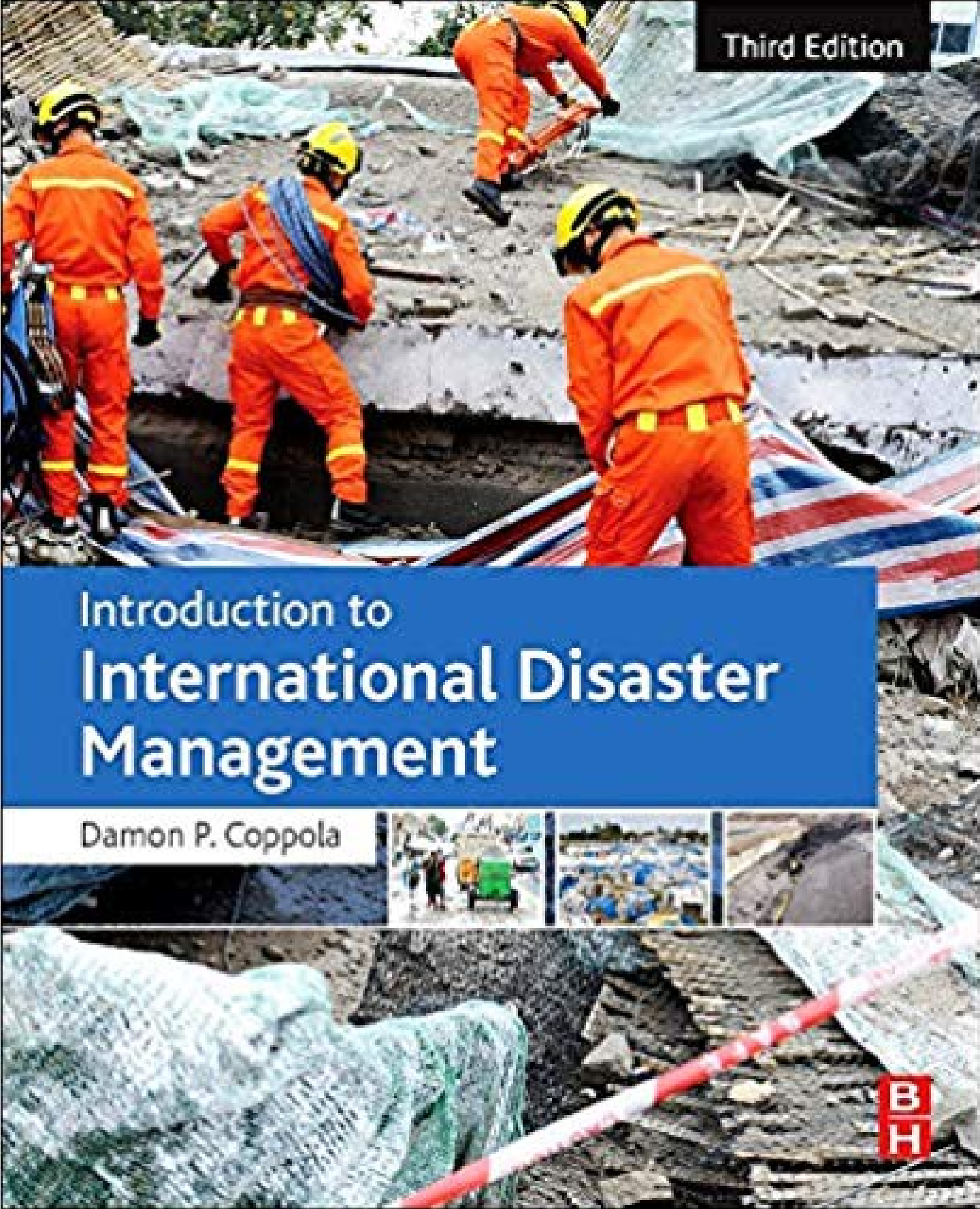
Third Edition
Introduction to
International Disaster Management
Damon P. Coppola
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Butterworth-Heinemann is an imprint of Elsevier

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Editorial Project Manager: Marisa LaFleur
Production Editor: Preethy Simon
Designer: Mark Rogers

Butterworth-Heinemann is an imprint of Elsevier
The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, UK
225 Wyman Street, Waltham, MA 02451, USA

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British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

Library of Congress Cataloging-in-Publication Data
A catalog record for this book is available from the Library of Congress

ISBN: 978-0-12-801477-6

This text is dedicated to three pioneers in the field of disaster management:
Dr. Jack Harrald, Dr. Joe Barbera, and Dr. Greg Shaw.
I am wiser for knowing their work and lucky for having their friendship.

Foreword

Damon Coppola's book is a major contribution to understanding the universal principles of emergency management. Had it been available in 1978, it would have helped me become a better emergency manager. I joined the Office of US Foreign Disaster Assistance (OFDA) in 1978 after serving three years in Viet Nam and a year in Ghana with the development program of the Agency for International Development. My qualifications were that I had common sense and street smarts because I survived Viet Nam, had traveled the world, and worked in Africa. If I applied for the same disaster job today with those qualifications, I would be rejected, fortunately.

Today's emergency managers have a wealth of information available to them and can benefit from the many academic courses offered to build a solid foundation of expertise in disaster preparedness and response. This know-how aids them in their profession and strengthens their decision-making capability. Damon has compiled an impressive collection of facts, statistics, and checklists that can help a motivated person become a skilled emergency management technician. Chapter 11, "Special Considerations," is an insightful look at future challenges and possible solutions. His lessons, combined with field experience and good mentoring, can transform a technician into a competent professional. Insights gained through experience and difficult decision making are how one becomes a leader in the struggle against disasters.

As I look back on 46 years of international experience, including 375 disasters, I see patterns emerge. Leadership and politics play inordinate roles in disaster planning and response, internationally as well as in the United States. The failures following Hurricane Katrina were predictable, not only because of the known vulnerability of the Gulf Coast, but also because of ineffective leadership. The appointment of political supporters with no emergency management experience and weak interpersonal skills was a formula for failure. Unfortunately, it is always the disaster victims who pay the price of inept leadership and flawed decision making.

OFDA and the Federal Emergency Management Agency (FEMA) have been rivals for years, with the smaller OFDA wary of the larger FEMA. However, it was OFDA's smallness, its clear mandate, a short chain of command, and almost unlimited resources that enabled it to become so successful and well known in the 1980s and early 1990s.

OFDA's other critical ingredient for success was leadership. Outstanding leaders were appointed who were willing to take risks to assist disaster victims worldwide. OFDA's directors—Julia Taft, Julius Becton, and Andrew Natsios—were experienced managers and self-confident individuals who hired strong, experienced, and creative international disaster leaders and then took their advice. Fred Cuny battled the bureaucracy as much as he fought disaster threats. Paul Bell developed a cadre of Latin American emergency managers whose influence has transcended him. Bob Gersony, the remaining OFDA genius, plumbed the depths of many complex international situations to bring clear action recommendations to OFDA directors.

All disasters are local, but they are also political. Internationally, political influences take forms that are different from the political aspects in domestic disasters. OFDA prided itself on being nonpolitical and responding to all victims' needs. One example, the rapid and generous US government's response to the El Asnam earthquake in Algeria in 1980, has been cited by some as the reason that the government of Algeria offered to negotiate the return of the US hostages held by Iran. The only exception to nonpolitical assistance that I experienced was the failure of the US government to respond to a major

hurricane in Sandanista-ruled Nicaragua in 1992. Despite severe damage to the eastern coast of Nicaragua, populated primarily by Misquito Indians friendly to the United States, the Reagan administration refused to allow the US Embassy to declare a disaster. A declaration would have enabled OFDA to provide immediate assistance to needy hurricane victims.

As Damon documents, international disaster programs have had a significant influence on US emergency management. The most well known is the US Urban Search and Rescue Program (USAR Task Forces from Fairfax County, Virginia, and Metro Dade County, Miami, Florida), which was developed by OFDA. FEMA developed and expanded the teams into more than 25 USAR task forces that respond to disasters in the United States.

The probability forecasting system used by the National Hurricane Center originated with a US Navy system supported by OFDA to alert and warn vulnerable populations through American embassies around the world. The Bangladesh early warning system, funded by OFDA and enhanced by others, continues to save thousands of lives.

The management of spontaneous donations (chapter 6) after US and international disasters is an ongoing problem. Recognized as such by OFDA and FEMA in the 1980s, non-governmental organizations (NGOs) and the US government designed activities to educate potential donors and provided guidance to disaster-stricken country embassies. Today, the Center for International Disaster Information (CIDI) and InterAction work with FEMA, NVOAD members, and the Business Civic Leadership Center (US Chamber of Commerce) to educate donors and foster cooperation to better manage offers of goods, services, and spontaneous volunteers.

Despite the similarities between the US and international disaster needs and principles, there is limited cooperation among US emergency managers working on domestic activities and US emergency managers working on international programs. Although international coordination and the role of the United Nations (described in chapter 10) has improved cooperation, significant gaps remain between domestic and international emergency management programs in many donor countries. Damon's excellent use of universally recognized approaches may successfully forge more cooperation as both adherents recognize that they are using similar templates.

James Lee Witt, FEMA's famous and successful director, provided valuable guidance for emergency managers worldwide:

> We need to take a common-sense, practical approach to reducing the risks we face and protecting our citizens and our communities. We need to identify our risks, educate and communicate to our people about those risks, prepare as best we can for the risks, and then, together, form partnerships to take action to reduce those risks. This approach applies whether we are dealing with a flood, a tornado, a hazardous materials spill, a wildfire, a potential suicide bomb explosion, or a pandemic flu outbreak.

Good luck to the next generation. You will need to learn the basics and be willing to withstand the constraints of a bureaucracy. Perhaps you will be as lucky as I have been and work for outstanding leaders and with courageous colleagues. You will need all this book can provide and lots of personal courage.

Thanks, Damon, for a good start.
Oliver R. Davidson
Private-Public Partnerships for Disaster Reduction

Acknowledgments

The author would like to express profound gratitude to George Haddow and Jane Bullock for continuing to freely share their invaluable expertise and experience—much of which is captured in the pages of this text—and for their friendship and constant support. Special thanks also go to Ollie Davidson, Jack Harrald, Greg Shaw, J. René van Dorp, Joseph Barbera, Ryan Miller, Erin Ngo, Sanjaya Bhatia, Terry Jeggle, and Robert McCreight. Their research, practice, publications, and experience, which have unquestionably made the world safer from the consequences of disasters, served as both a resource and an inspiration in the writing of this text.

I would also like to thank Pam Chester, Sara Scott, and Marisa LaFleur at Elsevier for the tremendous assistance they provided in the development of this book. For their contributions to the content of this text, I would like to thank Timothy Wilcox, Ana Lucia Hill, Garrett Ingoglia, Liz Maly, Leonardo Maldonado, Cristina Ascone, Charis Galaraga, Johann Goldammer, Ann Patton, David Alexander, Rae Zimmerman, Vicki Bier, George and Sharon Ketchum, Wayne Blanchard, Barbara Johnson, Gunnery Sergeant Shannon Arledge (USMC), Greg Guibert, Claire Reiss, Gilbert Burnham, Gaye Cameron, Niels Holm-Nielsen, Juan Edwardo Donoso, Meredith Golden, Erdem Ergin, Amy Sebring, Avagene Moore, Sanjaya Bhatia, Irmak Renda-Tanali, Sarp Yeletaysi, Louise Comfort, Stephen Carter, David Gilmore, Alan Kirschenbaum, Jack Suwanlert, Cate Moore, Chris Schraders, Caroline McMullan, John Borton, Darcy Whiteside, Jessica Hill, Georg Pflug, Ralph L. Keeney, Clark Chapman, Anatoly Klypin, Eva Coles, and W. Kip Viscusi.

And finally, I would like to extend a very special thank you to my wife, Mary Gardner Coppola, who dedicated countless hours to providing invaluable editorial and material assistance that made this book possible.

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Introduction

The basis for the writing of this book is the juncture of two separate trends: (1) all countries face increased risk from a full range of known and previously unknown hazards, and (2) disaster consequences are having greater adverse effects on populations and environments. To the degree that they are able, governments pass legislation and take action to prepare for and mitigate the effects of these natural, technological, and intentional hazards. Despite even the best efforts, however, the fury of nature or the folly of man regularly results in disastrous events that overwhelm not only local response capacities, but also the response capacities of entire nations, even entire regions. When this happens, the full range of players from the international community is called on to intervene, requiring international disaster management.

The international response to disasters is convoluted, at times chaotic, and always complex. Every country has its own hazard profile, vulnerability fluctuation, and evolution or demise of emergency management systems, as well as unique cultural, economic, and political characteristics. Each of these qualities influences the country's interaction with international disaster management agencies and organizations.

Disaster management as a practice and a profession is rapidly expanding and improving. Such change is necessarily driven by the modern needs of governments and non-governmental organizations involved in one or more of the four phases of emergency management—mitigation, preparedness, response, and recovery.

This book was written to serve as a guide and reference for students, practitioners, and anyone interested in disaster management and its application to the international community.

Chapter 1 provides a general background on the impact and management of disasters worldwide. Included in this discussion is a brief history of emergency management. Several of the issues unique to international disaster management are touched on, while in-depth coverage is included in later chapters. Finally, several key terms are defined and discussed.

Chapter 2 addresses hazards. The various natural, technological, and intentional hazards are defined, and disaster-specific information is provided. Where applicable, the threat ranges of hazards are illustrated with charts, maps, and figures.

Chapter 3 examines the existence and assessment of vulnerability and risk. The disparity in these values between countries in relation to their variable levels of wealth is addressed in detail, as is risk perception, an important and influential component of vulnerability and risk.

Chapter 4 covers the mitigation of hazard risk. Mitigation is explained and then followed by definitions and examples of forms of structural and nonstructural mitigation. Insurance, as a mitigation option, is addressed. Finally, various obstacles to effective mitigation are identified and explained.

Chapter 5 addresses disaster preparedness. A general overview of preparedness is followed by several practical topics, including communications, social marketing, training, animals in disasters, public warning, and preparedness obstacles.

Chapter 6 examines the very complex response to international disasters. Following an overview of response, topics addressed include recognition of disasters, disaster assessments, the various components of disaster response (including search and rescue; the provision of food, water, and medical supplies; shelter; sanitation; social services; security; evacuation and relocation; medical treatment; and fatality management), and coordination, among many others.

Chapter 7 covers the recovery period following the disaster response. Components of disaster recovery addressed include the opportunity factor, sustainability, reconstruction of infrastructure, debris removal, rebuilding of homes and lives, economic recovery, debt relief, and other related issues.

Chapters 8 through 10 discuss the various players involved in the management of international disasters. These include governmental disaster management agencies (chapter 8), non-governmental organizations (chapter 9), and the various multilateral organizations and international financial institutions (chapter 10).

In conclusion, chapter 11 discusses several special topics that must be considered in the management of international disasters. These include coordination, the media, capacity building, political will, compound emergencies, donor fatigue, corruption, sovereignty, climate change, linking risk reduction and development (and differentiating between recovery and development), terrorism, and emerging epidemics.

CHAPTER

THE MANAGEMENT OF DISASTERS

1

CHAPTER SUMMARIES

Disasters have adversely affected humans since the dawn of our existence. In response, individuals and societies alike have made many attempts to decrease their exposure to the consequences of these disasters. All of these efforts have the same goal: disaster management. The motivating concepts that guide disaster management—the reduction of harm to life, property, and the environment—are largely the same throughout the world. Whether due to political, cultural, economic, or other reasons, the unfortunate reality is that some countries and some regions are more capable than others at addressing the problem. Furthermore, the emergence of a global economy makes it increasingly difficult to contain the consequences of any disaster within one country's borders. This chapter examines basic concepts of disaster management and expands upon those concepts to specifically address the management of international disasters, which is a complex discipline. Like disaster management on the national level, it involves actions that seek to mitigate the effects of hazards, ensures that populations are prepared for disasters should they occur, facilitates the response to disasters that do occur, and helps nations and people recover in the months and years following disaster events. The chapter provides a brief history of disaster management. To illustrate the disparity in the effects of disasters around the world, an examination of the global impact of disasters has also been carried out.

Key Terms: civil defense; complex humanitarian emergency; disaster; disaster management; disaster trends; emergency management; history of emergency management; mitigation; preparedness response; recovery.

INTRODUCTION

Disasters have adversely affected humans since the dawn of our existence. In response, individuals and societies alike have made many attempts to decrease their exposure to the consequences of these disasters, developing measures to address initial impact as well as post-disaster response and recovery needs. Regardless of the approach adopted, all of these efforts have the same goal: disaster management.

The motivating concepts that guide disaster management—the reduction of harm to life, property, and the environment—are largely the same throughout the world. However, the capacity to carry out this mission is by no means uniform. Whether due to political, cultural, economic, or other reasons, the unfortunate reality is that some countries and some regions are more capable than others at addressing the problem. But no nation, regardless of its wealth or influence, is advanced enough to be fully immune from disasters' negative effects. Furthermore, the emergence of a global economy makes it more and more difficult to contain the consequences of any disaster within one country's borders.

Introduction to International Disaster Management. http://dx.doi.org/10.1016/B978-0-12-801477-6.00001-0

This chapter examines basic concepts of disaster management and expands upon those concepts to specifically address the management of international disasters. A brief history of disaster management is provided for context. To illustrate the disparity in the effects of disasters around the world, an examination of the global impact of disasters follows. Finally, several relevant terms used throughout this text are defined.

DISASTERS THROUGHOUT HISTORY

Disasters are not merely ornamental or interesting events that adorn our collective historical record—these disruptions have served to guide and shape it. Entire civilizations have been decimated in an instant. Time and time again, epidemics and pandemics have resulted in sizable reductions of the world's population, as much as 50 percent across Europe during the fourteenth century bubonic plague (Black Plague) pandemic. Theorists have even ventured to suggest that many of history's great civilizations, including the Mayans, the Norse, the Minoans, and the Old Egyptian Empire, were ultimately brought to their knees not by their enemies but by the effects of floods, famines, earthquakes, tsunamis, El Niño events, and other widespread disasters (Fagan 1999). A worldwide drought in the eighth and ninth centuries, caused by shifts in the yearly monsoons and resulting in mass crop failure and subsequent starvation, is now believed to have been behind the fall of both the Mayan empire in Mexico and the Tang dynasty in China (Sheridan 2007). From a modern perspective, each of the catastrophic events that has occurred as of late, including the December 26, 2004, earthquake and tsunami (over 230,000 killed), the 2005 Kashmir earthquake (80,000 killed), the 2008 Sichuan earthquake in China (68,000 killed), the 2008 Cyclone Nargis (135,000 killed), the 2010 Haiti earthquake (perhaps as many as 200,000 killed), and the 2011 Great East Japan Earthquake (16,000 killed) might seem anomalous, but these disastrous events are not close to record-breaking, or even unique, in the greater historical context. (See table 1.1.)

Table 1.1 Selected Notable Disasters throughout History

Disaster	Year	Number Killed
Mediterranean earthquake (Egypt and Syria)	1201	1,100,000
Shaanxi earthquake (China)	1556	830,000
Calcutta typhoon (India)	1737	300,000
Caribbean hurricane (Martinique, St. Eustatius, Barbados)	1780	22,000
Tamboro volcano (Indonesia)	1815	80,000
Influenza epidemic (world)	1917	20,000,000
Yangtze River flood (China)	1931	3,000,000
Famine (Russia)	1932	5,000,000
Bangladesh cyclone (Bangladesh)	1970	300,000
Tangshan earthquake (China)	1976	655,000

Source: St. Louis University, 1997; NBC News, 2004.

THE HISTORY OF DISASTER MANAGEMENT

ANCIENT HISTORY

Hazards, and the disasters that often result, have not always existed. To qualify as a hazard, an action, event, or object must maintain a positive likelihood of affecting humans or possibly have a consequence that may adversely affect humans' existence. Until humans existed on the planet, neither the likelihood nor the consequence factors of hazards were calculable; thus their presence is negated.

With the appearance of humans, however, followed the incidence of hazards and disasters. Archeological discovery has shown that our prehistoric ancestors faced many of the same risks that exist today: starvation, inhospitable elements, dangerous wildlife, violence at the hands of other humans, disease, accidental injuries, and more. These early inhabitants did not, however, sit idly by and become easy victims. Evidence indicates that they took measures to reduce, or *mitigate,* their risks. The mere fact that they chose to inhabit caves is testament to this theory.

Various applications of disaster management appear throughout the historical record. The story of Noah's ark from the Old Testament, for example, is a lesson in the importance of warning, preparedness, and mitigation. In this tale, believed to be based at least partly on actual events, Noah is warned of an approaching flood. He and his family prepare for the impending disaster by constructing a floating ark. The protagonist in this story even attempts to mitigate the impact on the planet's biodiversity by collecting two of each species and placing them within the safety of the ark. These individuals are rewarded for their actions by surviving the disastrous flood. Those who did not perform similar actions, the story tells us, perished.

Evidence of risk management practices can be found as early as 3200 BC. In what is now modern-day Iraq lived a social group known as the Asipu. When community members faced a difficult decision, especially one involving risk or danger, they could appeal to the Asipu for advice. The Asipu, using a process similar to modern-day hazards risk management, would first analyze the problem at hand, then propose several alternatives, and finally give possible outcomes for each alternative (Covello and Mumpower 1985). Today, this methodology is referred to as *decision analysis,* and it is key to any comprehensive risk management endeavor.

Early history is also marked by incidents of organized emergency response. For example, when in AD 79 the volcano Vesuvius began erupting, two towns in its shadow—Herculaneum and Pompeii—faced an impending catastrophe. Although Herculaneum, which was at the foot of the volcano and therefore directly in the path of its lava flow, was buried almost immediately, the majority of Pompeii's population survived. This was because the citizens of Pompeii had several hours before the volcano covered their city in ash, and evidence suggests that the city's leaders organized a mass evacuation. The few who refused to leave suffered the ultimate consequence, and today lie as stone impressions in an Italian museum.

MODERN ROOTS

All-hazards disaster and emergency management, wherein a comprehensive approach is applied to address most or all of a community's hazard risks, are relatively new. However, many of the concepts that guide today's practice can be traced to the achievements of past civilizations. While the management of disasters during the past few thousand years was limited to single acts or programs addressing

individual hazards, many of these accomplishments were quite organized, comprehensive, and surprisingly effective at reducing both human suffering and damage to the built environment. See the following examples.

Floods have always confounded human settlements. However, archeologists have found evidence in several distinct and unrelated locations that early civilizations made attempts to formally address the flood hazard. One of the most celebrated of these attempts occurred in Egypt during the reign of Amenemhet III (1817–1722 BC). Amenemhet III created what has been described as history's first substantial river control project. Using a system of over 200 "water wheels," some of which remain to this day, the pharaoh effectively diverted the annual floodwaters of the Nile River into Lake Moeris. In doing so, the Egyptians were able to reclaim over 153,000 acres of fertile land that would have otherwise served no use (Quarantelli 1995; ESIS n.d.).

The roots of the modern fire department trace back 2,000 years to when the city of Rome was nearly destroyed by fire. Before this event, slaves had been tasked with fighting fires, and their poor training, lack of equipment, and understandable lack of motivation made them highly ineffective. Following the great fire, Emperor Augustus established a formal, city-wide firefighting unit from within the Roman army called the Corps of Vigiles. As a result, the firefighting profession became highly respected and, likewise, highly effective, and was emulated throughout the vast Roman Empire for 500 years. The structure of this organization was quite similar to many fire departments today, with members filling job-specific roles. (See exhibit 1.1.) With the fall of Rome, however, came the disappearance of the Corps of Vigiles, and organized firefighting did not appear anywhere in the world for another 1,000 years.

The Incas, who lived throughout the Andes region in South America during the thirteenth to fifteenth centuries, practiced a form of urban planning that focused on their need to defend themselves from enemy attack. Many of the Incan cities were located at the peaks of rugged, although easily defensible, mountains. The prime example of their architectural achievement is the fortress of Machu Picchu. However, in locating their cities upon mountaintops and other similar areas, the Incas merely replaced one man-made hazard with a whole range of environmental hazards. To facilitate life on this extreme terrain, the Incas developed an innovative form of land terracing that not only conserved water in their unpredictable climate but also protected their crops—and thus their existence—from the landslides that occurred during periods of heavy precipitation.

As later eras are examined, still more examples of methods created to address specific hazards and their consequences emerge. One of the greatest and most effective forms of disaster mitigation in history is the collective effort of the British and Indian governments, which sought to reduce Indians' annual suffering and starvation that occurred as a result of regular drought patterns. These famines became so devastating during the late nineteenth century that up to a million people were dying of starvation each year. A government study found that sufficient food existed throughout

EXHIBIT 1.1 JOB TITLES WITHIN THE ROMAN CORPS OF VIGILES

Aquarius: The firefighter whose main duties were the supply of water to the *siphos* or pumps and the organization of "bucket chains."
Siphonarius: The firefighter who was responsible for the supervision and operation of the water pumps.
Uncinarius: The firefighter who was a "hook" man, who carried a large fire hook for pulling off burning roofs.

Source: *FFCA, 2014.*

the country to feed the nation's entire population at all times, but insufficient capacity to distribute these resources led to location-specific shortages. To address these problems, planning committees were formed to develop various preventive measures, including a rapid expansion of the extensive railway system that crisscrosses the country (to quickly transport food), the adoption of a method by which indicators of emerging needs were identified and logged in a central repository, and greater monitoring of public health. So effective at controlling famine were these measures that many remain in force today. How much of a positive role was played by India's acclaimed railroad, which connects almost every settlement nationwide, continues to be debated. (Keniston 2007; Sweeney 2008).

CIVIL DEFENSE: THE BIRTH OF MODERN EMERGENCY MANAGEMENT

There is no global formula that explains how the countries of the world developed their disaster management capacities. However, there is one particular period in recent history that witnessed the greatest overall move toward a centralized safeguarding of citizens—the Civil Defense era. (See figure 1.1.)

FIGURE 1.1

Civil defense era poster, Pennsylvania, United States.

Source: Library of Congress, 2000.

Modern disaster management, in terms of the emergence of global standards and organized efforts to address preparedness, mitigation, and response activities for a wide range of disasters, did not begin to emerge until the mid-twentieth century. In most countries, this change materialized as a response to specific disaster events. At the same time, it was further galvanized by a shift in social philosophy, in which the government played an increasing role in preventing and responding to disasters. The legal foundation that allowed for such a shift was the result of advances in warfare technology.

In response to the threat posed by air raids and the ever-present and dreadful prospect of a nuclear attack, many industrialized nations' governments began to form elaborate systems of civil defense. These systems included detection mechanisms, early warning alarms, hardened shelters, search and rescue teams, and local and regional coordinators. Most nations' legislatures also established legal frameworks to guide both the creation and maintenance of these systems through the passage of laws, the creation of national-level civil defense organizations, and the allocation of funding and personnel.

Despite these impressive efforts, surprisingly few civil defense units evolved over time into more comprehensive disaster or emergency management organizations (Quarantelli 1995). But the legal framework developed to support them remained in place and formed the basis for modern disaster and emergency management as we know it today. For example:

- Great Britain's disaster management agency traces its roots to the Civil Defense Act of 1948.
- Canada's Office of Critical Infrastructure Preparedness and Emergency Preparedness (OCIPEP) grew out of the Canadian Civil Defense Organization created in 1948.
- The United States Federal Emergency Management Agency (FEMA) grew out of the Federal Civil Defense Act of 1950.
- France's civil protection is a product of that nation's 1950 Ordinance and the 1965 Decree Relating to Civil Defense.
- Algeria Civil Protection grew out of the 1964 Decree on the Administrative Organization of Civil Defense.

CAPACITY BY DEMAND: THE 1970S AND '80S

National emergency management capacity began to take a more centralized role in the 1970s and '80s as countries focused on the creation of national-level emergency management systems. Many developed their disaster management capabilities out of necessity and an acceptance of the need to formalize both the authority and budget for an agency to address blatant disaster risk. Other countries formed their disaster management structures not for civil defense, but after being spurred into action by popular criticism for poor management of a natural disaster (e.g., Peru in 1970, Nicaragua in 1972, and Guatemala in 1976 following destructive earthquakes in each country).

And yet others, to a diminishing degree, still have no real emergency management structure to speak of, irrespective of their disaster history.

THE INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION

On December 11, 1987, the United Nations General Assembly declared the 1990s to be the "International Decade for Natural Disaster Reduction" (IDNDR). This action was taken to promote internationally coordinated efforts to reduce material losses and social and economic disruption caused by natural

disasters, especially in developing countries, through capacity building. On December 22, 1989, through UN Resolution 44/236, the General Assembly set forth the goals they wished to achieve during the Decade. In addition to establishing a special UN office in Geneva to coordinate associated activities, the resolution directed the various UN agencies to:

- improve the capacity of each country to mitigate the effects of natural disasters expeditiously and effectively, paying special attention to assisting developing countries in the assessment of disaster damage potential and in the establishment of early warning systems and disaster-resistant structures when and where needed;
- devise appropriate guidelines and strategies for applying existing scientific and technical knowledge, taking into account the cultural and economic diversity among nations;
- foster scientific and engineering endeavors aimed at closing critical gaps in knowledge in order to reduce loss of life and property;
- disseminate existing and new technical information related to measures for the assessment, prediction, and mitigation of natural disasters;
- develop measures for the assessment, prediction, prevention, and mitigation of natural disasters through programmes of technical assistance and technology transfer, demonstration projects, and education and training, tailored to specific disasters and locations, and to evaluate the effectiveness of those programs. (United Nations 1989)

It was expected that all participating governments would, at the national level:

- formulate national disaster-mitigation programmes, as well as economic, land use, and insurance policies for disaster prevention, and particularly in developing countries, to integrate them fully into their national development programmes;
- participate during the [IDNDR] in concerted international action for the reduction of natural disasters and, as appropriate, establish national committees in cooperation with the relevant scientific and technological communities and other concerned sectors with a view to attaining the objective and goals of the Decade;
- encourage their local administrations to take appropriate steps to mobilize the necessary support from the public and private sectors and to contribute the achievement of the purposes of the Decade;
- keep the Secretary-General informed of the plans of their countries and of assistance that can be provided so that the United Nations may become an international centre for the exchange of information and the coordination of international efforts concerning activities in support of the objective and goals of the Decade, thus enabling each State to benefit from the experience of other countries;
- take measures, as appropriate, to increase public awareness of damage risk probabilities and of the significance of preparedness, prevention, relief, and short-term recovery activities with respect to natural disasters, and to enhance community preparedness through education, training, and other means, taking into account the specific role of the news media;
- pay due attention to the impact of natural disasters on healthcare, particularly to activities to reduce the vulnerability of hospitals and health centres, as well as the impact on food storage facilities, human shelter, and other social and economic infrastructure;
- improve the early international availability of appropriate emergency supplies through the storage or earmarking of such supplies in disaster-prone areas. (United Nations 1989)

THE YOKOHAMA STRATEGY – GLOBAL RECOGNITION OF THE NEED FOR DISASTER MANAGEMENT

In May 1994, UN member states met at the World Conference on Natural Disaster Reduction in Yokohama, Japan, to assess the progress attained by the IDNDR. At this meeting, they developed the Yokohama Strategy and Plan of Action for a Safer World. Through this document, the UN affirmed that:

1. Impact of natural disasters in terms of human and economic losses has risen in recent years, and society in general has become more vulnerable to natural disasters. Those usually most affected by natural and other disasters are the poor and socially disadvantaged groups in developing countries, as they are least equipped to cope with them.
2. Disaster prevention, mitigation, preparedness, and relief are four elements which contribute to and gain from the implementation of sustainable development policies. These elements, along with environmental protection and sustainable development, are closely interrelated. Therefore, nations should incorporate them in their development plans and ensure efficient follow-up measures at the community, national, subregional, regional, and international levels.
3. Disaster prevention, mitigation, and preparedness are better than disaster response in achieving [disaster reduction] goals. . . . Disaster response alone is not sufficient, as it yields only temporary results at a very high cost. We have followed this limited approach for too long. This has been further demonstrated by the recent focus on response to complex emergencies, which, although compelling, should not divert from pursuing a comprehensive approach. Prevention contributes to lasting improvement in safety and is essential to integrated disaster management.
4. The world is increasingly interdependent. All countries shall act in a new spirit of partnership to build a safer world based on common interests and shared responsibility to save human lives, since natural disasters do not respect borders. Regional and international cooperation will significantly enhance our ability to achieve real progress in mitigating disasters through the transfer of technology and the sharing of information and joint disaster prevention and mitigation activities. Bilateral and multilateral assistance and financial resources should be mobilized to support these efforts.
5. The information, knowledge, and some of the technology necessary to reduce the effects of natural disasters can be available in many cases at low cost and should be applied. Appropriate technology and data, with the corresponding training, should be made available to all freely and in a timely manner, particularly to developing countries.
6. Community involvement and their active participation should be encouraged to gain greater insight into the individual and collective perception of development and risk, and to have a clear understanding of the cultural and organizational characteristics of each society as well as of its behaviour and interactions with the physical and natural environment. This knowledge is of the utmost importance to determine those things which favour and hinder prevention and mitigation or encourage or limit the preservation of the environment for the development of future generations, and in order to find effective and efficient means to reduce the impact of disasters.
7. The adopted Yokohama Strategy and related Plan of Action for the rest of the Decade and beyond:
   a. Will note that each country has the sovereign responsibility to protect its citizens from natural disasters;
   b. Will give priority attention to the developing countries, in particular the least developed, land-locked countries and the small island developing States;

   c. Will develop and strengthen national capacities and capabilities and, where appropriate, national legislation for natural and other disaster prevention, mitigation, and preparedness, including the mobilization of non-governmental organizations and participation of local communities;
   d. Will promote and strengthen subregional, regional, and international cooperation in activities to prevent, reduce, and mitigate natural and other disasters, with particular emphasis on:
      - Human and institutional capacity-building and strengthening;
      - Technology sharing, the collection, the dissemination, and the utilization of information;
      - Mobilization of resources.
8. The international community and the United Nations system in particular must provide adequate support to [natural disaster reduction].
9. The Yokohama Conference is at a crossroad in human progress. In one direction lie the meagre results of an extraordinary opportunity given to the United Nations and its Member States. In the other direction, the United Nations and the world community can change the course of events by reducing the suffering from natural disasters. Action is urgently needed.
10. Nations should view the Yokohama Strategy for a Safer World as a call to action, individually and in concert with other nations, to implement policies and goals reaffirmed in Yokohama, and to use the International Decade for Natural Disaster Reduction as a catalyst for change. (ISDR 1994)

The participating member states accepted the following principles to be applied to disaster management within their own countries. The tenth and final principle formalized the requirement that each nation's government accept responsibility for protecting its people from the consequences of disasters:

1. Risk assessment is a required step for the adoption of adequate and successful disaster reduction policies and measures.
2. Disaster prevention and preparedness are of primary importance in reducing the need for disaster relief.
3. Disaster prevention and preparedness should be considered integral aspects of development policy and planning at national, regional, bilateral, multilateral, and international levels.
4. Development and strengthening of capacities to prevent, reduce, and mitigate disasters [are] top priority area[s] to be addressed during the Decade so as to provide a strong basis for follow-up activities [after that period].
5. Early warnings of impending disasters and their effective dissemination using telecommunications, including broadcast services, are key factors to successful disaster prevention and preparedness.
6. Preventive measures are most effective when they involve participation at all levels, from the local community through the national government to the regional and international levels.
7. Vulnerability can be reduced by the application of proper design and patterns of development focused on target groups by appropriate education and training of the whole community.
8. The international community accepts the need to share the necessary technology to prevent, reduce, and mitigate disaster; this should be made freely available and in a timely manner as an integral part of technical cooperation.

9. Environmental protection as a component of sustainable development consistent with poverty alleviation is imperative in the prevention and mitigation of natural disasters.
10. Each country bears the primary responsibility for protecting its people, infrastructure, and other national assets from the impact of natural disasters. The international community should demonstrate strong political determination required to mobilize adequate and make efficient use of existing resources, including financial, scientific, and technological means, in the field of natural disaster reduction, bearing in mind the needs of the developing countries, particularly the least developed countries. (ISDR 1994)

THE UN INTERNATIONAL STRATEGY FOR DISASTER REDUCTION

The international community, through the efforts of the UN, named the 1990s the International Decade for Natural Disaster Reduction to increase awareness of the importance of risk reduction. Following the positive advances by the UN and member governments during this time, the UN General Assembly voted in December of 1999 to further their successes by creating the International Strategy for Disaster Reduction (ISDR).

ISDR was created to help create nations, organizations, and communities that are "disaster resilient" by espousing the idea that disaster reduction must be fully interlinked with development. The ISDR sought to reduce disasters' human, social, economic, and environmental toll, which was plaguing rich and poor countries alike (and continues to). To achieve these goals, the ISDR promoted four objectives as tools toward reaching "disaster reduction for all":

- *Increase public awareness about risk, vulnerability, and disaster reduction.* The more people, regional organizations, governments, NGOs, UN entities, representatives of civil society, and others know about risk, vulnerability, and how to manage the impacts of natural hazards, the more disaster reduction measures will be implemented in all sectors of society.
- *Obtain commitment from public authorities to implement disaster reduction policies and actions.* The more decision makers at all levels commit themselves to disaster reduction policies and actions, the sooner communities vulnerable to natural disasters will benefit from applied disaster reduction policies and actions. This requires, in part, a grassroots approach where communities at risk are fully informed and participate in risk management initiatives.
- *Stimulate interdisciplinary and intersectoral partnerships, including the expansion of risk-reduction networks.* The more disaster reduction entities share information on their research and practices, the more the global body of knowledge and experience will progress. By sharing a common purpose and through collaborative efforts, the world's nations will be more resilient to natural hazards impacts.
- *Improve scientific knowledge about disaster reduction.* The more we know about the causes and consequences of natural hazards and related technological and environmental disasters on societies, the better prepared we are to reduce risks. Bringing the scientific community and policymakers together allows them to contribute to and complement each others' work. (UNISDR 2001)

The ISDR worked with many different UN agencies and outside organizations, as administered by the IATF/DR and the Inter-Agency Secretariat of the ISDR. These two bodies were formed by the UN General Assembly through UN Resolutions 54/219 and 56/195 to implement ISDR.

THE HYOGO FRAMEWORK FOR ACTION (HFA)

In 2005, at The World Conference on Disaster Risk Reduction in Kobe, Japan, the 168 countries in attendance adopted the Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters. This action was endorsed by the General Assembly in UN Resolution 60/195. The HFA outlined a 10-year plan that reflected the intention of the global community to take a more comprehensive, holistic approach to disaster risk reduction. The HFA called for nations to pursue three strategic goals during the decade of action in order to bring about a substantial and measurable reduction of disaster losses (fatalities and social, economic, and environmental losses). These goals were intended to be aligned with the Millennium Development Goals (MDGs), signifying a recognition that disaster risk reduction was closely connected with overall national development. The goals included:

- The integration of disaster risk reduction into sustainable development policies and planning;
- Development and strengthening of institutions, mechanisms, and capacities to build resilience to hazards; and
- The systematic incorporation of risk reduction approaches into the implementation of emergency preparedness, response, and recovery programs.

The Hyogo Framework also defined five priorities for action and identified the collective and individual roles and responsibilities of key stakeholders in its implementation and follow-up. These priorities include:

1. Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation;
2. Identify, assess, and monitor disaster risks—and enhance early warning;
3. Use knowledge, innovation, and education to build a culture of safety and resilience at all levels;
4. Reduce the underlying risk factors; and
5. Strengthen disaster preparedness for effective response at all levels.

Following the WCDR, the United Nations Under-Secretary-General for Humanitarian Affairs (USG) launched a consultative process to consider practical ways of strengthening the ISDR system, building on existing mandates, institutions, partnerships, and mechanisms, with the key purpose of implementing the Hyogo Framework for Action. The rationale for strengthening the ISDR and describing it as a system of partnerships was based on the need for making substantial progress in implementing a worldwide disaster risk reduction agenda, which calls for concerted efforts by all stakeholders. The UN Office for Disaster Risk Reduction (UNISDR; see chapter 10) developed a standard set of comprehensive indicators against which regions, nations, and local governments could plan for and measure their actions. In two-year increments, nations self-assessed their progress against the defined measures of success, and reported this progress to the world community. The tool was called the HFA Monitor, and the reports that were submitted were (and remain) available on the UNISDR (http://bit.ly/1mK0Rwe).

THE POST-2015 FRAMEWORK

In March of 2015 the global community again meets in Japan—this time in the tsunami-impacted city of Sendai—to look for a way forward in managing global disaster risk. The Third World Conference on Disaster Risk Reduction will see the culmination of years of preparation for the follow-up to the Hyogo

Framework for Action in the development of a new global framework. While at the time of publication this framework had yet to be given a formal title, it is referred to as the *post-2015 framework for disaster risk reduction*, or more simply as *post-HFA*.

The post-2015 framework was called upon by UN General Assembly Resolution 66/199. When nations meet in Sendai, their actions will represent the culmination of hundreds of meetings held in all regions of the world and scores of reports drafted to define the outstanding needs. The intention is to continue progress that has been achieved thus far in international cooperation toward achieving disaster risk reduction. It will build on the knowledge and practice accumulated through the implementation of each of the previous efforts, including the IDNDR, the Yokohama Strategy and Plan of Action, the International Strategy for Disaster Reduction, and the HFA.

In June of 2014, the UN General Assembly released a document entitled "Suggested Elements for the Post-2015 Framework for Disaster Risk Reduction" that addressed the structure and content of the framework to be developed and released in March of 2015. Understandably, the proposed purpose of the future framework was described as being "to manage disaster and climate risk in development at local, national, regional, and global levels for the resilience of people, communities, and countries" (United Nations General Assembly 2014). This document proposes several recommendations for the new framework inclusive of guiding principles, implementation measures, areas of focus (including public awareness and education, international cooperation, monitoring, reporting, and reviewing), as well as how to perform the transition between the existing and the new framework. But perhaps most telling are the global targets and indicators for the new framework, which include:

- Reducing disaster mortality by half by 2025 (or by a given percentage in a given period of time);
- Reducing disaster economic loss by a given percentage by 2025; and
- Reducing disaster damage to housing, educational, and health facilities by a given percentage by 2025.

MODERN DISASTER MANAGEMENT – A FOUR-PHASE APPROACH

Comprehensive disaster management is based upon four distinct components: mitigation, preparedness, response, and recovery. Although a range of terminology is often used in describing them, effective disaster management utilizes each component in the following manner:

1. *Mitigation.* Also called Disaster Risk Reduction (DRR), mitigation involves reducing or eliminating the likelihood or the consequences of a hazard, or both. Mitigation seeks to "treat" the hazard such that it impacts society to a lesser degree. See chapter 4 for more information.
2. *Preparedness.* This involves equipping people who may be impacted by a disaster or who may be able to help those impacted with the tools to increase their chances of survival and to minimize their financial and other losses. See chapter 5 for more information.
3. *Response.* This involves taking action to reduce or eliminate the impact of disasters that have occurred or are currently occurring, in order to prevent further suffering, financial loss, or a combination of both. Relief, a term commonly used in international disaster management, is one component of response. See chapter 6 for more information.
4. *Recovery.* This involves returning victims' lives back to a normal state following the impact of disaster consequences. The recovery phase generally begins after the immediate response has ended, and can persist for months or years thereafter. See chapter 7 for more information.

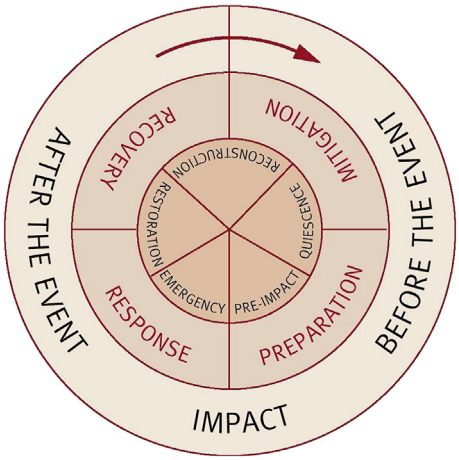

FIGURE 1.2

The disaster management cycle.

Source: Alexander, 2002.

Various diagrams illustrate the cyclical nature by which these and other related factors are performed over time, although disagreement exists concerning how such a "disaster management cycle" is visualized. These diagrams, such as the one in figure 1.2, are generalizations, and it must always be understood that many exceptions can be identified in each. In practice, all of these factors are intermixed and are performed to some degree before, during, and after disasters. Disasters tend to exist in a continuum, with the recovery from one often leading straight into another. And while response is often pictured as beginning immediately after disaster impact, it is not uncommon for the actual response to begin well before the disaster actually happens.

WHAT IS INTERNATIONAL DISASTER MANAGEMENT?

Two separate but interrelated concepts are represented by the term "international disaster management": (1) the study of the diverse emergency and disaster management systems and structures that exist throughout the world; and (2) the study of disaster management in scenarios where the capacity of a single nation's response mechanisms are overwhelmed.

Every country, every government, and every society is unique regarding

- its vulnerabilities and the root causes of such;
- the perception of risk and the methods used to identify and analyze it;
- the institutions, systems, and structures created to manage risk;
- the statutory authorities that guide the management of risk and the management of events that do actually occur; and
- the mechanisms developed to respond to disaster events and the response capacity of those mechanisms.

EXHIBIT 1.2 INTERNATIONAL DISASTER MANAGEMENT PARTICIPANTS

- Victims
- Local first responders
- Governments of the affected countries
- Governments of other countries
- International organizations
- International financial institutions
- Regional organizations and associations
- Nonprofit organizations
- Private organizations—business and industry
- Local and regional donors

Several times each year, the response requirements of disaster events exceed the disaster management abilities of a single nation or several nations. In these instances, the governments of the affected countries call upon the resources of the international response community. This cooperative international response is, by definition, international disaster management.

Over time and through iteration, a recognized and systemic process for responding to international disasters has begun to emerge. Standards for response have been developed by multiple sources, and a recognized group of typical participants has been identified. (See exhibit 1.2.) Through practice and study, formulaic, methodical processes for assessing both the affected nations' damage and their various response needs have been identified, tried, and improved on. What was only 30 years ago a chaotic, *ad hoc* reaction to international disasters has grown with astounding speed into a highly effective machine.

It is important to add that disasters do not become international just because they have overwhelmed a country's capacity to respond. There must be a commitment on the participants' part to recognize the need for international involvement and to accept the appeal made by the host nation's government. The sad truth is that, in practice, not all disasters elicit the same level of international interest and response, whether because of donor fatigue (see chapter 11), media interest, diverted priorities, or other events that may dilute public interest. The Mozambique floods of 2000 are but one example of a situation in which the international community was accused of sitting idly by as hundreds of people died. (See exhibit 1.3.)

Response and recovery alone, however, are not effective means of managing disasters if they are performed in the absence of a comprehensive regimen of preparedness and mitigation activities. (See table 1.2.) An important focal shift among the world's international disaster management organizations, agencies, and interest groups from disaster response to disaster prevention is evidence of widespread recognition and acceptance of this. Although many national governments, especially in the developing world, have yet to make a dedicated effort toward initiating or improving their pre-disaster management activities, many international development and disaster management agencies are working to address this issue. The UN, whose members consist of almost every country in the world, has made a sustained effort to lead its member nations in addressing their shortfalls: first by dedicating the 1990s to the IDNDR (producing the Yokohama Strategy and the Plan of Action for a Safer World), and then by following up with the International Strategy for Disaster Reduction (ISDR) and the Hyogo Framework for Action to ensure that forward momentum is maintained.

EXHIBIT 1.3 2000 MOZAMBIQUE FLOODS TIMELINE

February 9	Heavy rain begins falling across most of southern Africa, with Mozambique hit the hardest. The capital, Maputo, is submerged. Throughout the country, hundreds of thousands of families are left homeless and stranded. Damage to crops and infrastructure is severe.
February 11	At least 70 people have died due to the flooding. The UN reports that 150,000 people are in immediate danger from starvation and disease. Dysentery outbreaks are reported outside the capital.
February 22	Tropical cyclone Eline makes a direct hit on the country, worsening the condition in many areas already submerged by the floods. The South African Air Force begins making airlifts to over 23,000 desperate victims.
February 24	The UN makes an appeal for $13 million in immediate relief and $65 million for recovery assistance. The appeal goes unanswered. Rainfall draining from other parts of southern Africa begins to flow into Mozambique, worsening already poor conditions.
February 27	More rainfall causes flash floods throughout the country, destroying much of the remaining farmland.
March 2	Floodwaters have risen by up to 26 feet (8 m) in many parts of the country. International aid workers report that 100,000 people are in need of immediate evacuation, and over 7,000 are trapped in trees and need to be rescued (many have been trapped in the trees for several days without food or clean water). Finally, more than three weeks after the crisis began, international disaster management agencies begin to send responders and relief assistance.

Source: *BBC News, 2000.*

Table 1.2 Response and Recovery-Based Management versus Prevention and Risk Reduction-Based Management

Response and Recovery-Based Efforts	Prevention and Risk Reduction-Based Efforts
Primary focus on disaster events	Focus on vulnerability and risk issues
Single, event-based scenarios	Dynamic, multiple-risk issues and development scenarios
Basic responsibility to respond to an event	Fundamental need to assess, monitor, and update exposure to changing conditions
Often fixed, location-specific conditions	Extended, changing, shared or regional, local variations
Responsibility in single authority or agency	Involves multiple authorities, interests, actors
Command and control, directed operations	Situation-specific functions, free and open association and participation
Established hierarchical relationships	Shifting, fluid, and tangential relationships
Often focused on hardware and equipment	Dependent on related practices, abilities, and knowledge base
Dependent on specialized expertise	Focused on aligning specialized expertise with public views and priorities
Urgent, immediate, and short timeframes in outlook, planning, attention, and returns	Moderate and long timeframes in outlook, planning, values, and returns
Rapidly changing, dynamic information usage, which is often conflicting or sensitive in nature	Accumulated, historical, layered, updated, or comparative use of information
Primary, authorized, or singular information sources; need for definitive facts	Open or public information; multiple, diverse, or changing sources; differing perspectives and points of view
In-out or vertical flows of information	Dispersed, lateral flows of information
Relates to matters of public security, safety	Matters of public interest, investment, and safety

Source: Adapted from Jeggle, 2001.

Today, the United Nations Office for Disaster Reduction (UNISDR) guides the efforts of the international community's overall disaster management mission. (See chapter 10.) Specifically, the UNISDR seeks to build "disaster resilient communities by promoting increased awareness of the importance of disaster reduction as an integral component of sustainable development, with the goal of reducing human, social, economic, and environmental losses due to natural hazards and related technological and environmental disasters" (UNISDR n.d.).

In January 2005, in Hyogo, Japan, the UN held the first World Conference on Disaster Reduction. More than 4,000 participants attended, including representatives from 168 governments, 78 UN specialized agencies and observer organizations, 161 non-governmental organizations, and 562 journalists from 154 media outlets. The public forum attracted more than 40,000 visitors. The outcome of the conference was the twenty-four-page Hyogo Framework for Action, adopted by all member countries, that outlined members' resolve to pursue "the substantial reduction of disaster losses, in lives and in the social, economic and environmental assets of communities and countries."

With the adoption of this framework, which coincided with some of the most devastating hazards and disasters in recent memory, international disaster management climbed to the forefront of the international policy agenda. UNISDR, through the Global Platform for Disaster Risk Reduction, has increased and maintained international activity to address our growing hazard risk. (See exhibit 1.4.) For years, the nations of the world have watched as country after country, both rich and poor, have

EXHIBIT 1.4 GLOBAL PLATFORM FOR DISASTER RISK REDUCTION

The Global Platform for Disaster Risk Reduction (GP) was established by mandate of the UN General Assembly. The GP is an international meeting that occurs every two years and is attended by the international disaster risk reduction community, which includes governments, international organizations (including the UN and other regional organizations and institutions), NGOs, scientific and academic institutions, and the private sector. By mandate, the GP

- assesses progress made in the implementation of the Hyogo Framework for Action.
- enhances awareness of disaster risk reduction.
- enables the sharing of experiences and lessons from good practice.
- identifies remaining gaps and recommends targeted action to accelerate national and local implementation.

The first and second sessions of the GP, which occurred in 2007 and 2009, respectively, were attended by more than 152 governments and 137 organizations. These sessions helped to build momentum for national commitments to perform disaster risk reduction, culminating with the May 2011 GP meeting in Geneva, Switzerland. The benchmarks set out in the first two meetings focused on five main areas, including the goals to:

1. harmonize disaster risk reduction and climate change adaptation in the broader context of poverty reduction and sustainable development;
2. reduce community- and local-level risk through partnerships that better recognize the mutual dependence of governments and non-governmental organizations (NGOs), and to promote the role of women as drivers of action (with special consideration to youth and children's roles);
3. move toward full implementation of the Hyogo Framework for Action through several action targets (e.g., assessments of and mitigation for educational and health facilities);
4. increase the disaster risk reduction component of national budgets and international development funding (including humanitarian relief and recovery expenditures), and to improve measurements of the effectiveness of investment in risk reduction; and
5. continue the efforts of the ISDR in supporting governments and NGOs in their disaster risk reduction efforts.

Based on: PreventionWeb, 2011.

suffered the consequences of terrible disasters. However, it has not been until recently that world leaders have begun to fully grasp that many of these consequences could have been reduced through better mitigation and preparedness efforts and more effective response capabilities. As a result, the field of international disaster management is now in a position to influence these leaders in a way not previously possible.

DISASTERS, POVERTY, AND DEVELOPMENT

Research and practice support the theory that there exists a strong correlation between disasters and poverty. It is well documented that those developing countries repeatedly subject to disasters experience stagnant or even negative rates of development over time. (See figure 1.3.) Hurricane Mitch, which destroyed as much as 70 percent of the infrastructure in Honduras and Nicaragua (UNISDR 2004), is a prime example, having been blamed with reversing the rates of development in these and other Central American countries by at least a decade (and as much as 20 and 30 years in some areas; Oxfam 1998). The same effect has also been witnessed in many of the areas affected by the 2004 tsunami and earthquake events in Southeast Asia and the 2010 earthquake in Haiti. (See exhibit 1.5.) For countries with developing economies, the financial setbacks these events inflict can be ruinous, in contrast to their industrialized counterparts, where a robust economy absorbs such impacts. In 2001, for example, earthquakes occurred in both El Salvador and the United States (Seattle), each causing approximately $2 billion in damages. While this amount had little or no noticeable impact on the US economy, the financial consequences in El Salvador amounted to 15 percent of that country's GDP (UNDP 2004a).

The aftermath of a disaster exacerbates the debilitating causes of poverty in developing countries. Each disaster is unique in its consequences, so there is no single formula that can be used to characterize precisely how these problems will play out. The following list, however, provides a general

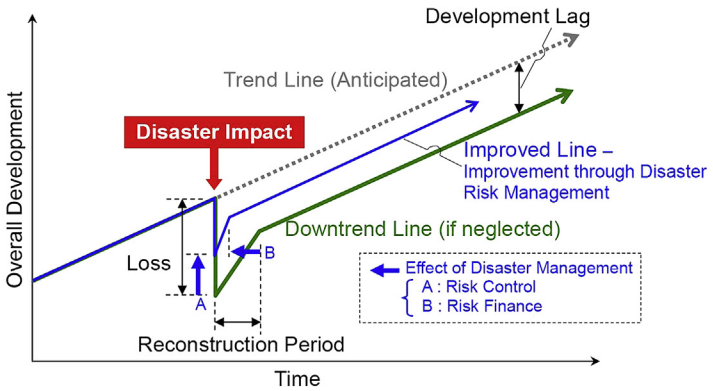

FIGURE 1.3

Impact of disasters on development.

Adapted from ADRC, 2005.

EXHIBIT 1.5 TSUNAMI SETS BACK DEVELOPMENT 20 YEARS IN MALDIVES

Within minutes of the December 2004 tsunami in the Indian Ocean, much of the economic and social progress in the Maldives was washed away.

According to government officials, the tsunami caused a 20-year setback in the development of this small country, an island nation off the coast of India, which only six days before the disaster had been removed from the UN's list of least-developed countries. In particular, the tsunami and its resulting floodwaters dealt a serious blow to the tourism sector, the country's main source of income. Nearly one-fourth of the 87 resorts in the Maldives were severely damaged and declared unable to operate. Tourism directly accounts for one-third of the country's economy, with the resorts alone providing between 25,000 and 30,000 jobs. When tourism-related tax and customs revenues are included, tourism contributes up to 70 percent of the economy, with the sector expanding each year. These earnings had helped to improve living standards in the Maldives, including increased school enrollment, lower unemployment, and more students seeking higher education abroad.

Based on: UNDP, 2005.

overview of the many ways in which disasters harm poor countries beyond the initial death, injury, and destruction:

- National and international development efforts are stunted, erased, or even reversed.
- Sizable portions of GDP often must be diverted from development projects, social programs, or debt repayment to manage the disaster consequences and begin recovery efforts. (See figure 1.4.)
- Vital infrastructure is damaged or destroyed—including roads, bridges, airports, sea ports, communications systems, power generation and distribution facilities, and water and sewage plants—requiring years to rebuild.
- Schools are damaged or destroyed, leaving students without an adequate source of education for months or even years.
- Hospitals and clinics are damaged or destroyed, resulting in an increase in vulnerability to disease of the affected population.
- Formal and informal businesses are destroyed, resulting in surges in unemployment and decreased economic stability and strength.
- Reconstruction efforts result in shortages of materials and labor, which in turn drive up construction costs, inflate salaries, and draw workers away from other sectors where they are needed.
- Residents are forced or impelled to leave the affected zone, often never to return, extracting institutional knowledge, cultural and social identity, and economic viability from areas that cannot afford to spare such resources.
- Desperation and poverty lead to a rapid upsurge in crime and insecurity.
- A general feeling of hopelessness afflicts the affected population, leading to increased rates of depression and a lack of motivation to regain independence from outside assistance.

DISASTER TRENDS

Increased accuracy in the reporting of disaster statistics has helped to provide both greater visualization and confirmation of something many scientists and disaster managers have been warning of for decades: the nature of disasters is rapidly changing. These changes are generally regarded as a result of human

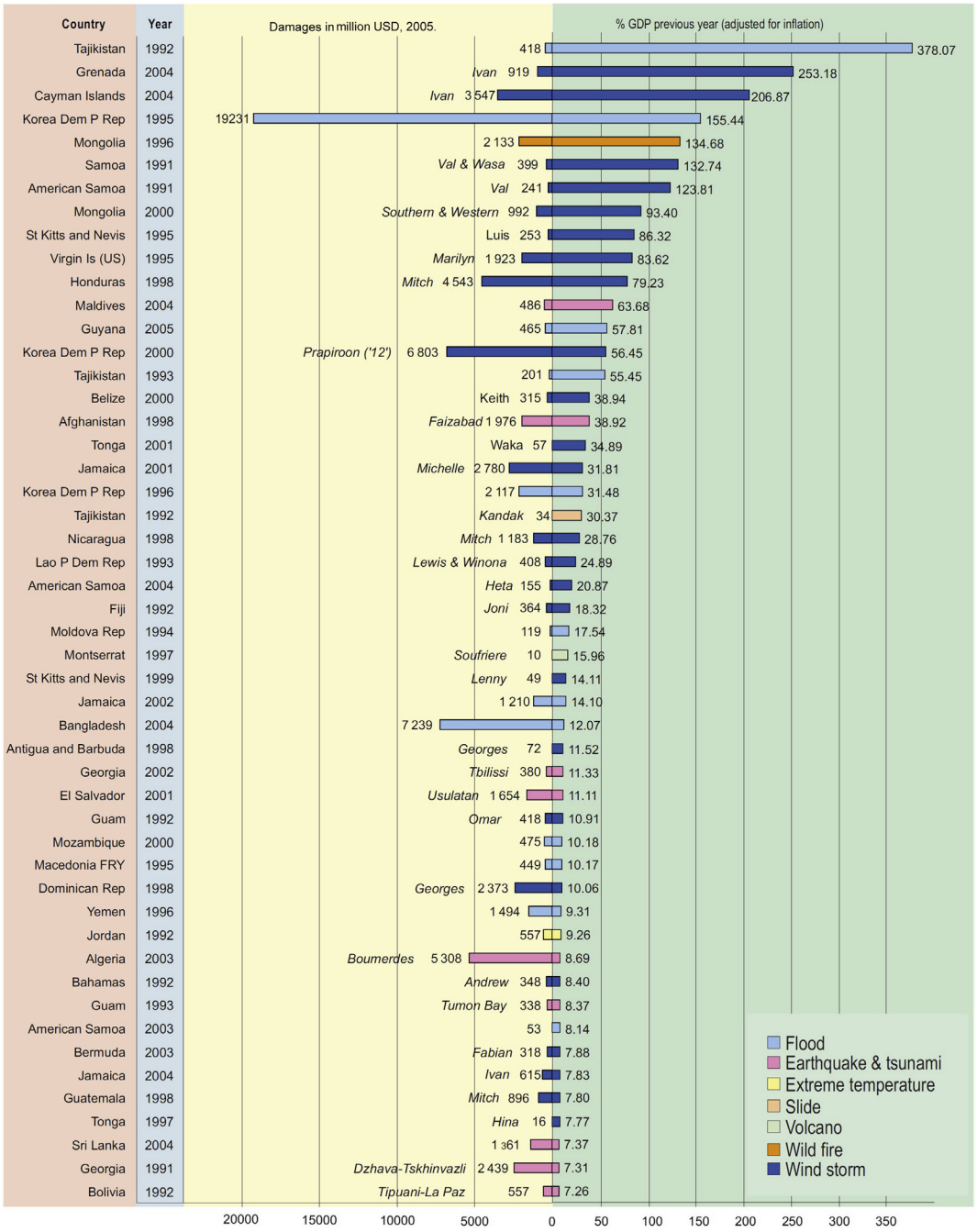

FIGURE 1.4

Selected natural disasters: total damage and share of the GDP between 1991 and 2005.

Source: EM-DAT – International Disaster Database.

actions and development patterns. What is troubling is that these trends indicate that more disasters are occurring each year, with greater intensity, and that a great many more people are affected by them, either indirectly or directly. And while these disasters are becoming less deadly worldwide, they are causing a much greater financial impact on both affected and unaffected nations. Finally, and what may be the most disturbing of these trends, is that the poor countries of the world and their citizens are assuming a much greater proportion of the impacts of disasters. In sum, recent trends indicate that

- the number of people affected by disasters is rising.
- overall, disasters are becoming less deadly.
- overall, disasters are becoming more costly.
- poor countries are disproportionately affected by disaster consequences.
- the number of disasters is increasing each year.

TREND 1: THE OVERALL NUMBER OF PEOPLE AFFECTED BY DISASTERS IS RISING

Human settlement has always been directed by the needs of individuals and societies, such as the need for food, water, defense, and access to commerce. Almost without exception, increased natural hazard risk has been assumed in favor of these needs, often as result of a confidence that hazard risk can be accepted as "part of life" or can be effectively managed. Evidence of such behavior is apparent in almost any example of previous human settlement: communities along rivers build levees; those located along the sea coasts construct sea walls and jetties; farmers place their houses and sow their crops upon the fertile slopes of active volcanoes.

However, as the population and size of these settlements grow, the assumed risk becomes more and more concentrated. The overall rates by which people have relocated from rural areas into cities (urbanization) have continued to increase over time. Rising populations in almost all countries of the world amplify the urbanization effect. In 1950, less than 30 percent of the world's 2.5 billion people lived in an urban setting. By 1998, the number of people on earth had grown to 5.7 billion, and 45 percent of them lived in cities. UN estimates state that by 2025 there will be 8.2 billion people on earth, and more than 60 percent of them will live in cities (UNFPA 2013; WHO 2014).

When humans settle in high-risk urban areas, the hazard risks they face as individuals increase. As of the year 2000, it was estimated that at least 75 percent of the world's population lived in areas at risk from a major disaster (UNDP 2004a). And because these high-risk areas periodically experience major disasters, it logically follows that the number of people who are annually affected by disasters (defined as having their homes, crops, animals, livelihoods, or health impacted) is equally high (UNISDR 2004).

Figures 1.5 and 1.6 display the observed total number of people annually affected by disasters during the twentieth and early twenty-first centuries. Note that, beginning in 1954, there is a significant rise in the number of people affected. It was during the decade of the 1950s that the mass transition toward urbanization began in the industrialized nations, a trend that most other nations of the world followed soon after.

TREND 2: OVERALL, DISASTERS ARE BECOMING LESS DEADLY

The seismic, meteorological, hydrological, and other forces that result in natural hazards are natural processes that occur irrespective of the actions or existence of humans. Water has overflowed the banks of rivers since before humans lived beside them. Archeologists and geologists have unearthed evidence