humans as well as those resulting from the adoption of new technologies or from ignorance of past cataclysms. Nuclear terrorism may take new forms as fissionable materials from the former Soviet states are bought by *rogue states* to enhance their international positions, international and domestic terrorists to advance their political agendas, criminals to extort money, and/or crackpots to vent their delusions. Biochemical terrorism poses similar dangers, complicated by the relatively *low-tech* capabilities needed to produce sarin gas, anthrax spores, and other lethal agents. Cyberterrorism, too, is an increasing threat as complex computer systems run communications, transportation, and other networks. Data-driven decision support systems are vulnerable to disruption, and lives may be at risk when air traffic-control, subway, hospital, and other computer systems are violated by terrorists for political purposes or even hackers intent only on vandalism. Bombs and lesser weapons of destruction also pose significant risks, particularly given the evident willingness of terrorists and criminals to kill large numbers of people. The bombing of the Murrah Federal Building in Oklahoma City demonstrated that seemingly unthinkable crimes are possible and security precautions are becoming a familiar aspect of public and private workplaces (Stanley, 1995).

As we move into the new millennium, progress poses two significant challenges. The first is the unknown itself; the second is fear of the unknown. The second challenge usually proves to be the greater obstacle. Progress in addressing known hazards, including expanding capacities to adapt to new challenges, should encourage confidence and reduce fear. While there are *wicked*

problems that may defy solution, societies can develop resilience that will assure survival. Fear can be healthy if it encourages appropriate caution and preparedness, but it should not engender fatalistic attitudes about the future. Capable emergency management agencies and an educated public provide the tools for survival. In response to the changing imperatives, the field of emergency management is finding new tools to manage hazards and to deal with disasters; it is professionalizing and promises to become one of the most challenging occupations in government. This chapter examines the major changes taking place in emergency management and how they will help shape the present millennium.

39.2 Technological Change

Christian E. Stalberg wrote in 1994, “The emergence of the intelligent city in the 21st century will radically transform emergency management as we know it today.” Computing and telecommunications technologies, once separate and well-defined, will merge and their distinctiveness will blur. Mobile wireless metropolitan area networks (MANs) will serve as the telecommunications backbone over which municipal management information systems will synchronize the various functions of government agencies and departments. Traditional organization and separation of municipal departments and agencies will undergo significant change as the intelligent city makes interdependent relationships more concrete and dynamic. Resource allocation will become more efficient as a separate and distinct function, which is called upon during times of crisis, as it is today. Emergency management, like other government responsibilities, will become integrated into every facet of municipal planning and operations. The intelligent city will incorporate each of the elements of emergency management (preparedness, response, recovery, and mitigation) into its overall planning and operational matrix.

Emergency management professionals have to be prepared to meet the challenges brought by technological and social change. The intelligent city will, in many respects, operate very much like an organism, monitoring its various component systems and responding accordingly to potential or actual changes of state in order to maintain equilibrium. This sensitivity to potential or actual changes affecting the equilibrium of the city will have important ramifications for emergency management. As conditions favoring disaster are detected, the intelligent city will respond accordingly, heightening readiness as appropriate. The intelligent city will assimilate knowledge of hazards and implement hazard mitigation as an integral component of its overall functionality.

Who will be responsible for this *intelligent city*? Well, everyone, of course, but it will be the primary responsibility of the emergency manager. It also depends on the assumption that *everyone* (local government, the community, the private sector, etc.) will be involved in the process. When a city is threatened by an impending or actual hazard that puts lives and/or property at risk, emergency managers interact with different departments and agencies in anticipation of changes that must be made to reduce losses or avoid them altogether. Emergency management is basically all about managing and coordinating a complex system.

Hewlett-Packard (HP), in its 1994 corporate vision video *Synergies*, portrayed how a range of information tools could benefit a community in a time of crisis. The tools included handheld translation devices to facilitate oral communication with an ethnically diverse population during emergencies, decision support systems to aid in disaster operations, and a plethora of other high-tech tools to assure that the emergency management system is seamless and effective. The video is part of a broad vision of how information technologies will serve people at the beginning of the next century. It focuses on HP’s unique “MC²” strengths in measurement, computing, and

communications and what we might achieve with them in the years ahead. Predicting technological advances more than a few years into the future is difficult at best. Undoubtedly HP's 1994 vision is already outdated, as some of the technologies have already been introduced and refined, some have been superseded before they even left the R&D facilities, and some have been tested and rejected for one reason or another. Societal needs and markets are moving targets and technological advance is not a linear process.

In terms of the tools of emergency management, it is already difficult to keep up with the changing technology. We are seeing telecommunications and computers merging, becoming nearly indistinct, and they are linking the various subsystems of the cities (e.g., transportation, energy, and waste) through MANs into an overall system imbued with intelligence. Imagine a single knowledge base, feeding and being fed by numerous subsystems that will serve as the *brain* of the intelligent city. For example, in the event of an emergency, traffic patterns will be changed automatically to permit orderly evacuation and/or rendering of aid. Spatial intelligence, combining information provided by next-generation GPS and GIS, will drive radio-direction, radio-location, and navigational guidance systems to plot vehicles and regulate and disperse traffic flows. Technology for storm prediction and tracking will improve, increasing the reliability and accuracy of preparedness activities (e.g., warning and evacuation). Automated forecasts and historical data will be matched and likely scenarios will be plotted. Computer-aided education and simulations using virtual reality will be used for training exercises. Emergency warning and notification systems will extend into the home and the workplace, taking advantage of the *anytime, anywhere* model of connectivity. These tools and technologies are being used today. All of these technologies were in use at the 1996 Centennial Games in Atlanta and are being used in other cities like Los Angeles and Chicago.

39.3 Human Dimension

The greatest opportunity for change in emergency management is in the human dimension, including the emergency manager and the public. It is fairly certain that in the future, public debt, insurance industry losses, and the trend toward greater societal equity will result in an increase in the responsibility the individual bears for his or her own actions and how they affect society. Institutions that currently absorb and then spread losses (government and insurance) across society will undergo a transformation as society systematically goes about the business of mitigating hazards rather than creating or aggravating them. As the impact of control and communications systems become widespread, there is a fear of their misuse. The dangers of control and conditioning have been amply described in George Orwell's 1984 and Aldous Huxley's *Brave New World*. Advances in information gathering and processing are raising very important issues about individual privacy and proprietorship of data. Decision making by community, regional, national, and international agencies raises very important issues relative to individual rights (particularly property rights), public participation in policy making, and other individual and group prerogatives.

The education and training of emergency managers, as well as the education of other public officials and private citizens, is also expanding. Many universities have accepted the challenge by including emergency management as a subject in undergraduate and graduate curricula. The courses are being offered as part of degree and/or certificate programs or as separate classes in public administration, sociology, geography, civil engineering, and other departments (Stanley 1992). The integration of disaster research, education, and practice is expanding rapidly as emergency managers, researchers, and educators are being brought together by such organizations as the Natural Hazards

Research and Applications Information Center at the University of Colorado. It is a challenge for researchers to keep abreast of the issues that are raised in hazard management and disaster operations, and it is a challenge for emergency managers to keep up with the growing body of knowledge.

The impact of the changes upon emergency managers themselves will be profound. The image of emergency managers as *air-raid warden-type* officials with little natural disaster experience has taken decades to dispel. Now, few communities can afford to entrust their safety and property to untrained, inexperienced administrators. The social and economic risks are too high and the political risks can prove costly for elected officials. The profession has also advanced past the Civil Defense era's models of *command and control*, opening up the communication process and involving more public, private, and nonprofit organizations in decision making. Emergency operations are cross-sector, intergovernmental, multiorganizational efforts, requiring political skill as well as technical expertise. Officials are at least talking to one another. But the challenge yet to be faced is how to manage the vast amounts of information that technology has put at their fingertips (Sutphen and Waugh, 1998).

The changes in the field of emergency management signal the development of a distinct profession. A *profession* emerges as occupational groupings mature and there is an identifiable body of technical knowledge. Members begin to identify with colleagues in other jurisdictions or even nations, develop standards of conduct and professional practice, and establish minimum professional qualifications and experience. That process is well under way in the field of emergency management, and in the twenty-first century, emergency management agencies and policy making will increasingly be guided by professionally trained and educated officials.

Professionalization of the field will also reduce the unevenness in agency capacities and encourage communities to recognize and address hazards. Emergency management has been an administrative *backwater* in many jurisdictions. Offices have been staffed by persons with few technical skills relating to environmental hazards or disaster operations. Thomas Drabek's 1987 study of professional emergency managers found that, while some communities had highly capable officials and offices with considerable technical and administrative capacity, many had poorly trained, inexperienced officials with little or no administrative and political support. Indeed, local offices often had only one emergency manager, who sometimes was part-time and sometimes was unpaid. The very unevenness of capabilities made it difficult to develop effective regional, state, and national emergency management systems. The early experience of the Federal Emergency Management Agency (FEMA) was much the same. The national system was made all the more complex by conflicts in agency missions and organizational cultures (Waugh 1993, 1996).

Just as in other areas of government administration, the need for officials to have technical skills, appropriate education, and relevant experience grows as jurisdictions grow. Rural communities generally find it easier to adjust to known hazards and to reduce the risk to life and property. People learn to live with the risks, often at their own peril. However, as population grows and concentrates in urban areas, the exposure to risk grows. Complex transportation, communication, and power systems, the lifelines of communities, are fragile and the costs of disruptions increase as dependence upon them grows. Individuals can afford to live with risks that communities cannot.

California and Florida exemplify the problem of risk exposure. Tremendous population growth in both states particularly in hazardous coastal areas, coupled with the infrequent albeit inevitable major disasters, has created the potential for catastrophe. Both states have populations concentrated in areas subject to periodic disaster, and both have populations that are unusually diverse, thus complicating the processes of communication and often increasing the vulnerability of residents. Nonetheless, emergency management officials have to assess risk as accurately as possible, communicate the danger to residents who may have little or no disaster experience and

may not even believe or understand official estimates of probability, educate residents on how to reduce the risk to themselves and their property, and make sure that public resources are brought to bear to reduce hazards, prepare for and respond to disasters, and recover from disasters once they occur. Mitigation strategies have to be devised and implemented and an effective emergency management system has to be cultivated. Those tasks go far beyond the capabilities and authority of the emergency management agencies themselves. Complex networks of public agencies, non-profit organizations, and for-profit companies provide capabilities ranging from emergency planning, temporary shelter, emergency medical services, and unemployment benefits to psychological counseling of both victims and responders, risk assessment, evacuation, and search and rescue. The network is highly professional in California and increasingly professional in Florida. There is also an increasing linkage of disaster management to other programs (e.g., homeless shelters, HIV/AIDS hospices, children's services, veterinarian services, food banks, social services for non-English-speaking groups, crisis counseling, employment services, and charitable organizations). Guiding emergency management agencies through the intergovernmental and multiorganizational maze requires administrative and political experience and skill, as well as personal qualities that facilitate communication and encourage cooperation.

Failure of local officials in fulfilling their tasks can result in significant legal liability, particularly if the failure was in one of their areas of discretion. Federal and state officials enjoy the protection of sovereign immunity, meaning they cannot be sued unless their government agrees to permit it. Local officials are protected by the same principle of sovereignty as long as they are exercising authority or implementing policies and programs mandated by state or federal officials. However, much of the business of emergency management is discretionary on the part of local officials. Land-use regulation, building codes, and other hazard-reduction mechanisms typically are local responsibilities. Local officials may also be held liable for evacuation orders that prove unnecessary, loss of property value when development is restricted, loss of property value when hazards are identified and the risk is publicized, and other decisions. The potential legal costs of poor decision making are strong arguments for effective, professional emergency managers. Political skill is also needed as the reliance on nonstructural mitigation increases. Land-use regulation and building codes, in particular, are intensely political issues in local government and often involve groups, such as developers, who are very influential in community affairs.

As President Bush almost found in south Florida in the aftermath of Hurricane Andrew, there can be significant political costs if officials do not prepare reasonably and respond decisively to a major disaster. The poor showing of officials of the FEMA almost cost President Bush the state's electoral votes in the 1992 election. That lesson has not been lost on President Clinton, governors, mayors, and other elected officials. None would wish to entrust their political careers to ineffective emergency management officials. FEMA and its state counterparts, in particular, have benefited from the attention to professional competence in the selection of agency directors and other officials.

The process of professionalization began decades ago in many larger communities. In some cases, the level of risk or frequency of disaster was so high that officials necessarily hired experienced and capable emergency managers. In some cases, highly capable administrators helped design and staff their own agencies to assure effectiveness. While *bottom-up* organizational designs were common in some communities, appropriate training and experience were mandated by state officials in other states. The dilemma of emergency management is not that local officials and agencies are incapable of addressing hazards and responding to disasters, it is the unevenness of capabilities. Some agencies are well organized and capable and others are not. Disaster experience, public attention, investments of resources, and good leadership encourage

capacity building. The challenge for state and federal officials is to raise the capabilities of all agencies and officials to at least minimal acceptable levels of competence so that the system can function effectively regionally and locally.

Another challenge is to increase the capacities of local officials and agencies so that they can function effectively and coordinate with their counterparts in neighboring communities. Local officials are typically the *first responders* to disaster and, as such, can determine the overall success of disaster operations and recovery efforts. Capacity building necessarily has to begin at the local level. Local officials, too, have principal legal responsibility for mitigation, such as land-use and building regulation, as well as for response and recovery efforts. Unless state officials assume responsibility for disaster operations or ask federal officials to do so, locals are in legal control. Moreover, while environmental hazards may be regional, such as the hazards posed by seismic fault lines or large coastal storms, risk is more often localized. Population centers, hazardous soil conditions, floodplains, and such require local attention. To some extent, state and federal authorities can help local agencies with their preparedness, mitigation, response, and recovery efforts, but local officials have to tailor their efforts to the specific hazards and capabilities within their own communities. As in other program areas, there have been historical targeting problems when programs are mandated from the federal, or even the state, level. While FEMA has emphasized *all-hazards* programs since the 1980s, that generally does not literally mean addressing all conceivable hazards. For local officials, it usually means addressing the range of hazards that may reasonably occur in their community (Waugh 1996).

Professionalism was one of the three themes Thomas Drabek identified in his landmark study of successful emergency managers in 1987. He sought characteristics associated with the perception of success and the responses of agency representatives indicated that the success of emergency managers was related to

1. Professionalism, including the exercise of the coordinator role, knowledge, commitment, and external recognition
2. Individual qualities, including *people skills* or personality, communication skills, unique personal qualities, and disaster experience
3. Specific emergency management activities, including an all-hazards approach to emergency management (rather than a civil defense approach alone), agency or individual visibility in the community that encourages linkages, and task-related activities

In short, success was associated with technical skill, interpersonal skills, relevant experience, professional and administrative visibility, and an orientation toward cooperation and collaboration rather than an authoritarian or *command-and-control* approach (also see Waugh 1993).

Institutions of higher education, as well as the International Association of Emergency Managers' (formerly the National Coordinating Council on Emergency Management) CEM (certified emergency manager) Certification Commission, recognized that continued learning is necessary. The lag time between gaining of new knowledge through experience and the dissemination of that knowledge in ways to effect change will be reduced considerably by improved information capture, processing, and distribution. Maintenance learning i.e., maintaining the status quo, will give way to innovative learning. The separation of education and work will end and the two will become almost indistinguishable from one another. This will occur for three reasons: (1) real learning is experiential, i.e., on the job; (2) the time lag between gaining new knowledge and its implementation is wasting valuable resources; and (3) a measurable return on investment in creating new knowledge must be gained if further investment is

to take place. This has important implications for emergency management in extending hazard reduction into all phases and aspects of society.

The development of the CEM program addressed the technical and administrative aspects of the emergency manager role as well as the need for relevant experience and training. CEM is administered under the auspices of the International Association of Emergency Managers, a professional organization largely made up of local government emergency managers. The program was created in cooperation with FEMA, the National Emergency Management Association (NEMA), and other national and state professional organizations with related interests. Certification requires that applicants possess a 4-year degree in an appropriate area of study, at least 3 years of emergency management experience, at least 100 h of emergency management classroom training within the last 5 years, at least 100 h of general management training within the last 5 years, and three references to substantiate the training and experience. Experience in emergency planning, exercises, disasters, budgeting, and related functions is also assessed. Once certified, managers must pass a written test every 5 years.

Up until 1994, the education requirement was waived, and until 1996, equivalent coursework was accepted. If the normal course of professional development continues, standards will be raised periodically and equivalent education, training, and experience will become less acceptable. Education, training, and experience requirements may also become more specific and longer. To date, job announcements do not always mention CEM credentials as a minimum qualification, although that will change as more receive the credential and they advance into executive positions with responsibility for new hires. It might be expected that additional skills and competencies, beyond the CEM credential, will include broad experience with natural and technological hazards and disasters, expertise in new information technologies, knowledge of the more technical aspects of hazards and their mitigation, and people skills. Political acumen will be a valued skill as well.

39.4 Conclusion

The future of state and local government in the United States will be shaped by a combination of forces, including technology, politics, economics, demographics, and environmental change. As futurist Alvin Toffler (1981) has indicated in *The Third Wave*, strong leadership will be replaced by local and individual action. Government will provide the resources, especially the learning mechanisms, to equip individuals for their increased responsibilities. Government will encourage self-sufficiency in preparedness, response, recovery, and hazard mitigation within individual neighborhoods and communities. Governments will partner more with the private sector to maximize the greater potential of resource utilization within the community. Government will become less top-heavy, more flat, and decentralized, following similar trends in the business sector. Continued decreases in federal aid will demand that local governments realize greater efficiency and look for economies of scale in service delivery. This will be accomplished by increased privatization of public services and government stimulation of local self-sufficiency. Geologic, fire, wind, and flood hazard districts will be created to raise funds for hazard mitigation. Citizens will have more control over the activities of government that affect them. Citizen access to government will increase through direct participation in decision making via telecommunications, making most, if not all, representative forms of government obsolete. Government's primary job will be to inform and educate. Local government has become more complex and fragmented. At best, departments do not work in concert; at worst, their objectives are at complete odds with one another. The emergency manager of tomorrow will be the catalyst to eliminate the incongruities

between government agencies, operating not in isolation but in relation to all other departments and agencies within government.

Hazard identification will be incorporated into the fabric of infrastructure design, planning, and operations. Agency actions will be in concert with one another throughout the municipality as decision making and plan *checks* will occur with every other agency in the municipality. Within this matrix, planning and operations are a continuum, feedback and corrections are immediate, and accommodation or rejection of innumerable actions takes place. The relationship between risk and cost will be better understood and individualized. Mechanism for mutual aid will improve, as cities and states will be linked through what is now taking shape under the guise of the *national information superhighway*, the deployment of LEOS (low Earth orbiting satellites), and the like. Through these interconnections, cities will compare experiences and learn from one another. Vulnerable infrastructure in high hazard areas will be identified and systematically retired.

In the new millennium, emergency management will become more *proactive*, rather than *reactive*, as it is today. Emergencies will occur with less frequency as *unexpected situations* or *sudden occurrences* decrease with applied cybernetics. There should be fewer surprises and more lead time in which to prepare, in other words. Virtually all of the technologies necessary to construct the intelligent city have already been introduced, albeit some in rudimentary form. Technological forces in computing and telecommunications have already precipitated dramatic changes in the manner and style in which cities operate. While we are in the infancy of consciously merging the various components, the groundwork for the intelligent city is already being laid, changing the municipal landscape and transforming both the theory and practice of emergency management forever.

Emergency managers need to heed the words of Socrates: “Let him who would move the world first move himself.” There is strong momentum for the continued professionalization of emergency managers. The process is reaching maturity—the focus is changing from minimum qualifications to more rigorous requirements for continuing education and technical training. To be effective, emergency managers will have to understand the intergovernmental and organizational environments in which they work, as well as be proficient with the available tools and knowledgeable about the hazards that they will have to address. Political skills are more important than technical skills if emergency management is to be integrated into the fabric of society and emergency managers are to be effective advisors for elected officials and the public at large and as administrators of their programs.

The key is to look to the future with hope, with optimism, and above all without fear.

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Chapter 40

Coastal Hazard Mitigation in Florida

Patricia M. Schapley and Lorena Schwartz

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40.1 Introduction

Like preventive medicine is to health care, hazard mitigation is to emergency management. Both concepts are based on the belief that reliable information, adequate resources, and rational decision making can reduce the risks associated with living in an environment that is not entirely predictable or controllable. Just as one may practice preventive medicine to reduce the chances of needing more expensive treatment in the future, public officials may invest in hazard mitigation programs to minimize the costs of recovering from the impacts of a major disaster.

For several reasons, natural hazard mitigation increasingly is becoming a policy priority for public officials and managers, particularly in coastal areas. This concern arises primarily from the recent sequence of major and costly disasters in the United States (hurricanes Hugo, Iniki, Opal, and Andrew; the Northridge earthquake; and the Midwest floods) and the skyrocketing public and private costs associated with disaster recovery. In particular, sustained population growth in the coastal areas from Texas to Maine means that more lives are vulnerable to natural hazards and require protection from the potentially deadly effects of flooding, hurricanes, and other coast-related storm events. Urban development in these coastal areas also means that a larger number of private and public properties are at risk.

With nearly 1200 miles of coastline and a coastal population approaching 12 million, the state of Florida serves as an excellent case for analyzing the components of a coastal hazard mitigation program. The purpose of this chapter is to describe Florida's approach to mitigating the impacts of natural hazards in its coastal zone. It begins with an explanation of the purpose of hazard mitigation and its connection to the broader objectives of emergency management. It continues with an overview of hazard mitigation policies and programs at the federal level that are the context for Florida's approach. The main section of this chapter then presents the policy framework used in Florida to manage the impacts of growth in coastal areas and mitigate hazards associated with coastal development. It includes details on the events and factors that shaped Florida's approach into what it is today. This chapter concludes with the authors' assessment of the strengths and shortcomings of this approach.

40.1.1 Definition of Hazard Mitigation

Godschalk et al. (1999) define natural hazard mitigation as "advance action taken to reduce or eliminate the long-term risk to human life and property from natural hazard" (p. 5), such as hurricanes, floods, earthquakes, and landslides. Examples of natural hazard mitigation include adoption of stricter building codes and design standards, land use restrictions in hazardous areas, construction of flood- and erosion-control devices, relocation of structures from hazardous to safer areas, and educational programs for public officials and the community about risks associated with living in hazardous areas and the benefits of hazard mitigation activities. Hazard mitigation is considered a phase of emergency management, which also includes disaster preparedness, response, and recovery (Godschalk 1991). Until recently, most communities emphasized these three phase of emergency management and undervalued the importance of mitigation.

Hazard mitigation may occur before or after the effects of a natural hazard. The intent of *predisaster* mitigation is to reduce the physical impacts of a hazard by taking steps to either avoid the hazard or reduce or eliminate the potential for damage. An example includes adoption of land use controls that prohibit development in areas identified as hazardous. *Postdisaster* mitigation takes place in response to the impacts of an actual disaster. For example, local officials may

institute stricter building codes following a major hurricane and require that damaged structures be rebuilt in accordance with these regulations.

Mitigation measures can provide many benefits to states and communities with hazard-prone areas. These benefits include saving lives and reducing injuries; preventing or reducing property damage; protecting critical facilities such as hospitals, police station, roadways, and utilities; reducing economic losses; minimizing agricultural losses; minimizing social dislocation; and lessening legal liability of government and public officials (National Research Council 1989; Godschalk 1991). It is now widely accepted that hazard mitigation measures will reduce long-term costs to the public and property owners by reducing expenditures on disaster recovery and assistance.

40.1.2 Need for Natural Hazard Mitigation

Interest in hazard mitigation has grown as public officials have come to acknowledge that conventional emergency management measures such as early warning systems and evacuation plans are not enough to protect communities from the long-term economic and social losses associated with natural disasters. In 1989, the National Research Council reported that disaster preparedness and evacuation are effective strategies to reduce death and injuries, “but do little to prevent property damage and the sometimes devastating economic impacts associated with disasters” (p. 7). Furthermore, a sequence of major and costly natural disasters in the late 1980s and early 1990s (including hurricanes Hugo, Andrew, and Iniki; the Northridge earthquake; and the Midwest floods) reinforced the council’s message and prompted several in-depth reviews of the nation’s emergency management and disaster relief programs, leading to reforms at the federal level that place greater emphasis on hazard mitigation. Federal officials and the private sector now extol the benefits of hazard mitigation and promote the adoption of mitigation measures by state and local agencies, businesses, and homeowners.

40.2 Description of Coastal Hazards and Exposure in Florida

Florida is a 447-mile-long peninsula with 1197 miles of coastline and 2276 miles of tidal shoreline (Florida State University 1992). Due to its geography, topography, and climate, it is vulnerable to a variety of natural hazards, namely, hurricanes and tropical storm events, coastal flooding, storm surges, and coastal erosion. Florida has the dubious distinction of being the target of more hurricane strikes than any other state. From 1891 to 1996, a total of 74 hurricanes and 79 tropical storms hit the state. These storms caused at least 3800 deaths and \$40 billion in property damage (Williams and Duedall 1997). Florida also has experienced coastal flooding and tornados associated with tropical and other storm events.

Coastal shoreline erosion is another common hazard in Florida. Although erosion is a natural, ongoing process, it constitutes a hazard in places where the shoreline is developed for private or public purposes. Florida’s Department of Environmental Protection (DEP) has classified 233 miles of sandy beaches as *critical erosion areas* where substantial development or recreational interests are threatened (Florida Department of Environmental Protection 1993). Complicating this problem is a predicted rise in sea level over the next century, which could increase beach erosion. State and local officials must determine how to diminish the threat of erosion to affected coastal communities through structural and nonstructural shoreline stabilization methods and through regulation of future land use and construction. Any of these choices presents high costs, both economically and politically.

In Florida, natural hazard mitigation has become a priority largely due to population growth in its hazard-prone coastal areas. In 1940, Florida was the 27th largest state in the nation; but by 1990, it had become the fourth largest, with a population of nearly 13 million people (Florida State University 1992). By 1997, its population had increased to 14.7 million (University of Florida 1998). This growth has concentrated for the most part in the state's 35 coastal counties, and this trend is expected to continue. As of 1996, some 11 million people, or 77% of the state's population, lived in coastal counties (University of Florida 1997). By the year 2020, analysts project that population in the coastal counties will increase by 50% to about 15.4 million people, or nearly 76% of the statewide population (Florida Center for Public Management 1997).

It is also important to point out that some of this growth has occurred in or near areas that are the most highly vulnerable to coastal hazards, such as barrier islands, beachfronts, estuarine shorelines, and flood zones. Consequently, it has become increasingly difficult to evacuate residents from areas that are in the path of a hurricane. This problem is particularly acute in Florida's urbanized coastal areas, where it could take more than 80 hours to evacuate threatened areas in the event of an approaching hurricane (Sheets 1995).

Another consequence of Florida's coastal development is increased exposure to property damage. In 1980, the state's total value of insured coastal property exposure was nearly \$333 billion. By 1993, that figure had grown by 162% to \$871.7 billion. This figure represents about 28% of the total value of insured coastal property exposure in the 18 states along the Atlantic Ocean and Gulf of Mexico (Insurance Institute for Property Loss Reduction and Insurance Research Council 1995). In 1996, the National Flood Insurance Program (NFIP) held over 1.5 million policies in Florida's coastal counties, providing nearly \$149 billion worth of coverage (Florida Center for Public Management 1997). In addition, the Florida Hurricane Catastrophe Fund, which the 1993 Legislature established to provide reinsurance for catastrophic losses due to hurricanes, had a total exposure of more than \$632 billion in residential and commercial properties throughout the coastal counties (Florida Center for Public Management 1997). Since hurricane Andrew hit Dade County in 1992 and produced more than \$15.5 billion in insured claims, property insurance has become more expensive and harder to obtain, particularly in coastal counties (Ayscue 1996).

In spite of the risks, Florida's population, especially in coastal areas, continues to grow at high rates. Coastal hazard mitigation has been and will remain a major policy issue in Florida due to the number of lives at risk and the value of private and public property at risk along its extensive shoreline. Since the 1970s, the state of Florida has taken significant steps toward the development of a statewide comprehensive approach to hazard mitigation involving actors at the state and local levels. Before looking at this approach, a description of the federal approach to hazard mitigation is provided as context for Florida's program.

40.3 Federal Government's Role in Hazard Mitigation

Since the federal government plays an important role in shaping and supplementing state and local hazard mitigation programs in Florida, it is important to understand how the federal approach to hazard mitigation has evolved and how it currently operates. The federal role in natural hazard mitigation began in the early 1900s as ad hoc efforts to provide disaster relief and build flood control structures (Congressional Research Service 1993). It has expanded to include a multifaceted, all-hazards approach that focuses on emergency preparedness, disaster relief, flood insurance, and mitigation. Four pieces of legislation provide the basis for federal involvement in

coastal hazard mitigation: the National Flood Insurance Act, the Coastal Zone Management Act, the Coastal Barrier Resources Act (CBRA), and the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Two agencies, the Federal Emergency Management Agency (FEMA) and the National Oceanic and Atmospheric Administration (NOAA), are largely responsible for administering the provisions of these acts. FEMA retains the majority of this responsibility as it administers disaster assistance, implements the National Mitigation Strategy, and houses the Flood Insurance Administration (FIA), which administers the NFIP and Community Rating System. NOAA oversees the National Coastal Zone Management Program, which covers a variety of coastal issues including coastal hazard mitigation and coastal development.

The federal government's initial role in emergency management was narrow and limited. The various disasters that occurred in the United States between the years of 1803 and 1950 were handled through a series of ad hoc federal actions, which provided financial and technical resources to stricken areas. However, in 1950, the Federal Disaster Act was passed, which provided for the first time a continuing federal role in disaster relief (Drabek 1991). This role expanded in the 1960s as the federal government began to institute a series of financial incentives and disincentives to encourage states and communities to adopt hazard reduction measures. There was no centralized federal program for emergency management until 1979 when President Carter created FEMA.

40.3.1 National Flood Insurance Program

Hazard mitigation first became a part of federal emergency management activities in 1968 with the National Flood Insurance Act. The act made federally subsidized flood insurance available to properties in communities that enforced land use and control measures designed to reduce vulnerability of structures to damage from flooding. These measures included restrictions on new construction and substantial improvements to existing structures. Its intent is to limit inappropriate development in floodplains and provide insurance for structures in flood-prone areas. Today, more than 18,000 communities currently participate in the NFIP (FEMA 1998). In effect, the NFIP serves as an incentive to communities to adopt mitigation measures in return for insurance that otherwise would not be affordable to the average homeowner. Its creation signified a switch from structural (such as dams and levees) to nonstructural solutions (such as land use and structural elevation) to mitigate flood damages (Burby and French 1985).

In 1990, FEMA initiated the Community Rating System, which rewards communities with mitigation programs by reducing flood insurance premiums. Following the 1993 Midwest floods, the Congress reformed the NFIP to increase the amount of funding available for mitigation activities. The National Flood Insurance Reform Act of 1994 authorized the annual transfer of \$20 million into the newly created National Flood Mitigation Fund to provide grants to states and localities for planning and implementing mitigation projects such as elevation, acquisition, and relocation (Flood Insurance Revamped 1994). Although there were attempts to amend the NFIP to require coastal shoreline setbacks for structures, none succeeded.

40.3.2 Disaster Relief

By the 1970s, the federal government began to condition the provision of disaster assistance on state and local commitment to mitigate the impacts of future natural disasters. In 1974, the Disaster Relief Act required that state and local governments evaluate hazards in affected areas and take action to mitigate the hazards, including land use and building standards, in order to receive federal disaster aid (Congressional Research Service 1993). In 1988, the Congress passed

the Robert T. Stafford Disaster Relief and Emergency Assistance Act [42 USC s. 5121 (1996)], the nation's first significant piece of hazard mitigation legislation. It provided for federal financial support of state and local hazard mitigation activities, including planning and projects. Specifically, Section 409 of the act authorized FEMA to condition the provision of disaster assistance on state and local actions to mitigate hazards, including preparation of a state hazard mitigation plan. The purpose of the 409 plans is to ensure that states and local governments evaluate natural hazards in the area designated to receive federal disaster funds and identify projects and actions in order to reduce vulnerability to hazards [44 CFR s. 206.405 (1998)].

Thus, many states and local governments have undertaken hazard mitigation programs in response to federal requirements for disaster assistance, as well as participation in the NFIP. The Stafford Act instituted an approach to hazard mitigation that placed an increased responsibility on state and local governments to plan for hazards and implement mitigation measures. However, some have criticized the Stafford Act for encouraging state and local governments to mitigate hazards in the wake of a disaster rather than in anticipation of future ones (Godschalk et al. 1999).

A series of major natural disasters from the late 1980s (hurricane Hugo and the Loma Prieta earthquake) to the early 1990s (hurricanes Andrew and Iniki), plus concern over the federal budget deficit, prompted the federal government to assess its emergency management program and identify ways to contain rising costs associated with disaster recovery (Congressional Research Service 1993). In 1993, FEMA adopted a new mission to reduce the loss of life and property by promoting the use of comprehensive risk-based emergency management programs. The main focus of the mission was to create an emergency management system that stressed mitigation, rather than response, and partnerships with local, state, and federal governments, voluntary agencies, business and industry, and individual citizens. In an effort to support this mission, FEMA initiated the National Mitigation Strategy in 1994 in an effort to support this strategy, which contains two long-range goals: to increase substantially public awareness of natural hazard risk so that the public would demand safer communities in which to live and work and to reduce significantly the risk of death, injuries, economic costs, and destruction of natural and cultural resources that result from natural hazards (FEMA 1997). It declares mitigation as the *cornerstone* of the federal emergency management program.

The National Mitigation Strategy proposes a list of responsibilities for FEMA, all federal agencies, state and local governments, the private sector, and citizens and prefaces it with the statement that the "ongoing role of the federal government will be significant, but limited" (FEMA 1996). FEMA's responsibilities include providing technical assistance to federal agencies and state and local governments on mitigation and making mitigation "the highest priority in recovery efforts following all disasters" (FEMA 1997). The strategy defines state and local government responsibilities as developing strategic mitigation plans and identifying funding sources to support them; adopting and enforcing all-hazards building codes; adopting incentives and disincentives; incorporating mitigation of natural hazards into land use management plans and programs; and lastly, developing, supporting, and conducting ongoing public information campaigns on natural hazard mitigation (FEMA 1996).

However, the strategy emphasizes that mitigation occurs at the local level and that FEMA should promote partnerships between state and local agencies to build consensus on mitigation issues and needs. Thus, the expectation is that state and local governments will become the primary actors in this intergovernmental system and institute appropriate policies and programs to mitigate hazards. To qualify for federal assistance, states and local governments increasingly will have to demonstrate their intent to adopt and enforce hazard mitigation measures. Some critics

predict that the goals of the National Mitigation Strategy will conflict with political unwillingness among elected federal officials to exercise restraint when providing disaster assistance to state and local governments and to exact meaningful mitigation actions, such as land use and building regulations, in exchange for funding (Platt 1996).

40.3.3 Coastal Management

Two pieces of legislation authorize the federal government to mitigate hazards in coastal areas: the Coastal Zone Management Act [16 USC ss. 1451–1465 (1998)] and the CBRA [16 USC s. 3501 (1998)]. In 1972, the Coastal Zone Management Act was adopted to encourage states to undertake coastal planning. It authorized creation of the national Coastal Zone Management Program to provide policy guidance and financial and technical assistance to states that adopt coastal management programs in accordance with federal criteria. NOAA's Office of Ocean and Coastal Resource Management administers these provisions. To qualify for federal assistance, state coastal management programs must include (among other things) policies to reduce risks of flood loss; minimize the impact of floods on human safety, health, and welfare; and preserve floodplains. In addition, the management programs must identify and indicate special policies for, *areas of particular concern* that may include areas subject to significant hazards due to storms, floods, erosion, and sea-level rise. Finally, the management program must establish a process for assessing and reducing the impacts of shoreline erosion [15 CFR s. 923 (1998)].

In recognition of the protective functions of coastal barriers, Congress passed the CBRA in 1982 to guard these resources from inappropriate development. Coastal barriers, found along the shores of the Atlantic Ocean and Gulf of Mexico, are considered unsuitable for development because they are vulnerable to hurricanes, flooding, wind damage, natural shoreline recession, and significant sand movement during storms. Development of coastal barriers and alterations to these systems exacerbate coastal hazards (Bush et al. 1996). CBRA was enacted to identify remaining undeveloped coastal barrier resources and to restrict expenditure of federal funds that facilitate their development. The CBRA withdrew federal flood insurance and the use of federal monies for infrastructure from undeveloped coastal barrier islands identified in the Coastal Barrier Resource System. It originally affected 186 undeveloped barrier islands, which totaled 453,000 acres and 666 miles of shoreline (Beatley et al. 1994). In 1990, the Coastal Barrier Improvement Act added to the Coastal Barriers Resource System areas in Puerto Rico, the US Virgin Islands, the Great Lakes, the Florida Keys, and additional areas along the Atlantic and Gulf coasts (Public Law 101-591, November 16, 1990).

40.4 Florida's Approach to Coastal Hazard Mitigation

Although the federal government's programs and policies have shaped the approach taken in Florida to mitigate hazards in coastal areas, the desire of Florida's citizens to manage the impacts of growth on its coastal areas, including natural and cultural resources, has been the primary force behind initiatives to adopt and implement mitigation actions. Since the late 1960s, growth and new development have been major concerns underlying the state's public policy agenda. A large and steady influx of new residents raised concerns about the state's ability to manage growth in a way that minimized its impacts on natural systems, cultural and historic resources, capacity of roadways and other public facilities, and quality of life in general. These concerns were particularly acute in the coastal areas, the destination of most of the new growth as well as many tourists.

The state's formal commitment to protecting coastal areas began in 1968 with adoption of a new state constitution. It included an article that set forth natural resource conservation and protection as a policy of the state. Article II, Section 7 has become the foundation for many important laws passed in the following decades to protect coastal resources. The Environmental Land and Water Management Act (ELWMA) [Fla. Stat. ss. 380.012-.12 (1998)], passed in 1972, contained provisions authorizing the state to designate *areas of critical state concern* and adopt specific principles for guiding development in the area. Of the 12 critical areas either designated or considered for state designation, nine have been coastal sites, including the Florida Keys, Apalachicola Bay, and the Northwest Florida Coast. The Local Government Comprehensive Planning Act (LGCPA) [Fla. Stat. ss. 163.3161-.3425 (1998)], passed in 1975, mandated the adoption of local comprehensive plans that contained coastal management elements. The legislature strengthened this mandate in 1985 by authorizing the state land planning agency to adopt minimum requirements for the content of local plans and to review and approve all local plans as compliant with these requirements.

Florida's hazard mitigation initiatives have been an outgrowth of these and other state laws designed to protect coastal areas from the impacts of growth. Closely related to concerns about protecting coastal resources from growth were concerns about the escalating number of lives and properties at risk in coastal areas and the state's ability to respond to natural disasters. Consequently, the ELWMA, the LGCPA, and other legislation sought to guide growth in coastal areas to protect estuaries, dune systems, and barrier islands from development impacts and to minimize the potential impacts of natural hazards on these areas.

Florida uses several methods to carry out its hazard mitigation objectives: (1) state planning mandates that require local governments to mitigate hazards in coastal areas using land use and development controls and counties to prepare emergency management plans, (2) state regulation of construction in coastal areas, and (3) funding and technical assistance for local mitigation activities. Two state agencies, the Department of Community Affairs (DCA) and the DEP, are responsible for implementing mitigation programs in accordance with several different statutory authorities. The remainder of this section focuses on applications and outcomes of these methods.

40.4.1 State Planning Mandates

Florida is one of the several states that have adopted planning mandates to accomplish statewide objectives for hazard mitigation as well as other purposes, such as natural resource protection, housing, and infrastructure. Specifically, the ELWMA and the LGCPA (discussed previously) set forth state objectives for land use and resource protection to be accomplished through local planning and development regulations. These laws provide a statewide policy framework for managing the impacts of growth and development in coastal areas and require local governments to mitigate hazards in the coastal zone through comprehensive planning and regulation of land use and development. In fact, Florida's planning mandates emphasize land use and development controls as tools for local hazard mitigation. Local governments must prepare comprehensive plans that are consistent with goals outlined in the State Comprehensive Plan [Fla. Stat. s. 187.201 (1998)] and in regional policy plans. Furthermore, local land use and zoning decisions must be consistent with the goals and policies laid out in the local comprehensive plan. In this top-down policy framework, local comprehensive plans serve as the vehicles for carrying out state land use policies in the coastal areas.

The LGCPA includes provisions that apply specifically to coastal areas. They require each city and county with coastal territory to develop a local comprehensive plan that contains a separate

coastal management element. The purpose of the coastal management element is twofold: to “restrict development activities where such activities would damage or destroy coastal resources” and to “protect human life and limit public expenditure in areas that are subject to destruction by natural disaster” [Fla. Stat. s. 163.3178(1) (1998)]. A total of 35 counties and 162 cities in Florida are required to prepare coastal management elements.

State requirements for the coastal management elements are comprehensive and detailed, causing the element to resemble a *plan within a plan* (DeGrove and Stroud 1988). The coastal management element must include a map of existing land uses; an inventory of natural disaster planning concerns including measures to reduce hurricane evacuation times, structures with a history of repeated damage from coastal storms, and identification of coastal high-hazard areas and infrastructure within them; and policies and management techniques for limiting development in coastal high-hazard areas and areas of repeated damage and for regulating building practices and alterations to floodplains, beaches, and dunes [Fla. Admin. Code 9J-5.012(3) (1998)]. In addition, the state requires that the coastal management element contain policies that address protection and conservation of coastal wetlands, marine resources, and habitat; priorities for shoreline land uses; public access to beaches and shorelines; historic resource protection; orderly development and use of deepwater ports; and protection of estuaries. These requirements resemble those of the federal government for state coastal management programs under the National Coastal Zone Management program.

The ELWMA also has been an important piece of legislation in the state’s hazard mitigation program, though its application is limited to only 5% of the lands within the state. Since 1972, the state has applied the critical areas provision of the ELWMA to several coastal areas in order to address potential problems arising from overdevelopment, including hurricane evacuation. These areas include the Florida Keys, the Northwest Florida Coast, the Escambia–Santa Rosa Coast (two coastal counties also in Northwest Florida), and Hutchinson Island (a barrier island in Southeast Florida). Although only the Florida Keys officially were designated as an area of critical state concern, the statute was used in the other three areas to form Resource Management and Planning Committees composed of representatives of state and local agency interests, citizens, and the private sector. Their purpose was to prepare and adopt a long-term management plan for the area and seek approval for the plan from the state Administration Commission (i.e., the governor and cabinet). If an acceptable plan was not adopted, then the state was authorized to designate the area as an area of critical state concern, and development decisions would have to undergo direct state review (DeGrove 1998).

Florida’s state planning mandates have undergone critical review several times since their initial adoption in the early 1970s, leading to several revisions. A yearlong, intensive review in 1992 of the state’s growth management statutes emphasized the importance of postdisaster redevelopment plans for coastal communities. During the tenure of the third Environmental Land Management Study Committee (*ELMS III*), the impacts of hurricane Andrew on Dade County revealed the deficiencies in local planning for postdisaster redevelopment. No community had developed specific plans addressing how the period following a disaster would be used as an opportunity to mitigate hazards (*ELMS III* 1992). In most cases, local comprehensive plans contain policies indicating that the local government will enforce existing building codes and state regulations pertaining to construction seaward of coastal construction control lines (CCCLs) (discussed in the following text). *ELMS III* concluded the following: “Little has been done to implement existing State policies intended to direct population growth away from Florida’s most vulnerable coastal areas, and to limit public expenditures which subsidize growth in such areas. It is difficult to determine if the problem rests with the policies or the definition of the coastal high-hazard area”

(ELMS III 1992:90). Its recommendations led to a uniform definition of coastal high-hazard area, now defined for planning purposes as the area within Category 1 hurricane evacuation zones.

Although Florida has adopted one of the strongest planning mandates in the nation (DeGrove 1992), a weakness has been the implementation of hazard mitigation and postdisaster redevelopment goals via the coastal management elements of local comprehensive plans. Based on a review of a sample of local comprehensive plans, Deyle and Smith (1998) found the content of coastal management elements generally weak and void of hazard mitigation policies other than those dealing with construction and site use regulation. They attributed this finding in part to the apparently low priority given to this issue by the state relative to other issues, such as urban sprawl, affordable housing, and adequate public facilities requirements. In addition, they found that local officials are generally unaware of the policies in their comprehensive plans that relate to hazard mitigation.

In general, the state's ability to accomplish hazard mitigation through local land use planning is limited. Local officials often are reluctant to restrict development in areas that offer ocean views and proximity to beaches and that contribute significantly to the tax base. Furthermore, it is extremely difficult to apply restrictive land use controls to areas that are developed already. Most coastal communities simply propose in their comprehensive plans to prevent an intensification of land uses in coastal high-hazard areas rather than implement policies to reduce densities and relocate structures. However, as awareness about the vulnerabilities in the coastal areas grows, so too may the number of communities that opt to mitigate hazards through land use restrictions in these high-hazard areas.

40.4.2 County Emergency Management Plans

The state's emergency management statute [Fla. Stat. ss. 252.31-.62 (1998)] also requires local governments to plan for the effects of natural hazards. Florida Statute 252 states that it is a responsibility of the state "to provide the means to assist in the prevention or mitigation of emergencies which may be caused or aggravated by inadequate planning for, and regulation of, public and private facilities and land use." Each county in Florida must prepare and adopt a comprehensive emergency management plan that is in compliance with state standards and that is consistent with the state comprehensive emergency management plan. Each county emergency management plan must include an evacuation component, a shelter component, and a postdisaster and recovery component and address preparedness, response, recovery, and mitigation [Fla. Admin. Code 9G-7.003(2) (1998)]. Specifically, the county emergency management plan must identify strategies for rectifying hazard-related problems, address state priorities for spending state and federal pre- and postdisaster mitigation funds, and establish procedures for updating local postdisaster redevelopment plans.

Counties must have an emergency management plan approved by the state in order to qualify for matching funds. In addition, they must have a part-time or, in counties with a population of 50,000 or more, a full-time emergency management director (Florida Administrative Code, Chapter 9G-11.004). Municipalities are encouraged, but not required, to adopt an emergency management plan. However, municipal plans must be consistent with the applicable county emergency management plan.

The 1993 Legislature enacted these planning requirements following hurricane Andrew. Legislators had filed bills in previous legislative sessions to authorize improvements to the state's emergency management program, but none succeeded. Hurricane Andrew and the *storm of the century* that struck northern Florida in the winter of 1993 revealed the inadequacies in the state's

response to emergencies and demonstrated that all parts of the state, not just southern Florida, are susceptible to natural disasters (Mittler 1997). In a related action, the 1993 Legislature also approved creation of the Emergency Management Preparedness and Assistance Trust Fund (discussed under *Funding and Technical Assistance*), which provided a dedicated funding source to support implementation and administration of local emergency management programs.

The process requirements for local emergency management plans closely parallel those for local comprehensive plans. Both types of plans must meet state standards, must be consistent with a statewide planning framework, and must be approved by the state. However, their approaches to hazard mitigation differ in that county emergency management plans are operations-oriented and the local comprehensive plans are policy-oriented. The county emergency management plans address roles and responsibilities of various agencies and organizations in emergency management and indicate how the county will proceed before, during, and after an emergency. On the other hand, the local comprehensive plans must establish the policies that will govern local efforts to mitigate hazards either in response to a disaster or as part of day-to-day decision making.

40.4.3 Regulation of Construction and Development in Coastal Areas

In addition to mandates for planning in coastal areas, Florida law also includes regulations for construction in the most vulnerable portions of the coastal areas—beaches, barrier islands, and flood velocity zones (*V-zones*). To protect its beaches from the negative impacts of development, Florida adopted in 1965 the Beach and Shore Preservation Act [Fla. Stat. ss. 161.011-.45 (1998)]. This statute contains provisions addressing regulation of construction and reconstruction within areas located seaward of CCCLs. These lines are located and mapped by the state's DEP and adopted by administrative rule. The CCCL defines “that portion of the beach-dune system which is subject to severe fluctuations based on a 100-year storm surge, storm waves, or other predictable weather conditions” [Fla. Stat. s. 161.053(l)(a) (1998)].

New construction or reconstruction located seaward of the CCCL requires permit approval from the DEP and must comply with stringent standards applying to design and placement of structures. These standards are intended to protect the beach-dune system from development impacts and structures from the impacts of erosion and coastal storms. In addition, all new construction and reconstruction must be located behind the 30-year seasonal high-water line. However, state law allows for limited exceptions to this requirement if its application precludes a property owner from building a structure. These standards have the general effect of keeping structures as far as possible from the shoreline, elevating them above a destructive storm surge, and strengthening them to withstand hurricane-force winds. They resemble the requirements of the NFIP for new construction and reconstruction in communities participating in the program, with the key difference being the setback for new construction from the 30-year seasonal high-water line.

Florida's beach and shore preservation statute also includes regulations pertaining to new construction in areas defined as the *coastal building zone*. The Coastal Zone Protection Act [Fla. Stat. ss. 161.52-.58 (1998)], passed in 1985 along with revisions to the LGCPA, amended the beach and shore preservation statute to ensure that growth and development in the coastal building zone “shall be managed through the imposition of strict construction standards in order to minimize damage to the natural environment, private property, and life” [Fla. Stat. s. 161.53 (1998)]. Part of the intent underlying the requirements for the coastal building zone is to minimize costs to the state for postdisaster redevelopment and ensure that preventive measures are taken to reduce the harmful consequences of natural disasters or emergencies.

The coastal building zone is defined accordingly as: (1) the land area from the seasonal high-water line landward to a line 1500 ft landward from the CCCL; (2) in areas with no CCCL, the land area seaward of the most landward velocity zone (V-zone) line as shown on flood insurance rate maps [Fla. Stat. s. 161.54 (1998)]; (3) on coastal barrier islands, the land area from the seasonal high-water line to a line 5000 ft landward from the CCCL or the entire island, whichever is less; and (4) all land area in the Florida Keys located within Monroe County. In no case, however, shall the coastal building zone be less than 2500 ft landward of the CCCL [Fla. Stat. ss. 161.51 and .55 (1998)]. Designation of the coastal building zone indicates that hazardous coastal areas extend beyond those defined by CCCLs and that these areas, while not vulnerable to storm surges and erosion, are also vulnerable to high winds and flooding associated with coastal storms.

Local governments in the coastal building zone are required to incorporate the standards set forth in the Coastal Zone Protection Act into local building codes and to enforce them. These standards pertain to structural requirements for major, major nonhabitable, and minor structures. Major structures in the coastal building zone must conform to the state minimum building code; NFIP standards for design, construction, and location; minimum wind load requirements of 110 mph (115 mph in the Florida Keys); and design requirements for foundations (i.e., all anticipated loads resulting from a 100-year storm event). Of course, local governments are permitted to adopt standards that are more restrictive than those identified in the Coastal Zone Protection Act.

Although not a direct regulation of development in coastal areas, Florida's Coastal Infrastructure Policy [Fla. Stat. s. 380.27 (1998)] serves as a limitation to new development on barrier islands. An executive order issued in 1981 called for a reduction of state investment in infrastructure on coastal barriers. This policy was adopted as law in 1985 and now provides that no state funds shall be used to construct bridges or causeways to coastal barrier islands that were not accessible by bridges or causeways on October 1, 1985. Additionally, no state funds are to be used for planning, designing, or constructing projects that increase the capacity of infrastructure (such as roads and bridges, sewage treatment facilities, potable water facilities, utilities, and shoreline stabilization structures) unless consistent with the approved coastal management element. This policy parallels the federal government's Coastal Barrier Resource Act, discussed previously.

40.4.4 Funding and Technical Assistance

Ensuring effective implementation of Florida's hazard mitigation policies requires substantial investments in funding and technical resources. In particular, the outcomes of the state's planning mandates pertaining to hazard mitigation are contingent on the state's commitment to helping local governments carry out these mandates and providing adequate support. The state currently provides several means of support related to its hazard mitigation policies: (1) programs for land acquisition, including hazard-prone properties; (2) funds for preparation of emergency management plans; (3) grants and technical assistance to local governments for preparation of mitigation strategies; and (4) grants to local governments for coastal management projects. These are described in the following discussion.

40.4.4.1 Land Acquisition

Perhaps the most effective hazard mitigation strategy is government acquisition of hazard-prone properties and elimination of the possibility of their development. Since the 1970s, Florida has acquired numerous tracts of land for a variety of purposes, such as environmental protection, historic preservation, recreation and open space, and access to scenic views. When these

purchases included hazard-prone areas, these actions have had the additional effect of removing these properties from the supply of developable land and reducing the threat of hazards to lives and property. Although the state's land acquisition programs do not operate primarily to serve the purposes of hazard mitigation, they represent an important tool for accomplishing this goal in coastal areas. The state considers acquisition of coastal lands as an important element of its coastal management programs [Fla. Stat. s. 380.21(4) (1998)].

One of the state's most significant attempts to acquire hazard-prone properties was made through the Save Our Coast initiative in the 1980s. Under this program, the state has acquired 73,000 acres of beaches, barrier islands, coastal marshlands, and beach access points (Deyle and Smith 1994). The state legislature issued \$200 million in bonds to finance the initiative. In addition, the state's Conservation and Recreational Lands (CARL) program is directed to consider "the value of acquiring coastal high-hazard parcels, consistent with hazard mitigation and post-disaster redevelopment policies, in order to minimize the risk to life and property and to reduce the need for future disaster assistance" [Fla. Stat. s. 259.101(4)(d)] (1998) when using funds from Preservation 2000, Florida's \$3 billion land and water conservation program. This language was added to the state's land acquisition statute in 1993 to ensure that state land acquisition programs used *hazard mitigation potential* as a criterion for selection of properties. Finally, the state established in 1991 the Florida Communities Trust (FCT) to assist local governments in implementing the coastal, conservation, recreation, and open space elements required as part of the comprehensive plans. The FCT administers a grant program that makes available \$30 million to local governments on an annual basis for the purposes of furthering the coastal management, conservation, and recreation goals of the local comprehensive plan, conserving natural resources, and resolving land use conflicts.

Currently, the state's objective in coastal land acquisition is to support locally based processes, which recognize hazard mitigation, for identifying and prioritizing coastal properties that may be acquired as part of the state's programs [Fla. Stat. s. 163.3178(8) (1998)]. With a definitive acquisition list in hand, coastal communities would be ready to pursue land acquisition opportunities as they arise, particularly in a post-storm situation when federal disaster funds may be available. Coastal advocates have criticized the state land acquisition selection criteria and processes for overlooking hazard mitigation and other coastal objectives (ELMS III 1992).

40.4.4.2 Local Mitigation Strategies

In 1997, DCA launched a \$20 million program called Breaking the Cycle. Its purpose is to provide incentives to local governments to increase their mitigation efforts and to incorporate mitigation into local comprehensive planning, building, and emergency management programs. Through this program, the DCA awards to cities and counties funds that can be used to assemble an intergovernmental, interdisciplinary team that analyzes vulnerability to hazards, outlines mitigation goals, and selects and prioritizes specific projects to fulfill these goals (Florida DCA 1997). A stipulation of the funds is that mitigation strategy development involves not only emergency management officials but also local planners and building officials. The intent is to improve coordination on mitigation activities within each county and integrate hazard mitigation planning with the land use element of the local comprehensive plans, the comprehensive emergency management plans, and related codes and ordinances.

Local mitigation strategies are expected to streamline the process of requesting and receiving financial assistance from state and federal agencies for mitigation projects, either predisaster or postdisaster. According to DCA, "Communities that implement disaster-resistant planning

techniques and strategies stand to receive more money after a disaster, and these communities will be given priority over those who have not implemented a mitigation strategy” (Florida DCA 1999:15). In addition, the DCA hopes that the local mitigation strategies will guide ongoing investments in mitigation projects and function like a long-term capital improvements plan for mitigation (Smith, personal communication 1999). Presently, all 67 counties in Florida are under contract with DCA to prepare local mitigation strategies in cooperation with the municipalities within each county.

Several other programs designed to supplement the local mitigation strategies also exist under DCA’s Breaking the Cycle umbrella program. The Resource Identification Strategy (RIS) provides data to local officials on available funds for mitigation and long-term redevelopment projects. The Residential Construction Mitigation Program makes low-interest loans to eligible homeowners for retrofits to strengthen their homes’ resistance to wind. Its structural evaluation model is designed to satisfy the actuarial concerns of the insurance industry (Smith, personal communication 1999). To understand how the programs of the *Breaking the Cycle* initiative interrelate with mitigation programs of other entities (such as FEMA, Red Cross, and local agencies), DCA created the Florida Showcase Community Project. The state selected two coastal communities as mitigation demonstration sites and, in cooperation with the State University System, will monitor and evaluate implementation of mitigation initiatives (Florida DCA 1999).

40.4.4.3 *Emergency Management, Preparedness, and Assistance Trust Fund*

As described previously, the Florida Legislature created in 1993 the Emergency Management, Preparedness, and Assistance Trust Fund (EMPATF) to provide a dedicated funding source for emergency management. Revenues for this fund come from a surcharge on private and commercial property’s insurance premiums. Moneys from this trust fund support the development and implementation of state and local agency emergency management programs. At the same time, the legislature established the Florida Hurricane Catastrophe Fund to provide reimbursement to insurers for a portion of their losses due to catastrophic hurricanes. Beginning in 1997, the legislature annually appropriates a minimum of \$10 million from this fund to state and local agencies for loss reduction programs and efforts to protect infrastructure [Fla. Stat. s. 215.555(7)(c) (1998)].

40.4.4.4 *Grants for Local Coastal Management Programs*

The state legislature passed in 1978 the Florida Coastal Management Act [Fla. Stat. ss. 380.205-.24 (1998)] in recognition that “the coastal zone is rich in a variety of natural, commercial, recreational, ecological, industrial, and aesthetic resources of immediate and potential value to the present and future well-being of the residents of this state which will be irretrievably lost or damaged if not properly managed” [Fla. Stat. s. 380.2 1(3)(a) (1998)]. The Coastal Management Act authorized the state to submit a coastal management program to the federal government for approval and directed that this program be based on existing state laws pertaining to land use, comprehensive planning, and other relevant areas. Florida’s coastal program received federal approval in 1981.

This program is based on several existing state authorities pertaining to coastal issues, such as beach and shore preservation, comprehensive planning, environmental control, and emergency management. Participation in the Coastal Management Program qualifies the state for federal matching dollars to enhance efforts to implement these laws and programs. State and local agencies are eligible to apply for these funds to accomplish hazard mitigation objectives, such

as development of a postdisaster redevelopment plan. A primary objective of the state's coastal program is to mitigate hazards, and the program provides funds to local governments and state agencies to support planning for hazard mitigation.

The state also provides matching funds to local governments for eligible beach management projects to reduce the impacts of erosion on beaches. The Beach and Shore Preservation Act directs the state to develop a long-term plan for restoration of critically eroding beaches based on several criteria, including the extent of existing and potential damage to beachfront property. In 1998, the legislature established a dedicated funding source for erosion-control projects by earmarking a portion of state revenues from documentary stamp taxes for this purpose. Up to this point, funds for erosion control were appropriated annually from general revenue on an ad hoc basis, complicating long-term planning.

40.4.5 Insurance Issue

Apart from the mandates, regulations, and incentives that Florida uses to compel hazard mitigation in its coastal communities, the rising cost of property insurance is becoming one of the primary reasons why communities and property owners undertake hazard mitigation. The insurance crisis also has introduced the insurance industry as a major advocate for expansion of hazard mitigation programs. The purpose of this section is to describe the mechanisms created in Florida to ensure the availability of property insurance in coastal areas.

The destruction left from hurricane Andrew in 1992 brought many changes to the insurance market in Florida. Prior to this disaster, the insurance industry was lulled by years of relatively low losses. The hurricane activity between 1982 and 1991 was one of the lowest on record for Florida. A 1986 study by the All-Industry Research Advisory Council, an advisory organization for the insurance industry, released a study of the potential worst-case losses that the industry might face from hurricanes. The study predicted that two \$7 billion hurricanes could occur in the same year (Ayscue 1996). However, hurricane Andrew shattered that estimate by causing an estimated \$15.5 billion in damages to insured property. The 1980s was a time of unbounded competition for homeowners' policies throughout Florida and insurance companies lowered rates to gain a larger share of the insurance market in Florida. Often the rates given were even lower than what the insurance company's own actuaries felt were necessary to cover any future claims. But what the insurance industry did not count on was a hurricane such as Andrew to expose their overexposure.

Adding to this environment of complacency was the fact that during these years, Florida experienced relatively few and mild hurricanes. Hurricane Andrew brought the realization to insurance actuaries that their methodology for calculating risk was primitive and did not properly account for the full cost of possible damages in Florida. More complicated computer simulation techniques have since replaced this methodology. The old methodology contained two problems. One was the relative uncertainty inherent in hurricane prediction. This creates problems for actuaries who are not able to predict accurately whether there is a chance of a major hurricane hitting Florida in the near future or decades from now.

The second problem facing actuaries was the difficulty of predicting the amount of development that would occur in an area. The old methodology failed to note the increased development that occurred in Florida and other coastal states in the 1980s. Thus, the destruction of Andrew emphasized the reality of insurance overexposure to hurricanes not only in Florida but throughout coastal states. As Campbell pointed out: "People in the industry are now more concerned about events so large that they threaten the solvency of insurance markets as a whole.... The question of insurability has become a public policy issue, beyond the possibility of insolvency

of individual insurance firms. Some in the industry would turn to government as insurer of last resort..." (1997:7).

After hurricane Andrew, the state stepped in and took charge of the insurance situation occurring in Florida. First, the state passed a moratorium on cancellations and nonrenewals of residential property insurance policies. The moratorium allowed insurance companies to cancel or nonrenew only 5% of their policies in Florida and only 10% from one county for reasons of hurricane risk. However, no limitation was placed on their ability to cancel or nonrenew policies under its underwriting rules for any reason other than hurricane risk. The final phase of the moratorium concludes in November 1999. The passage of this moratorium was an effort on the part of the state to allow stabilization of the insurance market and an orderly adjustment to exposure problems occurring within the insurance industry.

However, the moratorium was not enough to keep hundreds of thousands of homeowners from losing their insurance coverage. Therefore, in November 1992, the state legislature created a market of last resort for residential property insurance, the Florida Residential Property and Casualty Joint Underwriting Association (JUA). In 1994, the state also created the Florida Property and Casualty JUA (Condo-JUA), which provides insurance to condominiums that are unable to obtain private insurance. By September 1996, the JUA had grown to 937,000 policies. Since that time, there has been an aggressive effort to reduce the number of properties insured by the JUA and find private insurance for these residential properties. The JUA currently includes 600,000 policy holders, with more than half located in Dade, Broward, and Palm Beach counties in southeast Florida (Sumner 1997).

Florida also has a coastal wind and hurricane insurance called the Florida Windstorm Underwriting Association (FWUA), which covers facilities in certain coastal areas where wind and hurricane coverage have been determined to be unavailable in the private market. This determination is made during a series of public hearings. Since hurricane Andrew, the number of FWUA policy holders has grown five times over and now includes more than 320,000 policy holders. The FWUA is a permanent insurance mechanism for high-risk areas (Sumner 1997).

In 1993, the Florida Legislature established the Florida Hurricane Catastrophe Fund, which acts as a reinsurance source for insurance companies serving Florida. Reinsurance reimburses insurers if hurricane losses reach a threshold level of loss. Most reinsurance is written in one of two ways. First, the reinsurer assumes a share of the risk in exchange for a share of the premiums, or second, the reinsurer assumes a layer of risk (e.g., losses between \$5 and \$10 million). In this way, reinsurance "spreads risk from the primary insurer to other parties" (Campbell 1997:9). The fund charges property insurers in Florida a premium for varying levels above the reimbursement threshold. The property insurer can select a 45%, 75%, or 90% reimbursement level and pay a premium based on the level chosen. However, all property insurers in the state must participate in the fund at some level. Florida law allows for the insurers to pass directly the cost of the premiums to policy holders.

Florida's insurance crisis also prompted scrutiny of the state's building code requirements and local code enforcement practices. Insurers and public officials alike began to question the existing building code system in Florida, particularly its administration and enforcement as well as the code itself, in light of the widespread damage to structures during hurricane Andrew. Many believe that inadequate administration and enforcement of building codes was a major factor contributing to the extent of structural damage (Dade County Grand Jury 1992 [as cited in Getter 1992]; FEMA 1993; Insurance Institute for Property Loss Reduction and Insurance Research Council 1995).

Currently, Florida law requires local governments and 14 state agencies to adopt one of the four minimum building codes—the Standard Building Code, the One and Two Family Dwelling Code, the South Florida Building Code, and the EPCOT Code. Local governments are charged with enforcement of the codes and are permitted to amend the model codes as long as the amendments result in more stringent requirements. However, the Governor’s Building Codes Study Commission, created in 1996, found that this system had led to a “patchwork of technical and administrative processes which allow for too many people to determine what codes are used, how those codes are administered and enforced, and interpreted, and to what level the participants ... are educated, trained and disciplined” (Governor’s Building Codes Study Commission 1997:44). Its recommendations resulted in sweeping reforms in 1998 to the state’s Building Construction Standards statute (Chapter 553, Florida Statutes). In particular, changes to the law called for development of a single, statewide code to replace the various state and local building codes that existed.

The state legislature directed the Florida Building Commission to develop and submit the Florida Building Code for approval in 2000. It took effect in 2001. The Florida Building Commission maintains the code and approves the amendments to it. The code contains special provisions (such as wind load requirements) for construction in coastal areas. It is hoped that a unified, uniform code will diminish inconsistencies in the administration and enforcement of building codes and thereby reduce potential for structural damage from natural hazards, a goal shared by insurers and public officials alike.

40.5 Conclusion

With steady population growth in Florida’s coastal areas, it is certain that hazard mitigation will continue to represent a major policy concern of the state. Since the 1970s, the state has developed and implemented a number of local mandates, regulations, and incentives to promote hazard mitigation within coastal communities and ensure that growth and development does not further exacerbate their vulnerability to natural hazards. As a whole, these actions embody Florida’s approach to hazard mitigation in coastal areas and provide the basis for local initiatives.

Perhaps the greatest strength of Florida’s hazard mitigation program is the consistent policy basis that it provides for local planning and regulation in coastal areas. All cities and counties must address common policies relating to land use, resource protection, emergency management, and postdisaster redevelopment. They must enforce minimum standards pertaining to construction in the coastal building zone and seaward of the CCCL. The state’s uniform building code, to be adopted in 2000, will further enhance consistency in the state’s hazard mitigation program. In addition, the state’s increasing commitment to providing funds for local mitigation activities improves the ability of cities and counties to meet and exceed these minimum requirements. The several mitigation funding sources and programs created since hurricane Andrew undoubtedly have raised awareness about the value of planning for hazards and will provide the tools to support this process.

One of the greatest constraints on Florida’s ability to mitigate hazards stems from the fact that many coastal areas are developed already and land use patterns in the high-hazard areas are established. The only mitigation opportunities available to these areas are postdisaster redevelopment or redevelopment for economic reasons. Planning for these potential opportunities is vital, yet most communities in Florida fail to develop plans that outline specific strategies to acquire

lands, relocate structures, or reduce densities in high-hazard areas when these opportunities arise. Furthermore, the state has not enforced aggressively the postdisaster planning requirements for coastal cities and counties. Finally, implementing these types of strategies often requires government acquisition of property, and land values in Florida's coastal areas tend to render acquisition financially infeasible.

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Chapter 41

Disaster Study, Crisis Study, and the Discipline of Public Administration

A Personal Reflection

Roger Wettenhall

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41.1 Introduction

This chapter asks questions about the connection between *schools* of disaster management and crisis management and about the connection of both with the discipline of Public Administration. In doing so, it observes that the disaster and crisis schools have been products of separate lines of development and that they have often not connected well.

Based in part on personal experience within the disaster study tradition, a late *discovery* of the crisis study tradition, and the development of some relevant Australian study centers, this chapter comments on differences of approach separating the two traditions. In inquiring into connections with the discipline of Public Administration, it concludes that there is not much evidence of serious association between that discipline and either the disaster or the crisis school

in the Australian experience. There is speculation about these connections more generally, and the question is asked whether Public Administration might be able to embrace newly developing but very relevant themes such as *emergency management*, *crisis management*, and *surprise management*.*

41.2 Discovering the Disaster Study School

I have practiced, taught, and researched within the profession and discipline of Public Administration for several decades, and as part of this experience, I have lived through two Australian natural disasters and wrestled with issues relating to their connection with the more general field of crisis research. The two disasters have been bushfire attacks[†]—sometimes called *firestorms*—on the cities of Hobart, capital of the island state of Tasmania, in 1967, and Canberra, the federal capital, in 2003.

In Hobart, on a hot summer afternoon in February 1967, many small fires in the surrounding mountainous countryside joined together, advanced on the city and surrounding towns and rural properties, caused the deaths of 62 people and massive property damage in a devastating 5-h onslaught, and set the processes of government in serious disarray. As I fought the fire in my own front and back garden, I reflected that, while for the first time in my life I needed the assistance of the local fire protection service, it was totally obvious—because of the widespread nature of the disaster and the breakdown of communication facilities (roads, telephones, etc.)—that I could never get it. From that reflection, I moved to consider how the regular apparatus of government and public administration serving the city and state would respond to a disaster event of this magnitude. The sustained research program that followed included interviews with ministers, senior government officials, and heads of many emergency-relevant organizations including the police, the fire services, and closely involved voluntary agencies, examination of a mass of relevant documents, and study of the existing Australian and general literature on disaster management issues. It led to publication of the book *Bushfire Disaster: An Australian Community in Crisis* (Wettenhall 1975).

I had a less intensive involvement in the firestorm that invaded Canberra's western suburbs in January 2003. The death and damage toll, while substantial, was less than in the Hobart case: What distinguished this event and concerned me as a researcher was the inquiry process that followed the disaster impact. More invasive and controversial than in the Hobart case—there had been a significant development in Australian coronial procedures in the intervening period—a long drawn-out inquiry process led to this headline in the city's main newspaper on the fifth anniversary of the impact: *City still mired in the ashes* (CT 2008). This is not further explored in this chapter, except to observe that such rehashing of the disaster experience often becomes

* This chapter draws in part from an article in the journal *Public Organization Review* (Wettenhall 2009) and in part from a presentation to the inaugural meeting of the Asian Association for Public Administration in Tokyo (Wettenhall 2010). It follows Dwight Waldo in distinguishing between *public administration* as the practice or activity being studied and *Public Administration* as the self-conscious activity of studying (teaching about and researching) that practice, that is, the academic discipline; see Waldo (1975: 198–200, 1979: 13).

† The term *bushfire* customarily used in Australia is interchangeable with *brushfire* and *wildfire* as more frequently encountered in US usage. In the disaster literature, bushfires are normally classified as *natural disasters* (as distinct from industrial and other *man-made disasters*), though human action (such as arson) may sometimes be a causative factor. The fire (or cyclone, earthquake, etc.) is generally regarded as the disaster agent, the disaster itself arising from the disruptions the agent brings as it impacts on a settled community: for a classic definition that emphasizes this point, see Fritz (1961: 655, 1968: 202).

a very troublesome recovery issue. Community leaders who perform as well as could reasonably be expected in the real emergency may come to suffer greatly from the blame-seeking featured in this inquiry process.*

Living through and then researching the Hobart disaster experience introduced me to the international disaster study movement. Though there had been earlier isolated studies, what can be described as a *network* of disaster scholars emerged after World War II with the aid of research grants from the US civil defense bureaucracy. The motivation of the civil defense principals in this cold-war period was to explore the likely outcomes for large settled communities of a nuclear attack, and it seemed likely that major disasters affecting such communities might have some similar effects (see, e.g., Wettenhall 1975: ch. 1). Prominent in this movement was the Disaster Research Center (DRC) that developed, under the inspired leadership of Professors Henry Quarantelli and Russell Dynes, first at Ohio State University in Columbus and later at the University of Delaware. A large research program built up, with senior students and research officers undertaking fieldwork studies of disaster events in many parts of the world—two of them turned up in Hobart in February 1967, to be mildly disappointed (the civil defense grants had made this travel possible!) to find that, in a bushfire disaster, the disaster agent attacked from the city's periphery with damage greatest in the suburbs, whereas in a nuclear attack, the damage could be expected to be greatest at the city center (Anderson and Whitman 1967; Wettenhall 1975: 220–221).

Quarantelli and Dynes contributed significantly to the burgeoning body of literature in the field,[†] and many later eminent disaster scholars could trace their entry into the field to this DRC program. The energy spread widely, through a Research Committee on Disasters with its own journal (*International Journal of Mass Emergencies and Disasters: IJMED*) within the auspices of the International Sociological Association, and countless invitations accepted to address emergency services groups around the world, to serve as consultants to those groups, and to give papers at relevant conferences.

Several other dedicated university centers were spawned with some connection to this pioneering DRC, as in the Australian case of the Centre for Disaster Studies at James Cook University of North Queensland. And, almost in parallel, a Natural Hazards Research and Applications Information Center developed at the University of Colorado in Boulder, though as its name suggests its focus was more physical than social, with a primary concern for the characteristics of the disaster *agents* themselves (fire, cyclone, and the rest), rather than for the social consequences of their visitations on settled communities—which scholars in the DRC tradition (I came to regard myself as a DRC *disciple*, as did many others) regard as the real disasters.

There was a hint in the pre-DRC literature that *catastrophe* might be a better term for a really big disaster event (Carr 1932, and see Dombrowski 1998: 25; Stallings 1998: 223–224). This became a more potent terminological issue in the first decade of the twenty-first century, following the East Asian tsunami of December 2004 and Hurricane Katrina's onslaught on New Orleans in August 2005. In the aftermath of these very large natural disasters, Quarantelli proposed seriously that *catastrophe* might be a better term for really big disasters of this sort (reported Birkland 2006: 4).

* On such problems of political (and administrative) leadership in crisis and disaster, see especially Boin et al. (2005). A fuller exploration of what happened in the Canberra case can be found in Wettenhall (2009).

[†] For a few examples of their work, see Dynes (1970), Quarantelli (1954, 1978, 1998, 1999), and Quarantelli and Dynes (1972). There were connected economic studies, as in Dacy and Kunreuther (1969).

So disaster has been an important and clearly recognizable area of scholarship closely intersecting with a related practical world of professionals and administrators since soon after World War II. When did crisis assume a similar status and, given the obvious relationship between the two, how has it related to the disaster field?

41.3 And So to Crisis!

There is, of course, nothing new about the word *crisis*, and it has been used millions of times in discourse about society, politics, government, management, and the economy.* Just as with natural disasters, there have been important individual studies of crisis types and events over a relatively long period, with Perrow's *Normal Accidents* (1984) being a conspicuous and well-regarded early example. However, perhaps for the reason that events capable of being described as crises are so much more numerous and more diverse, a conscious awareness of *crisis as a field of study* did not arrive until much later in the twentieth century.

An early mark of recognition occurred in the 1980s when Uriel Rosenthal founded a Crisis Research Centre at the University of Leiden in the Netherlands (Boin et al. 2005: x) and played a leading part in launching the *Journal of Contingencies and Crisis Management* (JCCM: see Rosenthal and Kouzmin 1993; see also Rosenthal et al. 1989). This initiative owed much to Perrow's exploration of the technical aspects of potential threats to public and corporate stability and was to some degree driven by people who had come to the field of management from engineering backgrounds—so contrasting with the sociological background of many who had driven the rise of the *disaster school*. As several of Rosenthal's colleagues later put it, the aim was to “nurture ... a generic crisis approach to all types of adversity” (Boin et al. 2005: x). The field of crisis was drawn broadly: it would embrace natural disasters but want to subject them to the same sorts of inquiry that would be used to confront corporate and financial collapses, revolutions, explosions, oil spills, labor unrest (strikes and lockouts), riots, hijackings, terrorist acts, and so on.

Another early mark of this recognition came with the publication in 2001 of the first edition of this *Handbook of Crisis and Emergency Management*, which owes so much to the insight and energy of its organizing editor, Ali Farazmand. In the introduction to the first edition, Farazmand articulated rising concern about “the multitude of crises facing our world at the turn of the new millennium,” lamented the absence of any basic work “that would present a collective body of literature” on the important features of public management flagged in the book's title, and lamented especially the general neglect of this field of study by the academic Public Administration discipline. As with the Leiden work, that collection ranged over *political, economic, environmental, personal, organizational, and institutional* crises, affecting public and private organizations alike, some being process-oriented and developing over a period of time and others involving sudden rupture of facilities, processes, and communities (Farazmand 2001: v, vii, 3).

There was much good scholarship here and good advice for concerned practitioners. However, the field expanded rapidly, and at its most catholic, it came to be populated by what later critical scholars described as “best-selling crisis management handbooks” that offered

* I used it myself in the subtitle of my book on the Tasmanian firestorm (*Bushfire Disaster: An Australian Community in Crisis*), but this was in ignorance of a separate school of crisis study. One of the leaders of the about-to-emerge crisis school pointed out that “for a considerable period of time, crisis used to be the pet concept of experts in international relations” (Rosenthal 1998: 228).

“the reassuring ‘ten principles of effective crisis management,’” selling “an illusion of control (top-down, linear, straightforward) which does not fit particularly well in the context of contemporary crises” (Boin et al. 2005: 157).

The better crisis scholarship recognizes the limitations of the very generalized approach. It accepts the dynamic and compound nature of all large crisis and disaster events and moves forward with an understanding that the analytical approach requires that careful attention be given to the characteristics of particular events and to the ways in which those characteristics shape social reactions and political and administrative needs in the recovery process.

41.4 Consensus versus Conflict Situations

There would be fairly broad agreement that natural disaster events share one characteristic that often differentiates them from other types of crisis events. It is important that this factor be well understood in the devising of relevant administrative procedures.

One of the early tasks of the DRC was to undertake what Fritz (1968: 203) described as “an act of intellectual debris clearance.” A common expectation held by many with some connection to past disaster experience was that disaster-stricken communities disintegrated into panic, looting, and other forms of destructive social behavior, and this expectation was frequently enough to color popular reporting of disaster events. But the careful research now being undertaken under the auspices of the DRC exploded those expectations as myths. It showed that, in the disaster situation, notwithstanding often great economic loss, moral codes rarely broke down, normal social conflicts were often forgotten, and the shared experience of danger and loss greatly strengthened social cohesion—leading to the establishment for a time of the *therapeutic* or *altruistic* community (Fritz 1961: 684–685; Hill and Hansen 1962: 200–201; Barton 1969: ch. 5).

So natural disasters were shown in social terms to be vastly different from other sorts of crises such as political, industrial, or financial disturbances that might produce riot behavior and significant looting. It was important, therefore, that they be viewed as governance problems requiring civilian rather than military control. Troops might be called out to deal with rioting and similar forms of political unrest, but that would be an entirely inappropriate response in the disaster situation and unlikely to contribute to the healing processes required.*

Serious thought was being given in Australia in the 1970s to the proper arrangements for the governance of natural disaster and emergency situations. There was also serious industrial unrest in the Western Australian minefields, and a proposition emerged in that state for the creation of a Directorate of Public Safety and a State Coordination Directorate. One concern was to provide better machinery for coping with natural disaster events, but another was to guarantee constitutional stability in a time of increasing social turbulence: in other words, to protect organized government from the effects of violence, insurgency, industrial disorder, and the like. Fortunately, a premature leaking of the proposal forced the state premier to disassociate his government from it. The wiser view was that the contemplated bringing together of consensus and conflict crises in the same organization would inevitably surround its operations with a degree of political controversy that would be highly inimical to the positive therapeutic community effect of natural disasters. There was the further difficulty that the secrecy that inevitably surrounds counterinsurgency operations would run completely against the information-spreading activities that deserve to be given high priority in counter-disaster work (episode described in Wettenhall 1980: 275–276).

* There is a mass of evidence in the literature coming from the natural disaster school to support these propositions.

There was some recognition of a difference between *conflict* and *solidarity* situations in the early crisis literature (Rosenthal et al. 1989: 12), and the importance of the consensual versus conflictual distinction was emphasized in the DRC's *What Is a Disaster?* exercise (Quarantelli 1998: 235–242, 251; see also later). It is likely that most followers of the natural disaster school agreed. It needs to be appreciated, of course, that the distinction may break down where the disaster exposes substantial economic disparity between groups in the affected community (contributing to significant looting as in the recent cases of New Orleans and Port-au-Prince, Haiti). And, even where there has been a high degree of consensus in the early postimpact period, that consensus may break down if there is a long inquiry process in which political blame-seeking is the order of the day.

The work of the DRC and its associates was also important in indicating that there was a broad coherence about the natural disaster experience that was unlikely to apply across the whole field of crisis situations and events. This coherence stood notwithstanding the differing characteristics of the various disaster agents, resulting differences in types of damage caused, and so on. It was reflected in the notion of a disaster time scale—warning–threat–impact–inventory–rescue–remedy–recovery (Dynes 1970: 56)—which should have alerted all in relevant disaster planning and administration both to the complexity and the likely sequencing of actions that needed to be taken when disaster is expected, is threatened, or actually strikes. Within that analytical framework, moreover, came the revelation that the major issues disaster administrators were likely to face in and around the impact were like to be very different from the social control issues that loomed large in earlier expectations (and still colored much press reporting): to give two examples, problems of *inventory* (measuring the extent of loss even as rescue is proceeding and so that remedy can begin) and of managing the *convergence phenomenon*—the massive inflow of messages, people, relief goods, and, before long, money into the stricken community at a time of severe disruption to the facilities needed to deal with them (on which see Fritz and Mathewson 1957).

Some of these features will of course be shared by other types of crises, such as factory explosions causing significant disruption to surrounding communities.* The point is not that there is no common ground but rather that care needs to be taken in identifying the characteristics of particular situations before drawing conclusions, developing theories, making recommendations, and so on. The further point is that adherents of both *schools*—disasters and crises, however the fields are construed—need to be aware of each other's existence and prepared to exchange data and concepts, in short to communicate meaningfully across whatever barriers remain between them.

41.5 Are They Closing the Gap?

There is both bad news and good news. A survey of relevant Australian university research centers in late 2009 showed that there was little interaction between one university's disaster center and another university's crisis center, about 1300 kilometers apart but within the same state; indeed, the two were scarcely aware of each other's existence. It would be rash to suggest that this position was typical—however, each was well enough connected with other centers around the world with interests similar to its own, and those connections had not contributed to breaking down the local barrier. One speculation was that the disaster centers, following the DRC model, were

* The classic pioneering study embraced by the DRC network was actually that of an ammunition ship explosion in Halifax Harbour in 1917 (Prince 1920; Scanlon 1997).

heavily influenced by the sociological background of many of their leaders and the crisis centers by the engineering background of many of theirs, and that the differences between these disciplinary traditions had contributed to holding them apart (Wettenhall 2010).

Quarantelli's initiative in developing the *What Is a Disaster?* exercise went some way to breaking down the barriers.* In introducing the book of that name (1998: 4), he explained that clarification was required especially "because we are at the threshold of the appearance of certain kinds of relatively new social happenings that will need to be either included or excluded from the rubric of 'disaster.'" This opened up connections with the new *crisis school* of scholars, and Rosenthal (as noted, one of its leaders) participated. He emphasized the growing significance of technological disasters (with telling brief case studies) and drew from geographical work that saw them as *unmanaged phenomena*. (If the situation in which they occurred had been adequately managed, they would not have been disasters!) But it was in no sense a confrontation, and it seemed likely that the two schools could advance together once agreement was reached on certain characteristics and conditions.

Size is clearly a factor, and the ongoing discussion is about *big* events. It is obviously difficult to map out where bigness begins, but clearly many events loosely described as *crisis* do not qualify. For me, the essentials for this agreement were that we are talking about *big* events, with *big* social consequences. So new propositions about disaster, offered in this *What Is a Disaster?* exercise, supported or amplified the founding definition offered by Fritz in 1961. For example, disasters are "neither trivial nor confined to localized social units," and what distinguishes them is the "social disruption" they cause—they are "products of society's 'lack of capacity' to defend itself from external forces," and so on (from Dombrowsky, Dynes, and Stallings in Quarantelli 1998: 109, 129–130, 202). The consensus that was developing was effectively asserting that all *major* crises that contained elements of this sort should be considered, along with the big *natural* disasters, as part of the rubric of a consolidated and multidisciplinary crisis–disaster *school*.

It is noteworthy that the Leiden influence has continued, with leading European scholars[†] producing significant works that use the terms *disaster* and *crisis* virtually interchangeably. A particular concern has been to explore political and policy impacts in what they have described as "crisis-induced framing contests" (Boin et al. 2009: 81); the contexts for these contests range from huge disasters like Hurricane Katrina and the 9/11 attack in the United States, through smaller natural disasters such as flooding in Germany and a Baltic Sea tsunami, through terrorist attacks in Spain and Sweden, to space shuttle mishaps. These (also, e.g., Boin and 't Hart 2003; Brändström et al. 2004; Boin et al. 2005; Bos et al. 2005; 't Hart et al. 2009) are careful, critical studies of high importance and show how the disaster and crisis schools can be brought together in meaningful ways. Equally significantly, these scholars mostly acknowledge their membership of the discipline of Public Administration, and they have model value in demonstrating the sort of contribution Public Administrationists[‡] can make.

* There were several conferences through the mid-1990s and a special issue of the *International Journal of Mass Emergencies and Disasters* (Quarantelli 1995) before the book of that name appeared (Quarantelli 1998). The DRC team returned to the issue in Perry and Quarantelli (2005).

[†] Prof. Paul 't Hart, a prolific contributor, is from the Dutch school and is an adjunct professor in the Australian National University. His frequent collaborator Arjen Boin continues to operate from Leiden University.

[‡] *Public administrationist* is Waldo's term used to distinguish those who teach and research from those—the professional administrators—whose environment and whose work they study: see also note* in page 792.

41.6 Challenge for the Discipline of Public Administration

The discipline of Public Administration has not been so far figured prominently in this account. Around the world, many of its members have made important individual contributions to the study of crises and disasters, but—perhaps Continental Europe may be something of an exception—the discipline in its own right has not been a conspicuous creator of dedicated study centers as have its sister disciplines of sociology and engineering. This is somewhat surprising given the central and critical part that professional practicing public administrators—the people Public Administrationists study and so often work with—have to play in the managing of big disaster and crisis situations.

It is not that the profession has not tried from time to time to stimulate greater interest. As Cigler (2009: 1172) has explained, the US Federal Emergency Agency (FEMA) joined with the National Association of Schools of Public Affairs and Administration in 1984 to select a group of public administration scholars from US universities to study emergency management in FEMA facilities. It may be assumed that that sort of contact has continued, and many of the academics who have participated have subsequently published on relevant subjects: as Cigler notes, “(t)heir contributions enrich the nation’s institutional memory, which is so important for improving EM [emergency management] practice and scholarship.”

The term *emergency management* has come into increasing use, and it is likely that its symbolic value has made some contribution both toward bridging the gap between the disaster and the crisis schools and toward engaging the interests of more Public Administrationists. In Australia, the Natural Disasters Organization (NDO) formed in 1972 gradually matured into the organization known as Emergency Management Australia (EMA), with its educational wing, originally the Australian Civil Defence School, becoming the National Emergency Services College.* But even as late as 2009, it seems that the academic disciplines the Australian emergency services bureaucracies mostly relate to are not Public Administration but rather (1) law (because of the security connection), (2) planning and land use, and (3) engineering (including especially the study of risk issues) (Wettenhall 2010).

It is for others to say whether this relative remoteness of academic Public Administration from the real world of crises and disasters is a feature of the experience of other countries.† But I want to suggest that the emergence of the mega-disaster world of the twenty-first century provides challenges that academic Public Administration will find it increasingly difficult to ignore and that there is evidence, through the first decade of the new century, that a new paradigm is developing that must be embraced in Public Administration teaching, research, and theorizing. Institutions that claim to take Public Administration seriously but do not embrace this paradigm will surely come to be seen as increasingly irrelevant in the modern world.

* For a commentary on the earlier history of the Australian organization that demonstrates civil defense origins as in the US case and shows that at the outset use of the term *emergency* was resisted for the very reason that it was thought that an agency with that name might be used to quell civil disturbances, see Britton and Wettenhall (1990: 247–250). In Australia, the frontline responsibility for handling disaster situations remains with the relevant state and territory organizations; the federal organization plays a coordinating role and may intervene in actual disaster situations where a state or territory government declares that the disaster situation is beyond its own capacity to deal with.

† It needs to be acknowledged that, from and since the 1980s, the Australian academic public administration exercise has mostly been shifted out of the political/social science faculties into management schools where simplistic one-size-fit-all *solutions* are more likely to be entertained.

The mega-disasters of the early twenty-first century—particularly the East Asian tsunami, Hurricane Katrina and the Japanese triple disaster of earthquake, tsunami and nuclear powerplant breakdown—have thrust the world into disaster–crisis situations of a magnitude and complexity not previously known. Governments that had developed a reasonable capacity to deal with smaller disasters were confronted with larger-than-ever challenges. Just before the turn of the century and using the crisis rather than disaster terminology, French scholar Lagadec (1997: 27, 29) addressed the matter of generating appropriate learning about crisis situations in which administrators found themselves; importantly, he observed that “[s]imply repeating the basic pre-planned motions, updating checklists and making sure managers know what is in them, is not enough,” and that the task is rather “to prepare, as an organization, to confront situations that are unmanageable and potentially highly destabilizing.” Researchers like Birkland (2006) and Farazmand (2007) have pursued these kinds of issues, with conclusions that are likely to improve governmental and societal performance in future calamitous situations—providing that, of course, leaders can find the capacity to take them seriously and act on them. Here the challenge for academic Public Administration is writ large.

In particular, in dealing with what he describes as the *grand failure* in governance and emergency management in the Katrina case, Farazmand draws on chaos and complexity theories to develop the concept of *surprise management*. He sees a capacity for such management as a necessary prescription for survival in a *hypercomplex* and *unknowable world*,* in which events such as Katrina and the tsunami can occur virtually out of the blue; it will require “application of a ‘specialized’ expertise outside the bureaucratic structure of government, one that is flexible, robust, upgraded constantly, and well informed” (Farazmand 2007: 149, 151).

The educational implications are immense, as will be clear from other chapters in this *Handbook*. Farazmand, editor of this *handbook* and a leading Public Administrationist, develops this idea of *surprise management* in ways that must surely challenge other active, thinking members of the Public Administration discipline. Up to now, they have worked with “stable theories of organization, management, and government”; but Katrina, the tsunami, and of course 9/11 all tell them that, at a higher level of understanding and readiness, they have to deal with “turbulence, instability, chaos, disequilibrium, radical change, and feed forward processes with dynamic events of unfolding nature” (Farazmand 2009: 407).

Some of this needs to be injected urgently into our teaching and our research stances. How ready is academic Public Administration to accept this challenge?

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* The notion of an *unknowable world* comes from Stacey (1992).

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