Aim & Scope of Disaster Management

Study Guide and Course Text
Aim & Scope of Disaster Management

Study Guide

Prepared by Don Schramm and Richard Hansen

To be used in conjunction with Aim & Scope of Disaster Management Course Text
Acknowledgements

The Disaster Management Center at the University of Wisconsin-Madison thanks the Office of Foreign Disaster Assistance for early support of course development. In particular, Gudren Huden, Denise Decker and Fred Cole deserve special recognition for their understanding of this innovative education process. At the University of Wisconsin, Linda Hook, Darrell Petska, Susan Kummer, Lolette Guthrie, Val Parish and Angela Armstrong must be thanked for their efforts in editing, design and production. The course development process is never over, and each of these people understands that very well.
Introduction

How to get started

This self-study course will meet the needs of people involved in disaster management for both sudden-onset natural disasters (i.e., earthquakes, floods, hurricanes) and slow-onset disasters (i.e., famine, drought). This course is designed for government personnel, representatives of private voluntary agencies, and other individuals interested in disaster management.

The procedure for self-study is:

1. Complete and score the pretest. Do not be disappointed if you have a low score. If you have a high score, you probably do not need this course.

2. Read the outline of course content to get a general idea of what is covered in the course.

3. Read the learning objectives to get a general idea of what you are expected to learn from the course.

4. Turn to Lesson 1: Introduction to Disaster Management
   - Review the study guide section for a brief description of the Lesson and any special suggestions on how to study.
   - Again read the learning objectives.
   - Carry out the learning activities listed.
   - Complete the self-assessment test at the end of the Lesson and score it using the answer key provided. If you have not answered most of the questions correctly, restudy the Lesson.

5. If you score well on the self-assessment test, proceed to Lesson 2.

6. Continue to study each Lesson and complete the self-assessment test until you have finished the course of study.

7. When you have completed all the self-assessment tests to your satisfaction, you can request a final examination package. This will include the final examination and any other supplementary material.
Pretest
Multiple Choice
Circle the correct answer(s):

1. As a disaster manager, you establish program objectives that will:
   a. prevent natural disasters
   b. reduce suffering from natural disasters
   c. avoid economic losses from natural disasters
   d. accelerate recovery
   e. all of the above

2. Disaster assistance is concerned with two types of aid:______ and ______.
   a. short-term assistance
   b. long-term assistance
   c. relief
   d. food aid
   e. medical aid

3. Planning strategies for hazard mitigation
   a. can adjust normal development programs to reduce loss
   b. should concentrate on single crops for ease of management
   c. might develop "disaster resistant" economic activities in hazard-prone areas
   d. a, b, and c
   e. a and b only

4. The disaster manager’s responsibility is:
   a. only in post-disaster activities
   b. only in pre-disaster activities
   c. only during the disaster event
   d. a and c but not b
   e. a, b, and c

5. During the post-emergency phase, which United Nations agencies take lead roles?
   a. UNDP
   b. FAO
   c. UNDRO
   d. HABITAT
   e. They all take lead roles

6. Certain specialists are associated with certain types of disasters and phases during those disasters. Match the following disaster phases with the appropriate specialist.

<table>
<thead>
<tr>
<th>Phases</th>
<th>Specialists</th>
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<td>b. climatologist</td>
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<td>3. cyclone emergency</td>
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<tr>
<td>4. flood reconstruction</td>
<td>d. seismologist</td>
</tr>
<tr>
<td>5. insect infestation</td>
<td>e. planner</td>
</tr>
<tr>
<td>6. drought prevention</td>
<td>f. architect</td>
</tr>
</tbody>
</table>

7. ________ are noncombatants who seek safety by entering another country during armed conflicts.
   a. displaced persons
   b. disaster victims
   c. unaccompanied minors
   d. refugees
8. Which of the following is not an element of disaster management:
   a. risk management
   b. impact reduction
   c. control of events
   d. resource management
   e. equity of assistance
   f. none of the above

9. A good example of how an activity in one phase can lay the framework for another phase is:
   a. supplying building materials
   b. supplying seeds
   c. supplying medical supplies
   d. supplying tents
   e. none of the above

10. Which of the following would be classified as a natural disaster:
    a. airplane crash
    b. famine
    c. hunger
    d. all of the above

11. Environmental degradation is a form of natural disaster caused by:
    a. farming practices
    b. water resource practices
    c. settlement practices
    d. all of the above

12. In the chronology of disasters the preparatory phase includes:
    a. preparedness
    b. mitigation
    c. warning
    d. all of the above

13. Maps that form an important part of a disaster manager's resources include:
    a. topographic maps
    b. demographic maps
    c. land-use maps
    d. vegetation maps
    e. all of the above

14. Which of the following are more likely to be a medium for public awareness programs (select more than one):
    a. radio
    b. movies
    c. posters
    d. university curricula
    e. newspapers
    f. comic books

True/False
Indicate T or F:

_____ 15. Wherever zoning codes in hazardous areas are unenforceable, building codes will be similarly unenforceable.

_____ 16. Epidemiologic surveillance requires only the identification of probable diseases and implementation of a preventive medicine program.

_____ 17. An emergency action manual is often a compendium of SOPs.

_____ 18. The most important preparedness tool is a disaster plan.

_____ 19. Vulnerability is the relative degree of probability that a hazardous event will occur.

_____ 20. Even national reconstruction agencies should include the position of disaster manager.
21. Fires in urban settlements, especially in the Third World, should not be considered in planning for man-made disasters.

22. The length each period, or disaster phase is a constant for all disasters.

23. Mitigation and preparedness activities for earthquakes are generally assigned to the agriculture ministry.

24. In a cataclysmic disaster the damaged area is usually very large.

25. Nongovernmental agencies are more concerned with disaster mitigation and preparedness than are major foreign governments.

26. Disaster management is highly dependent on accurate information collection and interpretation.

27. Because most disaster victims are mentally and physically worn, any attempt to use their energy and manpower as a resource is always a last resort.

28. If well-planned disaster management takes a development-oriented approach, a disaster can provide opportunities for accelerating the pace of development and for making constructive changes.

29. Loss management is accomplished either by lessening the impacts of the natural hazard or by taking actions in normal development projects that will reduce the risks to an acceptable level.

30. In an immediate post-disaster environment, the most critical component of resource management is material from international relief agencies.

31. Pre-disaster planning for refugee operations is usually more extensive than similar planning for natural disasters.
Outline of Content

Lesson 1: Introduction to Disaster Management
• Scope and Objectives of Disaster Management
• Disaster Managers
• Elements of Disaster Management

Lesson 2: Concepts and Terms in Disaster Management
• Natural Disasters
• Man-made Disasters
• Disaster Victim
• Disaster Relief Systems
• Phases of Disaster Response
• Phases of Relief Operations

Lesson 3: Natural Disaster Assistance and Refugee Operations
• Government’s Role
• Foreign Assistant Patterns
• Refugee Operations
• Assistance Models

Lesson 4: The Tools and Methods of Disaster Management
• Prevention and Mitigation Tools
• Preparedness Tools
• Tools of Post-Disaster Management

Lesson 5: Technologies of Disaster Management
• Mapping
• Aerial Photography and Remote Sensing
• Communications
• Information Management
• Logistics
• Epidemiology
Course Objectives

Lesson 1
• Develop an understanding of why and how the modern disaster manager is involved with pre-disaster and post-disaster activities.
• Understand the four work objectives of the disaster manager.
• Know the key personnel or specialists related to disaster management and associate them with the types of disasters and phases in which they are useful.
• Understand the six elements of disaster management.

Lesson 2
• Develop an awareness of the chronological phases of natural disaster response and refugee relief operations. Understand how the phases of each are parallel and how they differ.
• Understand the key concepts of a) disaster management related to development, and b) the relationship of different disaster management activities to the appropriate disaster phase.
• Understand the relationship of disaster phases to each other and the linkage of activities from one phase to the next.
• Identify the major disaster types.
• Understand the "relief system" and the "disaster victim."

Lesson 3
• Identify the organizations that are involved in natural disaster assistance.
• Differentiate between disaster assistance for refugee operations and for natural disasters.
• Understand traditional patterns of foreign assistance.
• Be able to relate victims to assistance models.

Lesson 4
• Describe the four sets of tools available to disaster managers.
• Describe the three planning strategies useful in mitigation.
• Identify the regulatory controls used in hazard management.
• Describe public awareness and economic incentive possibilities.
• Understand the tools of post-disaster management.

Lesson 5
• Describe the eight principal disaster management technologies with which a disaster manager should be familiar.
• Identify other supplemental skills that could be useful.
Lesson 1

Introduction To Disaster Management

Study Guide Overview

This lesson defines the term disaster manager, explains the objectives of disaster management, and discusses the elements and specialists involved in disaster management.

Learning Objectives

• Develop an understanding of why and how the modern disaster manager is involved with pre-disaster and post-disaster activities.
• Understand the four work objectives of the disaster manager.
• Know the key personnel or specialists related to disaster management and associate them with the types of disasters and phases in which they are useful.
• Understand the six elements of disaster management.

Learning Activities

• Read this lesson,
• Study Figures 1-1, 1-2, and 1-3 plus Tables 1-A and 1-B.

Evaluation

Complete the self-assessment test, compare your answers to the answer key found in a separate document in this directory.
Lesson 1 Self-Assessment Test

Multiple Choice
Circle the correct answer(s):

1. Pre-disaster activities undertaken to reduce the society's vulnerability are considered _____ activities.
   a. impact reduction
   b. control of events
   c. loss management
   d. resource management
   e. risk management

2. As a disaster manager, you establish program objectives that will:
   a. prevent natural disasters
   b. reduce suffering from natural disasters
   c. avoid economic losses from natural disasters
   d. accelerate recovery
   e. all of the above

3. Certain specialists are associated with certain types of disasters and phases during those disasters. Match the following disaster phase with the appropriate specialist.

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<td></td>
</tr>
<tr>
<td>___6. drought</td>
<td>f. architect</td>
</tr>
<tr>
<td>prevention</td>
<td></td>
</tr>
</tbody>
</table>

4. Which of the following is not an element of disaster management:
   a. risk management
   b. impact reduction
   c. control of events
   d. resource management
   e. equity of assistance
   f. none of the above

True/False
Indicate T or F:

_____ 5. When a variety of relief agencies are trying to provide assistance, they should assist the victims of their choice.

_____ 6. Disaster management is more concerned with post-disaster response than with pre-disaster activities.

_____ 7. Mitigation is the most important function in bringing disasters under control.

Answer Key
1. c
2. e
3. d,e,a,f,b,c
4. f
5. F
6. F
7. T
Lesson 2

Concepts and Terms In Disaster Management

Study Guide Overview

This lesson presents the concepts and terms used in disaster management. Knowledge of these will aid you in planning and developing strategies for disaster management and in communicating with disaster specialists. The material explains and categorizes different kinds of disasters. It discusses in detail what we mean by "disaster victim" and explains "relief system." Of particular importance is a discussion of the phases of natural disaster response: the preparatory phase, the warning phase, the emergency phase, the rehabilitation phase, and the reconstruction phase. Of equal importance are the comparable phases of refugee relief operations, the relationship of disasters to the development process, and the timing of disaster management activities.

Learning Objectives

• Develop an awareness of the chronological phases of natural disaster response and refugee relief operations. Understand how the phases of each are parallel and how they differ.
• Understand the key concepts of a) disaster management related to development, and b) the relationship of different disaster management activities to the appropriate disaster phase.
• Understand the relationship of disaster phases to each other and the linkage of activities from one phase to the next.
• Identify the major disaster types.
• Understand the "relief system" and the "disaster victim."

Learning Activities

Read this lesson

Evaluation

Complete the self-assessment test, compare your answers to the answer key found in a separate document in this directory.
Lesson 2 Self-Assessment Test

Multiple Choice
Circle the correct answer(s):

1. Environmental degradation is a form of natural disaster caused by:
   a. farming practices
   b. water resource practices
   c. settlement practices
   d. all of the above

2. The emergency phase of a natural disaster consists of:
   a. search and rescue
   b. evacuation
   c. provision of temporary shelter
   d. emotional recovery
   e. all of the above

3. Examples of rapid-onset disasters include:
   a. tsunami
   b. earthquake
   c. epidemic
   d. famine

4. A good example of how an activity in one phase can lay the framework for another phase is:
   a. supplying building materials
   b. supplying seeds
   c. supplying medical supplies
   d. supplying tents
   e. none of the above

True/False
Indicate T or F:

_____ 5. In a cataclysmic disaster the damaged area is usually very large.

_____ 6. The length of each disaster phase is usually constant for all disasters.

_____ 7. Forward planning in refugee relief should be carried out many years before refugees move toward a border.

_____ 8. The term "relief system" refers to a specific program initiated by UNHCR in the early 1950s.

_____ 9. The term unaccompanied minor is used instead of orphan to satisfy donor agency relief supply requirements.

_____ 10. If a well-planned disaster management program takes a development-oriented approach, a disaster can provide opportunities for accelerating the pace of development for making and constructive changes.

_____ 11. Risk is the relative degree of probability that a hazardous event will occur.

Answer Key
1. d  6. F
2. a,b,c  7. F
3. a,b  8. F
4. a,b  9. F
5. F  10. T
11. T
Lesson 3

Natural Disaster Assistance and Refugee Operations

Study Guide Overview

This lesson introduces the types of organizations normally assigned to disaster management activities and explains which organizations become involved with which disaster phase(s). It provides information on the roles of government and of foreign assistance organizations that address natural disasters and refugee operations. The lesson also outlines models for disaster assistance.

Learning Objectives

• Identify the organizations that are involved in natural disaster assistance.
• Differentiate between disaster assistance for refugee operations and for natural disasters.
• Understand traditional patterns of foreign assistance.
• Be able to relate victims to assistance models.

Learning Activities

Read this lesson.
Review in detail Table 3A: Disaster Assistance Program Models.

Evaluation

Complete the self-assessment test, compare your answers to the answer key found in a separate document in this directory.
Lesson 3 Self-Assessment Test

Multiple Choice
Circle the correct answer(s):

1. Disaster mitigation can be accomplished using:
   a. public information
   b. legal measures
   c. education
   d. people-to-people contact
   e. a, b and c only

2. During the post-emergency phase, which United Nations agencies take lead roles?
   a. UNDP
   b. FAO
   c. UNDRO
   d. HABITAT
   e. They all take lead roles

True/False
Indicate T or F:

_____ 3. Mitigation and preparedness activities for earthquakes are generally assigned to the agriculture ministry.

_____ 4. Relief agencies assisting refugees during the maintenance phase should only provide for daily needs and disregard long-term redevelopment.

_____ 5. In a refugee operation the primary emphasis is usually on protection, assistance, and direct aid provided by outside organizations.

_____ 6. Most preparedness activities fall under the domain of the United Nations Disaster Relief Office (UNDRO).

Answer Key
1. a,b,c,d
2. a,b,d
3. F
4. F
5. T
6. T
Lesson 4

The Tools and Methods of Disaster Management

Study Guide Overview

This lesson explores the variety of tools, programs, and methodologies that disaster managers can use to lessen the impact of a disaster and to assist in relief and reconstruction activities. The material covers tools and methods for use in prevention/mitigation, preparedness, and post-disaster management. It explains in detail four methodologies: plans and procedures, public policies, codes and standards, and standardized program structures.

Learning Objectives

• Describe the four sets of tools available to disaster managers.
• Describe the three planning strategies useful in mitigation.
• Identify the regulatory controls used in hazard management.
• Describe public awareness and economic incentive possibilities.
• Understand the tools of post-disaster management.

Learning Activities

Study this lesson.

Evaluation

Complete the self-assessment test, compare your answers to the answer key found in a separate document in this directory.
Lesson 4 Self-Assessment Test

Multiple Choice
Circle the correct answer(s):

1. Economic vulnerability mapping should consider:
   a. energy facilities
   b. transportation networks
   c. schools and hospitals
   d. financial institutions
   e. b and d only

2. Planning strategies for hazard mitigation
   a. can adjust normal development programs to reduce loss
   b. should concentrate on single crops for ease of management
   c. might develop "disaster resistant" economic activities in hazard-prone areas
   d. a, b, and c
   e. a and b only

3. Public awareness activities are:
   a. useful for mitigation programs
   b. helpful as a preparedness tool
   c. influential in disaster decision-making at all levels
   d. only possible through posters and radio

True/False
Indicate T or F:

_____ 4. Building performance standards are an example of a regulatory approach to hazard management.

_____ 5. Building codes and economic incentives are important strategies to use in hazard management.

_____ 6. In a refugee crisis a disaster manager is usually limited to moral persuasion and related attempts to influence public opinion.

_____ 7. In communities with an overlapping complex of formal and informal social organizations, disaster response will be more difficult than in poorer, less complex communities.

Answer Key
1. a,b,d
2. a,c
3. a,b,c
4. T
5. T
6. T
7. F
Lesson 5

Technologies of Disaster Management

Study Guide Overview

This lesson focuses on the technologies associated with disaster management. It stresses the importance of mapping, aerial photo interpretation, communications, information management, logistics, epidemiology and preventive medicine. It also mentions additional specialized disaster technologies and discusses skills that will enhance a disaster manager's effectiveness.

Learning Objectives

• Describe the eight principal disaster management technologies with which a disaster manager should be familiar.
• Identify other supplemental skills that could be useful.

Learning Activities

Read this lesson.

Evaluation

Complete the self-assessment test, compare your answers to the answer key found in a separate document in this directory.
Lesson 5 Self-Assessment Test

Multiple Choice
Circle the correct answer(s):

1. Remote sensing can be defined as:
   a. electronic sensors attached to an object to measure movement
   b. measurement of movement by remote control devices
   c. the use of satellites with imaging systems to produce computer-generated images
   d. aerial photography

2. Logistics planning tasks might include:
   a. identifying bottlenecks
   b. estimating port capacity
   c. inventory management
   d. warehousing needs
   e. all of the above

The following list of skills may be useful for disaster managers. Identify which are secondary and which are tertiary skills.

a. refugee camp planning      e. critical path techniques
b. disaster assessment        f. general geology
b. meteorology                g. law enforcement
d. cost accounting

3. Secondary skills: _________________________________________________________

4. Tertiary skills: __________________________________________________________

True/False
Indicate T or F:

_____ 5. Computer-generated maps are used in evacuation planning.

Answer Key
1. c,d
2. e
3. a,b,c,g
4. d,e,f
5. T
Aim and Scope of Disaster Management

Professional Review Board

E. V. Bighinatti
Katherine Parker
Robert White
Frederick C. Cuny, Principal Author / Editor
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Chapter 5 Technologies of Disaster Management
Acknowledgements
Many individuals and organizations contributed to the realization of this self-study course. At the U.S. Office of Foreign Disaster Assistance, the foresight and collaboration of Frederick Cole, Gudren Huden, Denise Decker and Fred Cole have been invaluable. Thoughtful review by E. V. Bighinatti, Robert White, and Katherine Parker helped smooth out the rough edges. From INTERTECT, the guidance of Frederick Cuny and assistance of Paul Thompson brought a cohesive text out of many disparate ideas, with added help from Jean Parker and Deborah George. At the University of Wisconsin, Linda Hook, Darrell Petska, Laura Jahnke, Val Parish and Susan Kummer must be thanked for their efforts in editing, design and production.

Introduction
Disaster management as an identifiable profession is relatively new. The tasks of a disaster manager, however, have been around for a long time. They have typically been thought of as disaster relief assistance, or of specific ad hoc activities during and after a disaster emergency. Many people have been disaster managers without thinking of themselves in that term.

There has been a growing awareness in recent years that all of these activities, in fact, comprise the process of disaster management. By understanding this as an identifiable role, we can describe a coherent and cohesive direction for people who are involved in the field of disasters. This, of course, includes the spectrum of activities from administration to project implementation; from disaster prevention to disaster mitigation to disaster preparedness to disaster response.

Disaster management is not necessarily a full-time activity. Indeed, for most people in the field, their concerns for disaster issues form only a part of their total responsibilities. Similarly, this course is not designed for only full-time professional disaster managers. Rather it is intended to be useful even for individuals who expect to be active only during some aspect of disaster related operations.

One of the ideal objectives of this course and of the Disaster Management Center (DMC) is for disaster managers eventually to work themselves out of their job. The ultimate success of disaster management would be the elimination of the underlying causes of disasters; this would contribute to minimizing the people’s vulnerability to disaster. Positive responses to emergencies will make an enormous impact on the current deadly state of disaster events.

To move towards those idealized objectives will require more from disaster managers than an understanding of the aim and scope of their jobs. It will also require development of several skills and technologies. This course is viewed by the Disaster Management Center as being one component of a training program that will contribute towards those skills and technologies.
Chapter 1
Introduction to Disaster Management

The Scope of Disaster Management

The term "disaster management" encompasses the complete realm of disaster-related activities. Traditionally people tend to think of disaster management only in terms of the post-disaster actions taken by relief and reconstruction officials; yet disaster management covers a much broader scope, and many modern disaster managers may find themselves far more involved in pre-disaster activities than in post-disaster response. This is because many persons who work in the development field, or who plan routine economic, urban, regional or agricultural development projects, have disaster management responsibilities. For example, housing specialists planning a low-income housing project in a disaster-prone area have the opportunity (and an obligation) to mitigate the impact of a future disaster if the houses incorporate disaster-resistant construction technologies. In the same manner, agricultural development projects must be planned in such a way that they help stem environmental degradation and thus lower the farmer's vulnerability to losses from droughts, floods, cyclones, or other natural hazards. In fact, in dealing with natural hazards, the vast majority of disaster management activities are related to development projects; only a small portion are related to emergency response.

Of course, disaster management also encompasses the field of emergency assistance and long-term maintenance for refugees and displaced persons. The refugee field of disaster management is highly specialized and requires not only many development skills but also a broader awareness of political, legal, and humanitarian issues.

Figure 1-1, which is based on a conceptual model developed by the Office of U.S. Foreign Disaster Assistance, shows some of the many sets of activities in management of natural disasters. Figure 1-2 depicts the principal sets of activities in management of refugee and displaced persons.

Definition of Disaster Management

"Disaster management" can be defined as the range of activities designed to maintain control over disaster and emergency situations and to provide a framework for helping at-risk persons to avoid or recover from the impact of the disaster. Disaster management deals with situations that occur prior to, during, and after the disaster.

The Objectives of Disaster Management

The objectives of disaster management are:

• to reduce or avoid the human, physical, and economic losses suffered by individuals, by the society, and by the country at large
• to reduce personal suffering
• to speed recovery.
Figure 1-1
Major Aspects of Natural Disaster Management
Figure 1-2
Major Aspects of Refugee Management
When assisting refugees or displaced persons, a fourth objective is to provide protection to victims or persons whose lives or property are threatened by armed conflict, tribal animosity, religious persecutions, etc. The University of Wisconsin Disaster Management Program defines "protection" as intervention by governments, international organizations, or private relief organizations to protect persons threatened by armed conflict. Intervention for refugees or displaced persons may include provision of sanctuary or a means of escape from conflict, and emergency support to victims threatened by disease, starvation, and exposure to the environmental elements. (This definition may be broader than the usual interpretation by the United Nations and the International Committee of the Red Cross.)

**Disaster Managers**

The term "disaster manager" is applied to a person who has responsibility for planning and managing pre- and/or post-disaster activities. Disaster managers may be found in a variety of positions in many different types of agencies. The most prominent disaster managers are the personnel in governmental disaster preparedness agencies, national emergency or relief agencies, national reconstruction agencies, and emergency service agencies, departments or ministries. All require disaster management specialists.

Municipal or provincial governments often have disaster managers. Large cities will often have a director of emergency services; and persons in public health departments, police departments, or public works departments may be assigned additional responsibilities in emergency management.

Intergovernmental organizations often have specialized disaster or emergency management agencies. For example, the United Nations Disaster Relief Office (UNDRO) provides a wide variety of emergency management services to member governments. The United Nations High Commissioner for Refugees (UNHCR) and the United Nations Relief and Works Agency (UNRWA) provide specialized assistance to refugees.* Even within the nondisaster agencies of the United Nations, there are often special emergency management offices. Examples include UNICEF, which has an Emergency Unit; the World Health Organization, which has a Director of Emergency Relief Operations; and the Pan American Health Organization (a regional office of WHO), which has an Emergency Preparedness and Disaster Relief Coordination office that focuses specifically on the Americas. The World Food Program also has a special Office for Emergency Relief.

Some nongovernmental organizations, both at the local level and at the international level, are specifically organized to provide emergency services. The most prominent of these are National Red Cross and Red Crescent Societies, the League of Red Cross and Red Crescent Societies, and the International Committee of the Red Cross. There are also hundreds of other private relief organizations throughout the world organized to provide specialized assistance to victims. These agencies range in size and scope from small, local ambulance corps to large U.N. agencies with scores of staff and multi-million dollar budgets.

Many nongovernmental development organizations (NGOs) have disaster specialists on their staffs. This is in recognition of the fact that disasters often occur where development agencies have normal programs, and they cannot avoid becoming involved in post-disaster activities. This is also because of the frequency in which NGO's are called on to assist disaster victims. The specialists help to develop disaster plans for their organizations and to manage post-disaster operations.
Disaster management specialists can also be found outside of the systems specifically oriented towards disaster management or relief. Government ministries, such as agriculture, forestry, public health, defense, and public works, will often have major departments or key personnel assigned to disaster management or mitigation roles. It is common, for instance, to find a public works department employee who has assigned responsibilities for flood control activities. To be effective, that person must exercise responsibility not only in flood fighting but also inland use, settlement planning and evacuation. Thus, the effective disaster manager must have input into a variety of activities.

**Key Personnel and Specialists Related to Disaster Management**

Many people who serve in critical roles provide useful services in disaster management. While they are not considered disaster managers per se, their technological knowledge and skills and especially their experience warrant recognition of their potential contribution and function in disaster management. The examples are myriad: city and regional planners, watershed management and water resource development specialists, flood control engineers and specialists, code enforcement officials, public health specialists, doctors and nurses, dietitians and nutritionists, economic and agricultural development specialists, social scientists and welfare specialists, clergy and religious/ecumenical personnel, structural engineers, architects, reforestation and range land management specialists, firefighters, police, and development workers in general.

Although the above typically serve as the decision makers, other specialists often have an impact on disaster management decisions. These specialists include representatives from civic groups, academia, and the media, persons from research institutions focusing on disasters or disaster consequences, disaster management consultants, directors of development agencies, city managers, and other government officials.

**The Role of a Disaster Manager**

Table 1-A depicts the major natural disasters and some of the principal professions and specialists that should be involved in order to meet the needs in each particular phase. (Table 1-Depicts similar information for refugee operations.) This chart shows clearly that scores of different professionals are involved and that the primary role of a disaster manager involves the planning, coordination, and orchestration of actions in each time phase. In order to be successful, a disaster manager must have a broad base of knowledge in many different subjects and the ability to blend this knowledge into workable coordinated programs to meet the needs of those affected by disaster.

**Elements of Disaster Management**

A disaster manager must deal with six distinct sets of activities in order to affect successfully the course of events related to disasters. Known as the elements of disaster management, these include risk management, loss management, control of events, equity of assistance, resource management, and impact reduction.
### Professions Active in Various Phases of Disaster

<table>
<thead>
<tr>
<th>Types of Disasters</th>
<th>Prevention</th>
<th>Mitigation</th>
<th>Preparedness Planning</th>
<th>Emergency</th>
<th>Reconstruction</th>
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</thead>
<tbody>
<tr>
<td>Drought</td>
<td>Climatologists Agronomists</td>
<td>Agronomists Agricultural Engineers &amp; Extensionists Water Engineers</td>
<td>Water Engineers Agronomists Nutritionists</td>
<td>Nutritionists Physicians Nurses Social Workers</td>
<td>Agronomists Engineers Water Engineers</td>
</tr>
<tr>
<td>Earthquakes</td>
<td>Architects Engineers Contractors</td>
<td>Architects Engineers Physicians Nurses</td>
<td>Physicians Nurses Social Workers</td>
<td>Financial Specialists Architects Engineers Contractors</td>
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<tr>
<td>Floods</td>
<td>Engineers Rangeland Managers</td>
<td>Engineers Rangeland Managers</td>
<td>Engineers Planners</td>
<td>Architects Engineers Planners</td>
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<tr>
<td>Hurricanes</td>
<td>Engineers Architects Contractors Agronomists</td>
<td>Planners Physicians Nurses Meteorologists</td>
<td>Physicians Nurses</td>
<td>Engineers Architects Contractors Agronomists</td>
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<tr>
<td>Volcanoes</td>
<td>Planners</td>
<td>Planners</td>
<td>Planners</td>
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<tr>
<td>Insect Infestation</td>
<td>Entomologists Climatologists Meteorologists</td>
<td>Entomologists Agricultural Extensionists Agronomists</td>
<td>Chemical Engineers</td>
<td>Pesticide Applicators</td>
<td></td>
</tr>
</tbody>
</table>

Table 1-A
<table>
<thead>
<tr>
<th>Preparedness</th>
<th>Early Warning</th>
<th>Forward Planning</th>
<th>Emergency Response</th>
<th>Maintenance</th>
<th>Durable Solutions</th>
<th>Evaluation</th>
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</thead>
<tbody>
<tr>
<td>Operations Managers</td>
<td>Political Scientists</td>
<td>Operations Managers</td>
<td>Nutritionists</td>
<td>Social Workers</td>
<td>Political Scientists Internacional Legal Specialists</td>
<td>Operations Managers</td>
</tr>
<tr>
<td>Medical Personnel</td>
<td>Media Representatives</td>
<td>Planners Engineers</td>
<td>Nurses</td>
<td>Engineers</td>
<td>Diplomats</td>
<td>Medical Specialists</td>
</tr>
<tr>
<td>Public Health Planners</td>
<td>Diplomats</td>
<td>Medical Staff Communications</td>
<td>Doctors</td>
<td>Planners Administrators</td>
<td>Logisticians</td>
<td>Administrators</td>
</tr>
<tr>
<td>Engineers</td>
<td>Communications</td>
<td>Diplomats Logisticians</td>
<td>Engineers</td>
<td>Planners</td>
<td>Social Workers</td>
<td>Diplomats</td>
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<tr>
<td>Communications Specialists</td>
<td>Public Health Sociologists</td>
<td>Public Health Sociologists</td>
<td>Planners</td>
<td>Administrators</td>
<td>Diplomats</td>
<td>Diplomats</td>
</tr>
<tr>
<td>Logisticians</td>
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<td>Food Aid Specialists</td>
<td>Sanitarians</td>
<td>Diplomats</td>
<td>Housing Specialists</td>
<td>Sanitarians</td>
</tr>
<tr>
<td>Food Aid</td>
<td></td>
<td></td>
<td>Food Aid Specialists</td>
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</tbody>
</table>

Table 1-B
Risk Management. Risk management consists of identifying threats (hazards likely to occur), determining their probability of occurrence, estimating what the impact of the threat might be to the communities at risk, determining measures that can reduce the risk, and taking action to reduce the threat.

In natural disasters, risk management includes:

- hazard mapping
- vulnerability mapping
- estimation of potential losses, which can include:
  - losses of housing and physical structures
  - agricultural losses
  - economic losses
  - losses to physical infrastructure (such as roads, bridges, electric lines, etc.)
- development of appropriate disaster prevention and mitigation strategies.

Risk management is accomplished by lessening the effects of the natural hazard or by taking actions in normal development projects that will reduce the risks to an acceptable level. For example, if flooding is determined to be a major risk, the risk can be reduced by physical measures such as dams, flood control embankments, or channeling of the streams. Risk can also be reduced by moving threatened communities from flood plains and/or restricting economic activities in the flood zone to those that could absorb flood losses (such as forestry or agriculture).

Loss Management. Losses in a disaster include human, structural, and economic losses. Loss management addresses each of these through both pre- and post-disaster actions designed to keep losses to a minimum. The most effective loss management activities occur prior to the disaster and are focused on reducing the society’s vulnerability to the disaster. Actions include:

- improving the resistance of buildings and physical structures in the event of disaster
- providing improved safety for the occupants of buildings or settlements situated in hazardous areas
- increasing and/or diversifying the network of social support (or coping) mechanisms available to victims and communities in threatened areas.

Post-disaster loss management focuses on improving the response and broadening the range of support given to victims. This includes facilitating relief delivery and stimulating a rapid recovery. These are accomplished through emergency preparedness, which consists of 1) the estimation of post-disaster needs and development of approaches and programs to speed relief, response, warning and evacuation of persons known to be at risk from an immediate threat, 2) the provision of emergency assistance to help reduce the impact of losses, and 3) reconstruction, to lessen the economic burden of long-term recovery (see Figure 1-3).

Disaster preparedness refers to a broader range of activities, such as establishing emergency policies, developing evacuation plans, designating emergency shelters, and developing methods for rapid assessment of pre-positioning supplies. Materials planning emergency services, training and drills for emergency staff, training seminars and courses, and broad campaigns of public awareness aimed at preparing communities for the onset of a disaster are other aspects of preparedness. (The Disaster Management Center course, "Disaster Preparedness," explores the subject in detail.)
OPERATIONAL FUNCTIONS IN DISASTER RESPONSE

Government Ministries

DISASTER MANAGEMENT

Pre-Disaster Planning & Organization

Coordinator & Liaison

Voluntary Organizations (VOLAGS)

SPECIALIZATION

Damage Assessment

MASS CARE Shelter-Feeding-Clothing

Medical & Health Services

Individual & Family Services

LOGISTICS Supply-Warehousing-Transportation

Public Information

Communications

Warning, Rescue & Evaluation

Reconstruction or Rehabilitation

Figure 1-3
Another means of improving response is to expand or diversify the portfolio of assistance given to the disaster victims. Shelter, water, food, medicine, and clothing are usually considered as the normal emergency response. The potential range of assistance is in fact much broader. It should include economic assistance, family reunification, assistance to small businesses, rehabilitation of a community’s public utilities, emergency assistance to farmers that enables them to harvest the remnants of crops, provision of food to livestock and draft animals, reduction of erosion caused by floods, social and psychological counseling, and literally hundreds of other activities.

**Control of Events.** The critical element of disaster management is the control of events during and after the emergency. It is important that disaster managers control a situation rather than respond to it. Control is maintained through the following measures:

- Anticipation of a disaster and the cause-and-effect relationships generated by each type of event
- Mitigation, or reduction, of the scope of a disaster. Mitigation is the most important function in bringing disasters under control. The more that can be done to reduce the effects of disaster, the fewer problems a disaster manager will face in the aftermath.
- Preparedness. By reviewing the anticipated scope of a disaster, managers can plan adequate responses, develop organizational procedures, and prepare to meet the needs that are going to arise.
- Accurate information collection and assessment. Once a disaster has commenced, the manager needs to have reliable data upon which to base priorities and to guide response.
- A balanced response. Each type of disaster will require a different set of responses. The disaster manager must review the different strategies and approaches for meeting disaster needs and develop an appropriate mix of responses, so that all sectors of the community can be equitably assisted. More than one approach may be necessary in order to meet a variety of needs in the same sector.
- Action. Once a problem has been identified and a response strategy selected, the action must commence immediately. Appropriate action must be phased in a timely manner and undertaken before demands and needs escalate. Action delayed means lost opportunities and a lessening of control, which add to the suffering of the victims.
- Leadership. Disaster management should lead, rather than follow, public action. If programs are timely, the first element of leadership is attained. Rapid response and timely aid give people hope and encourage them to take positive actions themselves to help meet their needs. A delayed response leads to confusion and frustration and may force disaster managers to choose alternative courses that are ultimately less desirable.
- Discipline. Disaster managers, disaster management systems and organizations, and all key personnel in the relief and disaster management system must operate in an orderly, precise, and disciplined manner. The appearance of discipline and self-assuredness will reassure the public and promote compliance. The success of a disaster manager relates directly to the leadership exercised and the ability to coordinate the actions required to bring order out of chaos.
**Equity of Assistance.** All disaster assistance should be provided in an equitable and fair manner. Assuring that all disaster victims are treated fairly and equally is an important element of disaster management. This is especially important at the national level when a variety of different relief agencies, each with different constituencies and demands by their management and donors, are trying to provide assistance. Doctrines of fairness must underlie uniform relief and reconstruction policies in order to insure that disaster victims receive fair treatment and obtain adequate access to the resources available.

**Resource Management.** Few disaster managers have adequate resources to meet all the competing needs and demands of a post-disaster environment. Thus, resource management becomes a critical element of disaster response. The disaster manager must be familiar with the resources available. He or she must know how to form them into a balanced package of assistance and how to maximize their use to the greatest advantage. For example, in the aftermath of a flood a relief agency may receive seeds that will enable 1,000 farmers to replant the crops that were destroyed by the flood. Yet disaster assessment surveys indicate that 2,000 farmers need replacement seeds. The manager who decides to give away all the seeds and reinvest the proceeds from the crop sales to purchase additional seeds can expand the number of persons serviced and thus maximize the contribution.

**Impact Reduction.** Disasters can have an impact far beyond the immediate human, physical, or economic losses. In a very real sense, disasters represent a loss of opportunity, not only to individuals, but also to entire societies. They can also be a serious setback to the country’s entire development program. The impact of the disaster on individuals and their society should be reduced to a minimum. For a nation struck by a disaster, this means managing the disaster in such a way that recovery is accomplished quickly and that the recovery efforts contribute to the overall development needs of the country and all its citizens.

**Notes**

* UNRWA provides assistance to refugees and persons displaced as a result of the partition of Palestine in 1948. UNHCR, which was established in 1951, provides protection and assistance to most others. This publication was prepared by the Disaster Management Center at the University of Wisconsin-Madison with financial support from the U.S. Office of Foreign Disaster Assistance, United States Agency for International Development (OFDA/USAID).
Chapter 2

Concepts and Terms in Disaster Management

What constitutes a disaster?

There are many definitions of a disaster. Among relief organizations definitions vary according to each agency's roles, biases, and capabilities. This course defines a disaster as a situation resulting from an environmental phenomenon or armed conflict that produces stress, personal injury, physical damage, and economic disruption of great magnitude. It is important to note that even though disasters are referred to by the event that caused them, a disaster is not the event itself. For example, an earthquake is a natural phenomenon; if it does not strike a populated area with weak buildings, it is not likely to be a disaster.

Whether an event qualifies as a disaster often depends upon who is doing the defining. To a government, an oil refinery explosion could be a major disaster, but it is unlikely to trigger a massive response from the United Nations or from voluntary agencies (VOLAGS) unless hundreds of low-income families are hurt in the explosion. Conversely, disasters caused by long-term environmental degradation will often draw attention from VOLAGS long before governments mobilize their resources.

It is necessary to differentiate between disasters and accidents. An airline crash is certainly severe and costly, but the number of people affected is relatively small. What separates a disaster from an accident, or incident, is its magnitude of need and of victims involved.

It is also important to differentiate disasters from individual, non extreme or small-scale suffering. For example, hunger is a growing world-wide phenomenon; while it is a major concern, it is often endemic, being addressed with different approaches. Only when hunger becomes widespread and acute, in other words a famine, does the situation qualify as a disaster. This distinction is important because it helps define disasters as a separate set of events and gives a starting point for studying and understanding their importance, their impact, and the proper responses they require.

Natural Disasters

The term "natural disasters" refers to those disasters that are triggered by natural phenomena. These phenomena (such as earthquakes, cyclones, floods, etc.) are known technically as natural hazards.

The term "natural disaster" can be misleading because it implies that the disasters are solely a result of natural hazards-when in fact, human endeavors are a major contributing factor in creating a disaster. For example, if settlements or farms were not located in flood plains, disasters would not result from floods. If housing were built to earthquake- and cyclone-resistant standards, these hazards would be of scientific interest only and not result in disasters. (Natural hazards, their causes and effects, are the focus of the Disaster Management Center course "Natural Hazards.")

In recent years, a special type of natural disaster has begun to occur more frequently. This disaster is environmental degradation. It results typically from poor farming, grazing, or
settlement practices, or because of demands for fuel wood. Excessive exploitation of natural resources or improper use or maintenance of lands change the ecological balance; the resulting effects of deforestation, desertification, erosion, siltation, or flooding often bring disaster. Primary examples are increased flooding due to overgrazing or poor farming practices in the upper portions of a watershed, and increased desertification resulting from overgrazing or improper use of water resources.

This type of disaster is a growing concern not only because of the environmental consequences but also because large numbers of people can be displaced. The resulting social disruption can cause massive problems. For example, in the 1970s a massive drought forced thousands of Sahelian farmers and herdsmen to abandon their lands and migrate to urban areas in search of food and work. Few of these urban migrants returned to the rural areas. Because the towns were unable to provide adequate services or decent housing, they now contain large slums with high unemployment.

**Man-made Disasters**

The term "man-made disasters" usually refers to disasters resulting from man-made hazards. Man-made disasters can be divided into three categories: armed conflict, technological disasters, and disasters that are not caused by natural hazards but that occur in human settlements.

**Armed Conflicts and Civil Strife.** Disaster management concerns itself with various aspects of armed conflicts and civil strife, including the protection and support of displaced persons and refugees during the conflict; physical and economic reconstruction; and social rehabilitation in the aftermath of the conflict.

**Technological Disasters.** Technological disasters are usually a result of accidents or incidents occurring in the manufacture, transport, or distribution of hazardous substances such as fuel, chemicals, explosives, or nuclear materials. The catastrophic gas leak at the pesticide plant in Bhopal, India, in 1984 is an example that may be an indication of future industrial disasters in Third World nations ill-equipped to cope with their own rapid development.

Environmentalists fear that such disasters could become increasingly common in industrializing countries that lack the trained workers and government regulators to detect and correct hazards in larger and complex plants. The level of technical expertise among workers in developing countries is not as good as in developed countries. Even when safety regulations and legislation exist, the level of enforcement is often seriously inadequate. Often developing countries believe that environmental safeguards are too costly. Sometimes the working conditions in developing countries make it impossible for companies to impose safety standards. For example, in a plant in a country where the workers do not have shoes it is difficult to require the workers to wear steel-toed safety boots.

The accidents themselves are not much different from the kinds of accidents that occur in industrialized countries, but the likelihood of their occurring and the potential damage is much greater. The death tolls from the resulting accidents could be magnified because Third World industries often are encircled by shantytowns and slums filled with migrants from the surrounding countryside.
In other cases, technological disasters are more economic than physical. For example, large refineries have exploded with minimal loss of life, yet the cost of restoring those facilities can be a major burden substantially affecting the entire economy of a small country.

**Disasters In Human Settlements.** The principal disaster of this type is urban fire. When fires break out in Third World shantytowns they can have a devastating effect. Flimsy, wooden shanties packed closely together create conditions that allow the fires to spread quickly and burn virtually out of control. As unchecked urban growth continues throughout the Third World, this threat will grow even greater.

**Disaster Victim.** A victim is a person affected by a disaster. The term "victim" has many negative connotations. It provokes images of helplessness, of people who must be taken care of. For this reason, many agencies use substitute words such as "beneficiaries" or "recipients." Unfortunately, these terms do not adequately describe all the people affected and may not accurately depict the actions taking place. The term "survivors" could be used, but technically the word applies only to those who have escaped a life-threatening situation, whereas any individuals may be drastically affected by the consequences of a disaster even though they were not directly threatened by a loss of life. Victims are not helpless. They are capable of making intelligent choices. When allowance is made for their special need to cope with personal losses and to put personal affairs in order, they can participate effectively in all post-disaster activities. In fact, participation in constructive activity is one of the most effective means of coping, and disaster victims are usually highly active and thoroughly dedicated relief workers. Furthermore, as local people, they are particularly well suited to deal with the needs of their communities.

**What's In a Definition?**

Definitions are important. An organization's response is often dictated by the strictness or flexibility of the definition used. UNHCR, for example, has a very precise mandate and definition of a refugee. Voluntary agencies and governments, on the other hand, have considerable latitude over those whom they can assist.

While most countries, and international law, do not classify combatants as refugees, some countries and NGOs do. UNHCR and other humanitarian organizations may classify as refugees persecuted people, such as tribal or ethnic minorities, who desire to flee a country but who still remain in their homeland. This classification can provide them protection until they can be relocated to another country. Those Vietnamese under consideration for the Orderly Departure Programme of UNHCR furnish an example.

The term "displaced persons" also refers to people who are forced to leave their homes and homeland as a result of droughts and famines. The Ethiopians who migrated to Djibouti because of the 1984 drought were displaced persons. Several definitions of "refugee" illustrate the differences. UNHCR defines a refugee as any person who,

"owing to a well founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country; or who, not having a nationality and being outside the country of his former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it."
The World Council of Churches adds, "systemic economic deprivation" to the list of persecutions, thus broadening the definition. The Organization of African Unity includes the clause "...owing to external aggression, occupation, etc...," which enables people to seek refugee status even though they may personally not be threatened (Robert White, UNHCR).

In armed conflicts displaced persons and refugees are of special concern to disaster managers. Displaced persons are individuals and families forced to leave their homes because of the conflict, but who remain inside their country. Refugees are noncombatants who have sought (or are seeking) safety by leaving their homeland and entering another country.

The laws regarding refugees and displaced persons are vague in many ways. For example, do persons who flee their homes because of extreme economic hardships coupled with human rights oppression qualify as refugees or as illegal immigrants? For the most part, this and other related questions are unresolved, and it is outside the scope of the University of Wisconsin Disaster Management Program to discuss the fine points of refugee and immigration law. For the purpose of these courses, a refugee will be defined as a person who flees his/her homeland as a result of armed conflict and not for reasons of economic hardship or natural disaster.  

**Disaster Types**

Another means of classification is available in addition to the categories already discussed. Disasters may be classified according to how rapidly they begin and how long they last. In this classification system are two types of disasters: rapid-onset or cataclysmic disasters, and long-term or continuing disasters.

Rapid-onset disasters include earthquakes, cyclones, floods and tsunamis (popularly known as "tidal waves"). Slow-onset, long-term or continuing disasters include civil wars, droughts and famines, and epidemics.

This type of classification is useful because the general approaches that are used to respond to the disasters in each category are very similar. For example, in supporting refugees and displaced persons, feeding programs similar to those that are required for famine victims are used.

In a cataclysmic disaster, one large-scale event causes most of the damage and destruction. Following this event there may be a tremendous amount of suffering and chaos, and secondary disasters such as landslides may occur. Yet, things soon begin to improve. By contrast, in a long-term, continuing disaster the situation remains constant or may even deteriorate as time passes. In a cataclysmic disaster the damaged area is usually relatively small, while the area affected in a continuing disaster may be extremely large.

**The "Relief System"**

In disaster management there is much talk about a "relief system." However, no one specific system exists, but rather groups of organizations that provide different types of assistance at different levels. These include governments; intergovernmental organizations, such as the United Nations; Red Cross Societies; international voluntary organizations; international credit institutions, such as the World Bank and the International Monetary Fund; local social and economic groups; and many peripheral organizations such as cooperatives, trade unions, etc.,
that often become involved when disaster strikes. In any one country or in any one disaster, these groups may band together formally or informally to provide relief to the disaster victims. Some agencies act in the capacity of fund raisers, others act as donors. Some provide funds directly to the victims while others provide funds to other agencies that will help the victims. It is the role of the disaster manager to insure that coordination to the greatest extent possible is carried out.

Certain relief systems have evolved to provide assistance to refugees and displaced persons; other systems have evolved to provide assistance to victims of natural disasters.

**Sectors In Disaster Relief**

Disaster relief activities typically address a variety of needs. In disaster management this spectrum of human endeavors is classified by sectors. The most common are health, housing, agricultural, economic, and social sectors. These sectors are known as the prime sectors, because they are of prime concern to the disaster victims. A second group of sectors include urban settlements, transportation, lifelines, and critical facilities. These are known as secondary or support sectors, because they have indirect effects on the disaster victims.

Most disaster-related programs take a sectoral approach. That is, most programs focus on the problems unique to a particular sector and usually require technicians with skills specific to that particular field.

**Intervention**

"Intervention" refers to an action taken in order to change the course of events. In disaster management the term's use is similar to the medical sense, i.e., disaster response initiated from outside the affected community is a form of intervention and, as such, must be handled with care because it does come from without. It therefore always runs the risk of being more disruptive than productive.

**Other Important Terms In Disaster Management**

Pre-disaster planning is the process of preparing, in advance, to meet a future disaster. Pre-disaster planning consists of disaster prevention, mitigation, and preparedness.

**Disaster Prevention** is action taken to eliminate or avoid harmful natural phenomena and their effects. Examples of prevention include cloud seeding to control meteorological patterns, pest control to prevent locust swarms, erection of dams or levees to prevent flooding, etc.

**Mitigation** is action taken to reduce both human suffering and property loss resulting from extreme natural phenomena. Measures include land use planning, improved disaster-resistant building techniques, and better agricultural practices.

**Preparedness** encompasses those actions taken to limit the impact of natural phenomena by structuring response and establishing a mechanism for effecting a quick and orderly reaction. Preparedness activities could include pre-positioning supplies and equipment; developing
emergency action plans, manuals, and procedures; developing warning, evacuation, and sheltering plans; strengthening or otherwise protecting critical facilities; etc. (The Disaster Management Center course, "Disaster Preparedness," covers the subject in detail.)

**Risk** is the relative degree of probability that a hazardous event will occur. An active fault zone, for example, would be an area of high risk.

**Vulnerability** is a condition wherein human settlements, buildings, agriculture, or human health are exposed to a disaster by virtue of their construction or proximity to hazardous terrain.

**Secondary Threats** are hazards such as landslides or erosion. Created or triggered as a result of a larger or stronger hazard (e.g., an earthquake, cyclone), secondary threats can occur during the primary disaster event or may happen days, weeks, or even months afterward. After a recent earthquake in Central America, hillsides that had been loosened by the tremors finally slipped five months later when they became saturated with water during the rainy season. The resulting mudslide killed dozens of low-income families who were squatting on the slope.

Secondary threats in the immediate aftermath of a disaster are a major concern of disaster managers. A top priority of assessment teams is to identify secondary threats and evacuate people before secondary disasters occur.

**Phases Of Disaster Response (Natural Disasters)**

**The Preparatory Phase.** The preparatory phase of disaster response includes all of the activities that help a society and the disaster agencies to prepare for a disaster event. Activities carried out in the preparatory phase include organization, legislation, development of procedures, inventories of resources, and establishment of response plans. These activities are broadly classified as disaster prevention, mitigation and preparedness.

In general, disaster prevention is event-focused. In other words, the objective of prevention is to prevent the disaster from occurring. Disaster mitigation accepts the fact that some natural event may occur, but it tries to lessen the impact by improving the community's ability to absorb the impact with minimum damage or disruptive effect. Disaster preparedness assumes that a disaster will occur; it focuses on structuring the emergency response and on laying a framework for recovery.

**Warning Phase.** Preceding most disasters is a period of time during which it becomes obvious that something hazardous is going to happen. Certain specialists focus on trying to detect signs of a building threat. By monitoring events, they look for indicators that tell when, where, and what magnitude the event may be. This is known as prediction or forecasting. The objective is to provide disaster managers with enough information so they can give the people at risk adequate notice or warning to prepare for the disaster and, if necessary, to evacuate.

At the present time, warning is possible for droughts and famines, cyclones and most severe weather phenomena, volcanoes, large scale fires, and in some cases earthquakes. Work is also underway in refugee management to develop early warning techniques that will let relief agencies know of impending refugee crises.
**Emergency Phase** This phase of disaster response involves actions that are necessary to save lives and reduce suffering. They include search-and-rescue, first aid, emergency medical assistance, and restoration of emergency communication and transportation networks. Some disasters, also necessitate evacuation from areas still vulnerable to further disaster events and provision of temporary shelter, food, and water. Other actions taken during the emergency phase include initial disaster assessment and emergency repairs to critical facilities.

**Rehabilitation (Or Transitional) Phase.** The transitional phase is a time period when people begin to return to work, to repair infrastructure, damaged buildings and critical facilities, and to take other actions necessary to help the community to return to normal. During this phase, emotional recovery occurs as families and individuals regroup and try to put their lives back in order. In many ways, the rehabilitation period is the most difficult for the victims. Relief agencies must be sensitive to varying degrees of need and must provide appropriate forms of assistance. Emergency relief measures must be discontinued during this phase so that people can begin to regain their self-reliance. (The Disaster Management Center course, "Disaster Response," covers in more detail the subjects of response and rehabilitation.)

**Reconstruction Phase.** The reconstruction phase of a disaster involves the physical reordering of the community and of the physical environment. During this period people reconstruct housing and other community facilities, and agriculture returns to normal. The actual time span is often very difficult to define. It may start fairly early and may last for many years.

**Phases Of Refugee Relief Operations**

The phases of refugee relief operations parallel in many ways the operations in natural disasters, but there are some significant differences.

**Emergency Preparedness** is the set of activities taken by organizations to plan and prepare for reacting to a new refugee emergency. These preparations can and should meet any contingency, but they may also focus on a known situation that is predicted to develop into an emergency. Preparedness activities usually include organizing, developing contingency plans, stockpiling emergency supplies, developing procedures, and training staff.

**Monitoring And Early Warning** is the process of keeping watch on current events in order to predict when political, economic, or social events may deteriorate to a point where information to diplomats may allow mediation before a crisis develops. Diplomats can also provide relief agencies with timely data that will facilitate the development of contingency plans specific to the area of concern.

**Forward Planning** is advanced planning carried out when an emergency is imminent, e.g., refugees are known to be displaced and moving toward a border. Some of the usual activities include preparations for protecting the refugees and granting them refugee status, as well as alerting agencies that will provide assistance.*

**Emergency Response** encompasses the activities that occur immediately after the refugees arrive in the care of humanitarian agencies. Typically, emergency activities include protection and legal assistance; provision of health services-food, shelter, water, sanitation, and many other basic necessities for survival; and a variety of social services to people with special needs such as unaccompanied minors** and widows with small children.
**Maintenance** refers to the services that are provided to refugees during the period after the emergency but before a permanent solution to their plight is developed. Maintenance operations may include tracing and family reunification, general care and food distribution, a variety of social services such as education and cultural activities, and efforts to help the people to become as self-sufficient as possible under the circumstances.

**DURABLE (Permanent) SOLUTION** is the term used to describe collectively the three long-term solutions that resolve a refugee situation—voluntary repatriation, assimilation, and resettlement to a third country. In this phase, any number of activities can take place including transportation of the refugees, legal assistance, and provision of financial and material aid to the refugees to help them start their new lives. If the solution is repatriation or assimilation, the patterns of assistance often resemble reconstruction and development assistance given to the victims of natural disasters.

**Evaluation** occurs as a refugee operation ends or as a new phase begins. Evaluation should be carried out by every manager and key members of the staff. The results and lessons learned should become the basis for further emergency preparedness activities.

**Key Concepts**

Several themes and key concepts of disaster management should be kept in mind. Some of these are:

**The Relationship Of Disasters To Development.** People tend to regard disasters as separate and distinct events having little or no relationship to the political or economic development of a country. In recent years, however, the relationship between disasters and development has become clearer. Disasters are now recognized as one of the major contributors to underdevelopment, and underdevelopment is one of the major contributors to disaster. It has also been recognized that if disaster response is mishandled, many years of progress can be wiped out and the chances for further progress set back. Disasters can alter agricultural patterns, settlement patterns, patterns of migration, work habits, diets, and even basic family structures. If disaster management is well planned and development-oriented, a disaster can provide opportunities for accelerating the pace of development. Constructive changes can then be made.6

It is extremely important that disaster managers be aware of the impact of disasters and the role that development programs can play in mitigating disasters and reducing vulnerability.

**The Relationship Of Various Disaster Activities To The Appropriate Phase Of A Disaster.** All disaster-related activities are divided into distinct time periods. The length of any one period can vary greatly depending on the type of disaster and other factors. Disaster managers must recognize the different phases and know what activities are appropriate in each phase. For example, emergency activities often include the distribution of free relief supplies. But if this activity is carried on in the later phases of a disaster, there is a danger that dependencies may be fostered and that the relief may provide disincentives to agricultural or economic recovery.

**The Relationship Of Various Time Phases To Each Other.** The phases of a natural disaster can be depicted graphically as a continuum, as shown in Figure 2-1. The activities that are
carried out to mitigate a disaster closely resemble the activities that would be carried out during reconstruction. They are essentially development activities since they not only reduce the disaster impact but also provide economic or social benefit. By understanding how these activities relate to each other and to development, one can see the close interrelationship between good disaster management and development activities.

**How Activities In One Phase Should Set The Stage For The Next.** Study of Figure 2-1 and Figure 2-2, the latter depicting the phases of refugee relief operations, will show how activities in one phase relate to the preceding and following phases. For example, emergency response can be facilitated if the operations have been planned prior to the disaster, not during it. As a general rule, each phase and each activity of a disaster lays the framework and sets the stage for activities in the next phase. Therefore, when planning an emergency response, the disaster manager should keep in mind how that activity can help promote faster recovery. Consider this simple example. If a house has been destroyed in a windstorm or flood, there are several options for providing shelter during the emergency. The relief agency can provide a tent that will offer shelter; or it can provide building materials that the victims can use to build a temporary shelter and then later reuse in the reconstruction of their permanent house. The tent solves one need during one phase, but the building materials not only solve needs in the emergency phase but also help prepare for activities during the reconstruction phase. By opting to provide building materials rather than tents, the disaster manager maximizes the utility of resources at his or her disposal and paves the way for a speedier recovery.

**References**

1 MacDonald, Franklin, Presentation at the Symposium on the Role of Education in Disasters, Harvard University, 1984.


3 The University of Wisconsin Disaster Management Center offers courses on management of refugee and displaced persons operations.

4 Cuny, op. cit.


6 Cuny, op. cit.

**Notes**

* "Assistance" in refugee operations applies to relief and material aid prepositioning supplies, designating sites for the arrivals, and attempting to determine the health and nutritional status of the people when they arrive (remote detection).

** The term "unaccompanied minors" is used in lieu of orphans because relatives, extended family members, and even parents can often be found after careful searches among the refugee populations.
Figure 2-1
Disaster Continuum

Figure 2-2
Refugee Operations Continuum
Chapter 3

Natural Disaster Assistance and Refugee Operations

Introduction

When most people think of disasters, they imagine voluntary agencies or the Red Cross or Red Crescent providing emergency relief materials and aid to disaster victims. While this image is, in part, correct, it depicts only a portion of the assistance that is provided and the manner in which it is delivered. In this chapter we will explore the full range of disaster assistance and identify the types of organizations and the way in which disaster assistance is (or should be) provided. It is important to know what type of organizations are normally assigned disaster responsibilities and the specific organizations that become involved in each time phase.

Natural Disaster: Government's Role

The ultimate responsibility for coping with natural disasters lies with the national government of the affected country. Responsibility for disaster mitigation is usually assigned to a government ministry. For example, mitigation activities for drought would normally be assigned to an agricultural ministry, while mitigation and preparedness activities for earthquakes would typically be assigned to a housing or public works ministry.

Preparedness planning is usually carried out by an inter ministerial committee or by a unit of government that specializes in planning and coordination. The latter may be a specially created preparedness group or it may be an existing planning group such as a central planning office.

During an emergency the disaster preparedness authorities may assume responsibility for coordination of emergency activities, or a new emergency committee may be established. Depending on the type of disaster, however, operational responsibilities will again usually be assigned to one or more ministries, usually those with some degree of operational capacity or with special equipment required for the emergency period. For example, public works departments, which have trucks and engineering equipment, are often assigned lead responsibility during floods, while public health departments are usually assigned lead responsibility during famines or epidemics. During the post-emergency phases and especially during reconstruction, operational responsibility may be shifted to another government ministry or combination of ministries. If the disaster has been particularly destructive or widespread, special regional agencies may sometimes be formed with staff seconded from the normal ministries. These regional agencies tend to remain in existence for about one to five years. They are then disbanded and the personnel return to their former jobs.

Natural Disasters: Foreign Assistance Patterns

Donor governments and international voluntary organizations render foreign assistance when the disaster relief and recovery requirements exceed the resources available in the affected country. The assistance patterns vary according to the phase and the type of disaster. While many development agencies participate in development activities that might mitigate disasters,
few would see this as their primary role. Likewise, few participate in disaster preparedness planning.

During the emergency phase, nongovernmental organizations often become prominent in dispensing emergency relief. This is because of their flexibility and inherent ability to respond quickly to an emergency. In general, nongovernmental organizations should usually be regarded as specialized service agencies; that is, they have special skills or interests that are generally sector-focused. They usually provide assistance for only limited periods of time, primarily during the emergency and rehabilitation phase. Since their funding is dependent on public support and interest in a particular disaster. Voluntary agencies tend to work in person-to-person types of activities and generally prefer to do small-scale, short-term projects rather than long-term activities that require large capital expenditures. In order to make the most of scarce resources, governments often prefer to turn over large segments of humanitarian efforts to these agencies so that government resources can be channeled into longer term, and more expansive recovery activities. Because voluntary agencies work directly with the disaster victims, they tend to be highly visible. Yet their overall responsibilities are fairly limited.

During reconstruction, development agencies (both VOLAGS and intergovernmental agencies) may also become involved. This is because many of the reconstruction activities involve development work, and many agencies recognize that the reconstruction period offers opportunities for advancing development goals.

Major foreign governments usually have a greater interest in disaster mitigation and preparedness than nongovernmental agencies. Most of the work in these activities has been stimulated by government donor agencies responsible for disaster aid. The Office of U.S. Foreign Disaster Assistance (OFDA) of the Agency for International Development is an example. Foreign governments usually provide bilateral assistance directly to the host government and may provide technical assistance for planning, or financial assistance in implementation.

When a disaster occurs, foreign governments may provide assistance through several different methods. These include bilateral assistance to the government for general support or for specific projects and multilateral assistance through organizations such as the United Nations or various regional groups. They may also fund voluntary agencies to conduct specific projects.

The pattern of aid established during the emergency will usually carry over into reconstruction, but emphasis on voluntary agencies is generally replaced with more bilateral assistance directly to the government and its ministries. Technical assistance for project administration and planning is also a popular form of aid.

The United Nations system is another major source of international aid for disasters. The United Nations Development Program (UNDP), the Food and Agricultural Organization (FAO), and the United Nations Center for Housing and Human Settlements (HABITAT) are the principal U.N. agencies actively engaged in disaster-prevention programs.

Preparedness activities fall under the domain of the United Nations Disaster Relief Office (UNDRO). UNDRO normally works through the UNDP resident representative (Resrep) in each country to provide planning assistance for disaster preparedness. This assistance is usually in the form of technical assistance and studies designed to help the government structure its emergency response.
During an emergency many different United Nations agencies may respond. UNDRO often sends a representative to help coordinate foreign donations. Acting on a government's request, UNDRO may stay on for several weeks to report on emergency needs and respond to those needs by external donors.

The United Nations specialized agencies may also respond with emergency assistance. UNICEF often initiates programs for women and children, and in droughts the World Food Program (WFP) provides emergency rations to augment available food supplies. UNHCR will sometimes assist the victims of natural disasters if they happen to be refugees or if drought victims are forced to leave their homeland in search of assistance. Most emergency assistance is provided as "project aid" by the U.N. agency using its own staff and locally hired personnel. The United Nations agencies have tremendous logistical capabilities and can undertake emergency projects on a vast scale.

During the post-emergency phases, the United Nations development agencies often take a lead role. The FAO is usually very active in agricultural recovery activities while UNDP and HABITAT become involved in physical reconstruction of houses and basic infrastructure. Assistance in the later phases, however, is usually in the form of cash and technical assistance, not operational projects.

The Red Cross system (or Red Crescent in Moslem countries) can also bring many resources to bear in an emergency. The Red Cross/Red Crescent Society in each country is usually chartered by the government and given semi-official status. Each national society, in turn, belongs to the international League of Red Cross and Red Crescent Societies (LRCS) to which they can turn for additional foreign assistance should it be required.

The Red Cross/Red Crescent is primarily concerned with emergency operations. The vast majority of their activities involve preparing for and responding to an emergency. Ideally, the national society will have many regional and local chapters, all of which have undergone some form of emergency training. In many cases, these are supported by a system of national emergency supplies that can be quickly augmented from international stockpiles maintained by the LRCS or obtained from its member societies through its international disaster appeals.

Because the primary focus is on emergency humanitarian assistance, most of the aid provided is "in kind" or materials. The LRCS also provides technical assistance to national societies in preparedness planning and emergency response management.

Worldwide, there are more than 1,000 different non-government, privately funded organizations that might respond to a disaster. These groups, known as private voluntary organizations (PVOs or VOLAGS for short) operate at both an international and local level to obtain funds and supplies for disaster victims. Most VOLAGS work on a person-to-person basis and focus their efforts on low-income families and communities. Some VOLAGS deal exclusively with disasters. These are considered "relief" organizations. Others focus more on development and work in disasters only when one strikes where the agency has a program in operation.*

Among the better known VOLAGS are CARE, Caritas, Catholic Relief Services, Church World Service, OXFAM, the Salvation Army, the various national organizations of Save the Children and Terre des Hommes, Medecins sans Frontieres, Christian Aid, Lutheran World Relief, and World Vision.
The resources they command give them an influential role in any operation in which they participate, and one or the other is involved in almost every country in the Third World.

Many NGOs at the local level provide assistance; and consortia, such as the various National Christian Councils, can often mobilize substantial resources. Some agencies have their own programs administered by a professional staff, supplemented in disasters by volunteers. Others operate through local counterpart organizations, though in a few cases they do have their own programs. Their interests are not restricted to any one sector. VOLAGS have entered housing, agriculture, small business, and many other fields, both in normal and in post-disaster times.

Refugee Operations

The patterns of assistance for refugee operations vary greatly from those of natural disasters. Under international protocol, the responsibility for the protection of refugees in the country of first asylum is assigned to the host country, but at their request this responsibility may be transferred to the United Nations High Commissioner for Refugees (UNHCR) or to another international organization. Thus, in a refugee operation, the primary emphasis is usually on protection, assistance, and direct aid provided to the refugees by outside organizations. This is an important distinction. Rather than helping a local government to expand its capabilities to deal with a natural emergency, refugee operations try to ease the burden and responsibility of the host government. How much of this burden will be taken over by foreign assistance depends on many factors, especially on how long the refugees remain in the country of first asylum.

In reality, there is almost no pre-disaster planning for refugee operations. What little planning does take place usually occurs in the few days, or even hours, before the refugees arrive. The host government normally assigns a government task force, the military, or in some cases, an operational agency of the government, to oversee and coordinate relief operations.

Once the refugees begin crossing the border, the United Nations system, the League of Red Cross/Red Crescent Societies (LRCS) and/or the International Committee of the Red Cross (ICRC), an independent Swiss organization established to deal with war victims, swing into action. The United Nations system is usually responsible for protection and coordination of assistance, while the LRCS or ICRC is responsible for humanitarian aid in the immediate vicinity of the conflict area or in a zone near the border. International voluntary agencies are usually available to assist in providing specialized services to the refugees. In many countries the U.N. agency becomes the coordinating agency for all international aid.

During the emergency period, voluntary agencies may work in a variety of roles. The U.N. has often requested VOLAGS with special skills or capabilities to assist in various field operations including processing and delivery of humanitarian assistance in refugee camps. UNHCR especially prefers to use VOLAGS as implementing partners in operational matters.

After the emergency, refugee support operations tend to become long, drawn out affairs. Many refugees remain in the country of first asylum for a decade or more. In some cases, host governments choose to allow the refugees to establish small settlements and farms so that they can help support themselves, but in many countries the refugees are forced to remain in camps while long-term, permanent solutions are sought. During the long interim period, referred to as
the "maintenance phase," disaster managers have often found themselves working in what would otherwise be considered development work. Activities have included settlement planning, housing construction, water resource development, agricultural extension, and public health and nutrition work.

The primary objective of refugee assistance is to find a permanent or durable solution to the refugee's plight. The three solutions are voluntary repatriation (returning to their homeland), settlement in the country of first asylum, or resettlement in a third country. A key problem for disaster managers is how to provide assistance and protection to refugees in such a way that promotes, not hinders, the development of durable solutions.

**Assistance Models**

The term "victim" is nonspecific. It encompasses everyone affected and obscures the reality that each disaster affects a specific group in a population more than others. Earthquakes affect people living in poor quality, non-engineered houses. In every type of disaster, specific groups of potential "primary victims" can be identified (columns 1 and 2 of Table 3-A). The characteristics of these groups provide a key to determining the kind of assistance that is appropriate during each phase of a disaster. These characteristics also give an indication about how to deliver the assistance.

Disaster assistance deals with two types of aid: relief, which is designed to reduce suffering and replace losses; and long-term assistance, which might be called "change-related" aid. The objective of the latter is to encourage people to change their normal habits or practices in order to reduce their vulnerability to a disaster or to make sure that a disaster does not recur.

Knowledge of the characteristics of the victims enables us to plan for both types of assistance. Relief is the easiest. Droughts can again provide an example. Farmers, especially marginal, subsistence farmers, will be prominent primary victims. In an emergency they and their families will need food and alternative sources of income until they can replant and harvest a normal crop. Therefore, the relief program must have a feeding component and a long-term assistance component; the latter, in the form of social services, will help the families find other means of supporting themselves until the emergency has passed and they can replant.

Knowing that primary victims will be farmers also helps us to plan disaster mitigation and reconstruction programs. Both activities require that people change some aspect of their normal way of doing things. In the disaster context, change can be brought about in one of three ways: through public awareness, in other words providing people with information so that they will act on their own; through legal measures, i.e., forcing people to change by law; or through extension and education, i.e., demonstrating and teaching alternative methods and encouraging their implementation by means of a variety of services.

If we know that the target audience will consist of farmers, mitigation measures will involve changing crops, cropping patterns, or agricultural practices. This will require demonstrations, technical assistance, and extensive people-to-people contact. We also know that public awareness and legal methods will have little impact on changing agricultural patterns; therefore, the assistance model for mitigation and reconstruction must be based on extension and education.
<table>
<thead>
<tr>
<th>Type of Disaster</th>
<th>Primary Victims</th>
<th>Predisaster Assistance Models</th>
<th>Emergency Relief Models</th>
<th>Post-disaster Assistance Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Droughts</td>
<td>Farmers</td>
<td>Agricultural extension, water resource development, land reform</td>
<td>Alternative income food</td>
<td>Agricultural extension, land reform</td>
</tr>
<tr>
<td></td>
<td>Herdsmen</td>
<td>Husbandry extension</td>
<td>Emergency fodder distribution</td>
<td>Husbandry extension</td>
</tr>
<tr>
<td></td>
<td>Nomads</td>
<td>Husbandry extension</td>
<td>Relocation and mass care</td>
<td>Husbandry extension</td>
</tr>
<tr>
<td>Earthquakes</td>
<td>Persons in low-quality housing</td>
<td>Housing Education to public &amp; contractors</td>
<td>Economic assistance, material aid</td>
<td>Housing Education to public &amp; contractors urban land reform</td>
</tr>
<tr>
<td>Famine</td>
<td>Women, small children and elderly</td>
<td>Nutrition education, home gardening, food preservation &amp; storage education</td>
<td>Selective feeding, general rations, horticultural extension</td>
<td>Nutrition education selective feeding home gardening, food preservation education</td>
</tr>
<tr>
<td>Floods</td>
<td>Farmers, urban squatters</td>
<td>Planning, land reform, housing education, watershed management</td>
<td>Evacuation and mass care</td>
<td>Planning, land reform, housing education, watershed management</td>
</tr>
<tr>
<td>Hurricanes</td>
<td>Farmers, occupants of low quality housing</td>
<td>Agricultural extension, housing education, land reform, watershed management</td>
<td>Economic assistance, material aid</td>
<td>Agricultural extension, housing education, land reform, watershed and coastal zone management</td>
</tr>
<tr>
<td>Insect infestation</td>
<td>Farmers</td>
<td>Agricultural extension</td>
<td>Agricultural extension</td>
<td>Agricultural extension</td>
</tr>
<tr>
<td>Epidemics</td>
<td>Small children</td>
<td>Immunization, environmental sanitation</td>
<td>Medical relief</td>
<td>Immunization, environmental sanitation</td>
</tr>
</tbody>
</table>

Table 3-A
Table 3-A identifies the primary victims in several types of disaster and lists the disaster assistance program models that can be used in each case. Comparison of column 3 "Pre-Disaster Assistance Models" and column 5 "Post-Disaster Assistance Models" shows that both borrow heavily from normal development methodology. By understanding these links, disaster managers will be more effective participants in both disaster and development activities.

References

1 "The Potential Contribution of Peace Corps to Disaster Preparedness in Africa," INTERECT.

Notes

* This is normally an advantage because agencies working in development in a country can be effective where they have existing programs. Agencies entering a country during the emergency have to learn their way around.

** While it is often true that there is little pre-disaster planning for refugee operations, planning can be effected for continuing flows of refugees from the same country, e.g., Vietnamese, Kampucheans, and Laotians arriving in neighboring countries throughout the 1970s; and Ethiopians entering nearby countries throughout the same period. Thus, the questions of planning and the ability to expand or contract an operation, depending on the circumstances, is key. Foreign governments may directly provide the host government with bilateral aid either in cash or in relief materials or foods, or they may support the refugees through the designated relief agencies.

*** "Primary victims" are persons affected by the immediate consequences of a disaster. For example, farmers would be primary victims of droughts. "Secondary victims" reside within the affected area or on the border of the area. They too suffer economic loss because of the disaster. An example is the small store owner within the disaster area who would be unable to sell goods because the primary victims lack the cash. Secondary victims in refugee operations include people living adjacent to a refugee camp. These persons have needs similar to the refugees and may be adversely affected by their pressure. They must be considered for assistance to avoid creating special problems and hostility between the refugees and their neighbors.
Chapter 4

The Tools and Methods of Disaster Management

Disaster management uses a variety of different tools, programs, and methodologies to lessen the impact of a disaster and to provide the managers with means of guiding relief and reconstruction activities. This chapter is a three-part exploration of these tools and methods as they pertain to 1) prevention and mitigation, 2) preparedness, and 3) post-disaster management.

I. Tools And Methods Used In Prevention And Mitigation

The primary focus of disaster management should be to prevent disasters and/or to mitigate those that do happen. Disaster managers can generally use four sets of tools. They are:

- hazard management and vulnerability reduction
- economic diversification
- political intervention
- public awareness.

The first two apply exclusively to disasters caused by natural phenomena, while the latter are used to try to mitigate impending refugee situations.

As a general rule government, intergovernmental organizations, and the larger VOLAGS carry out hazard management programs. This is because many of the hazard management activities involve vast areas and require large amounts of resources. At the community level, however, small agencies and communities can undertake a variety of activities with little outside assistance. Planting windbreaks and building flood embankments are examples of such activities.

The role of the disaster manager in hazard management is usually to insure that development plans and programs incorporate hazard management activities. For example, a country's office of disaster preparedness may help make the various ministries aware of the flooding problem and may carry out studies in conjunction with other ministries. The actual management of a watershed to prevent or reduce flooding is usually the responsibility of river authorities, or of ministries of forests, agriculture, human settlements, and/or rural development. These activities are often carried out with the help of the central planning office and/or rural and urban planning departments.

The range of specific tools for mitigating environmental hazards are:

- planning
- building regulations, including zoning, building codes, performance standards, and improved urban design
- strategic development or investment of sites and services
- economic incentives
- housing education, i.e., the training of home builders to improve the quality and performance of housing
• code encouragement, i.e., the use of building inspectors to advise and encourage homeowners to utilize disaster-resistant construction techniques (rather than simply to enforce codes)
• financial incentives as an inducement to builders to use hazard-resistant construction techniques
• insurance
• environmental management, for example, reforestation and rangeland management in watersheds
• immunization campaigns to reduce the threat of disease.

All the tools listed above require a technical understanding of the threats and the possible solutions. The selection of a particular set of approaches must be determined by the financial capacity of a government or PVO as well as by their administrative capacity. For example, the adoption of building codes would depend upon the capacity of the government to enforce compliance. In a case where rapid urbanization and small metropolitan budgets would not permit enforcement, housing education or code encouragement could be chosen as an alternative.

Several of these tools deserve more discussion in the context of disaster mitigation in the Third World.

Planning Strategies

Various strategies that can mitigate the impacts of hazards can be adopted through normal planning. Among these are:

A. Adjusting normal development programs to reduce losses. For example, certain varieties of crops that are more wind- or flood-resistant can often be introduced in areas prone to floods or cyclones.

B. Economic diversification. In regions where the principal or sole source of income is threatened, planners should attempt to diversify the economy and introduce economic activities that are less vulnerable, or not as vulnerable to the same types of disaster. Diversification is extremely important where economies are based on a single cash crop. Small island countries that depend on exporting bananas, palm oil, or other tropical agricultural products are vulnerable to extensive damage in a cyclone. Such countries could diversify into fishing, light manufacturing, or other activities, for example. Diversification will help protect the economy against natural disasters and also against unanticipated price fluctuations on the international market.

C. Developing "disaster resistant" economic activities within a region. Some economic activities are relatively unaffected by certain types of disasters. For example, warehousing is more suitable than manufacturing for locating in flood plains. Coconut palms are more suitable than citrus or other fruit trees in cyclone-prone coastal areas. Efforts should be made to identify and to encourage the development of enterprises that are less vulnerable to the hazards.
Regulations

Planners can use three sets of regulatory controls for hazard management. These are land-use planning and zoning; building codes and performance standards; and land-use and building standards.

Conventional land-use controls regulate function, density, and location of activities, the rate of development, and limits of growth. "Zoning" may be defined as a division of land into districts or land-use zones; the prescription of regulations within these zones depends on how the zones are to be developed. Zoning ordinances are usually divided into broad land-use categories, such as agricultural, residential, industrial, and/or commercial uses. Sub-zones may include such designations as reforestation areas, range-land management zones, and watershed management zones.

Zoning has a broad function in the reduction of vulnerability, since vulnerable areas can be controlled or set aside for certain types of development. For example, a hazardous area can be zoned permanently for agricultural or recreational use, thus minimizing concentrations of a population or a built environment on this site.

Land-use controls and regulations can be an effective tool for reducing vulnerability, but they are not a universal cure. Controls must be relevant to local conditions and must be formulated with a realistic assessment of the actual risk.

Building codes are used to control the built environment within an area. Economic concerns often dictate that hazardous areas be developed. To offset the threat and mitigate potential damages, building codes can be formulated to guide construction so that buildings and other man-made structures are as safe as possible.

Building codes and land-use zoning are often criticized as being ineffective in less developed countries, since enforcement is difficult and most growth is unregulated. Furthermore, codes and zoning are considered "passive" regulatory instruments; their enforcement often creates an adversary system between the public and the government. If development occurs in an area where it is not permitted, governments are usually powerless to reverse the situation. Enforcement activities may give rise to corrupt inspection officials who institute a system of bribery to overlook nonconforming uses or structures.

Because of these criticisms, planners have recently proposed an alternative that appears more workable in many of the developing countries. This is known as performance standard zoning and building regulation. In this approach, flexible standards are developed and adopted. They permit a variety of uses and construction as long as certain basic, minimal standards of safety and health are met. The standards usually permit people to use a variety of approaches to attain the desired standard. Rather than strictly enforcing the standard, the government makes a commitment to provide technical and planning assistance to persons in order to enable them to reach the highest standard possible. This type of approach is called an "active" approach. While it may be more expensive, a higher degree of compliance can usually be attained. Furthermore, governments become advocates and advisors rather than adversaries.
Strategic Development Or Investment

Planners are often able to encourage development away from hazardous areas by investing or creating a favorable environment for investment in less vulnerable regions or communities. This strategy is often difficult to implement in regional development. Most hazards are not site- or area-specific; they can threaten wide areas. For example, earthquake zones often extend for thousands of miles, and relocation of threatened settlements or enterprises is often not possible. Furthermore, hazards that occur infrequently are usually not considered in economic development planning.

Strategic investment has proven successful in agricultural sectors. For example, regional planning authorities in India have been successful in extending irrigation, land reclamation activities, and regional farm-to-market roads onto coastal plains that might otherwise have been developed with more intensive forms of economic activities. By developing the coastal plains with large, plantation agriculture relying on fewer laborers, the authorities have substantially mitigated human losses from hurricanes.

Economic Incentives

Governments are often able to extend a number of economic incentives to people and organizations in order to encourage development away from hazardous areas. Examples of incentives include provision of land, loans, grants, favorable credit, favorable taxation, technical assistance, or a combination of these.

In an effort to reduce human and agricultural losses, the government of Bangladesh recently initiated a program to provide small plots of irrigated land to landless peasants; these persons normally worked as sharecroppers on hazardous floodplains in the lower Brahmaputra delta and on low-lying, offshore islands threatened by hurricanes and storm surges. Low-cost loans for initial land development were made available through cooperating private sector institutions, and relocation grants were provided by the government. Once people had arrived in the new areas, technical assistance for farming was provided by government agricultural extensionists.

Public Information and Education for Hazard Management

Effective hazard management requires an informed public, especially those at risk. In hazard management this is called public awareness. Public awareness campaigns disseminate information about the types of hazard, the effects of a hazard, the measures available to reduce the impact, and the actions to take when the hazard strikes.

Typical public awareness activities include:

- film and video programs that illustrate and describe the hazard and the risk and demonstrate what can be done to prevent or mitigate losses
- radio programs
- school curricula and booklets that include lessons and projects about hazard mitigation
- comic books (perhaps based on the films or video programs) made available for general distribution
- posters placed around the community to act as a general reminder of the issues
• presentations on the subject made to public groups or private organizations (e.g., neighborhood councils)
• brochures and handouts distributed door-to-door or at public event, fairs, etc.
• features or articles in local media, especially periodicals.

It is crucial to promote disaster awareness in areas where risk and vulnerability are high and people are indifferent to potential hazards.

Public awareness activities can help motivate the public to initiate precautionary measures. Such activities can influence decision making at all levels. However, public awareness will not be successful unless it is continuous and highly visible.

A public awareness program for disaster mitigation describes or demonstrates techniques that can be taken to keep a disaster from happening. These can include cultivating drought-resistant food crops, making structural improvements to buildings to withstand the forces of earthquakes or high winds, and siting buildings or agricultural land out of floodplains.

Public awareness is also an important disaster preparedness tool. Preparedness awareness activities are designed to inform the public about what individuals can and should do to protect themselves and their property. Disaster preparedness activities naturally vary with each type of disaster. In the case of high winds, people would be encouraged to board up windows, batten down loose objects, etc. In the case of flooding, evacuation routes would be identified for the public. If a communicable disease epidemic threatens, information about its mode of transmission and means of control would be important.

Timing for a public awareness program in disaster preparedness depends on the type of disaster. For predictable and seasonal hazards such as flooding and high winds, a program of public awareness should be initiated immediately before and during the season. For slow-onset disasters (e.g., drought), implementation should begin as soon as there are indicators of its development. For non predictable events (e.g., earthquakes), issues of preparedness need to be brought continuously to the public's consciousness.

**Economic Mitigation**

The purpose of economic mitigation is to reduce the disaster's impact on the economy and on the economic well-being of the disaster victims. This is done by strengthening those sectors of the economy that are particularly vulnerable to disasters, by diversifying the economy, by introducing or expanding "disaster-resistant" economic activities, and by spreading or relocating economic activities to less vulnerable areas so that not all the principal enterprises would be affected at the same time. Insurance or other economic risk-spreading activities are also possible.

Economic mitigation uses the same general methodology employed to reduce physical losses. Once hazard mapping has been completed, planners identify those sectors of the economy that are vulnerable to disasters. This is done by relating risk to economic activities or means of production. First, the key elements of the economy and those that are not particularly vulnerable to disaster are identified. Often this is not difficult, especially for countries that have one-crop economies or only a few industries that earn foreign currency. Every economic activity is examined to determine if a hazard could affect a significant portion of that activity. This
analysis is conducted on both the macro and micro levels. In other words, even though a flood may not have a significant economic impact on a country as a whole, it may have a major impact on a community or region.

Economic vulnerability determinations should consider other critical activities and installations. Energy facilities and systems are of prime concern, as are transportation networks, fuel distribution facilities, road systems, and financial institutions. Even though the means of production may not be affected by a disaster, the disruption of transportation networks can make difficult the marketing or distribution of goods.

Economic diversification and insurance are the two primary economic mitigation measures. Diversification spreads the risk so that if a disaster occurs, the total losses in any one area or sector are acceptable. For many countries diversification can be a difficult choice. Small nations that are dependent upon one or two crops for their livelihood may find it politically and economically difficult to justify diversification simply on grounds of disaster mitigation. In this case, long-term development choices come into play. The decision may ultimately rest more on political or economical factors than on disaster mitigation strategies.

Insurance can play a major role in mitigating disaster losses. Unfortunately, there are too few programs currently available for low-income persons in the developing countries, although new programs and alternative insurance schemes are being developed.

In some cases governments and large economic institutions have found alternative ways of providing insurance to low-income people. For example, cooperatives can often be insured even though individual farmers who are members of the cooperative cannot. If a disaster occurs, the insurance pays the cooperative, which in turn divides the proceeds of the insurance among its members.

The indirect effect of insurance is also important to consider. Disaster claims paid for large institutions, facilities, installations, or structures can infuse much needed cash into the local economy. This can have a spin-off effect reflected in increased jobs, increased purchases and orders for local suppliers, and other economic boosts to the area affected by a disaster. Thus, even if it is not possible to insure low-income families and their houses, farms or business, the objective of disaster management should be to insure the maximum number of larger economic activities.

**Adjusting On-Going Development Activities**

Adjustment to on-going development programs is a major way to address disaster mitigation. Many development projects have the potential to reduce either physical or economic vulnerability of families and communities. For example, housing programs can incorporate, often at little or no additional cost, a variety of disaster-resistant construction and planning techniques; unfortunately these measures are frequently overlooked because the development program planners are not aware of disaster mitigation opportunities. Thus, an important function of disaster management is to review and adjust normal development programs so that they help mitigate or prevent future disasters. Areas of particular interest are:

- housing and urban development programs (siting and construction)
- establishment of new settlements
• forestry projects
• agricultural development projects land reclamation
• rangeland management

Diversification And Expansion Of The Social Support Network

The level of disorganization that results from a disaster is an inverse function of the level of social organization of the community. Societies with an overlapping complex of social organizations, both formal and informal, can more easily absorb a disaster and more quickly respond. In Third World poor communities, the network of social organizations is usually minimal; as a consequence, a disaster can have a far greater impact on the poor community.

Diversification of a community's social structure is an important mitigation measure. For the most part this can best be accomplished through extending normal development work in one of three ways. The first is institution building. Local organizations that serve as a means of coping with disasters or providing support to disaster victims should be identified and strengthened. A conscious effort to increase the organizations, capacities and skills can enhance their abilities to deal with crises.

The second activity is to increase the number of coping mechanisms within the community. By developing formal institutions and linking these groups to outside resources, communities can establish vehicles for intervention and assistance.

The third activity is to broaden the scope of service of local groups and to encourage activities that promote cooperation among different elements or groups within the society. Such cooperation can reduce the social impact of a disaster.

By increasing self-sufficiency and reliance on internal resources, agencies improve the ability of local people to cope with a disaster. This can be a mitigating factor and can help to speed recovery.

Measures For Mitigating An Impending Refugee Crisis

Unfortunately, measures for mitigating refugee situations as they begin to occur are poorly developed and documented, and rather unsuccessful. The few measures that the international community has at its disposal are not well defined, and governments are often reluctant to exercise the ones that they do have. In the early 1980s, many humanitarian agencies began to talk of "early warning activities" and the development of political and humanitarian interventions that could possibly prevent or mitigate a crisis from escalating into a massive refugee situation. These discussions have thus far proven unfruitful, except to further emphasize the links between certain natural disasters and the political consequences that often follow-along with conflicts that lead to refugee migrations.

For refugee mitigation measures to be successful, a system of early warning must be in place to alert governments and humanitarian agencies of an impending crisis. The early warning would be based on indicators that a political situation could lead to armed conflict resulting in displaced persons and possibly in refugees seeking asylum in another country. Recent research has shown that a number of indicators can point to an impending crisis. Unfortunately, there is
tremendous debate as to which interventions are then possible. The four most commonly discussed outside interventions are:

- **Political intervention by outside governments or intergovernmental organizations such as the United Nations.** Political interventions can range from military intervention to political or economic sanctions being taken against the country. Interventions are most often limited to expressions of concern by friendly nations.

- **Public opinion and moral persuasion.** Widespread public outcries against humanitarian abuses are considered to be the most effective tool for mitigating these abuses, although totalitarian governments have shown a remarkable ability to ignore world-wide opinion in many cases. However, a major public outcry against a particular situation may influence outside governments to take political or economic sanctions that could lead to resolution or mitigation of the situation.

- **Linking aid to human rights policies.** One measure sometimes used by western democracies is that of making economic or development assistance dependent upon the observance of human rights standards. This policy, first introduced by the Carter administration in the late 1970s, had mixed results. Most observers attribute this to an unequal application of the policy due to geopolitical considerations. It is likely, however, that this approach will continue to be advocated as an alternative to direct political intervention.

- **Internal interventions.** Thus far, most mitigation measures that have been discussed are those actions taken by governments or intergovernmental organizations outside the country where the situation is developing. There is often little that disaster managers can do inside the country. The measures are generally limited to moral persuasion and trying to influence public opinion. These are examples of nongovernmental organizations within a country helping to reduce tensions and alleviating some of the problems. For example, church organizations can often be effective mediators between parties in conflict. Relief organizations can frequently serve as a bridge between those seeking reconciliation. International organizations can often help reduce human rights abuses by placing large numbers of staff members in an area where abuses are occurring. These individuals serve as de facto observers and, by their presence, reduce human rights abuses. Nongovernmental organizations can often work in a partnership with the press to create a climate of accommodation and/or to help stem a growing crisis.

We must acknowledge, however, our minimal understanding of effective means for reducing a crisis that would create displaced persons or refugees. Agencies must understand that attempting to exercise these measures in a crisis may endanger their personnel.

## II. Preparedness Tools

The most important preparedness tool is the disaster plan and its various components. Every organization that responds to a disaster should develop a plan that:

- organizes the response
- establishes an organizational structure for each phase of the disaster
- establishes objectives, priorities, and goals for the organization
- assesses resources
The development of the disaster plan permits disaster preparedness training, which is an equally important tool in preparedness.

III. Tools of Post-Disaster Management

A disaster manager uses a variety of tools to plan and manage disaster response. Most important of these are plans and procedures, policies, codes and standards, and standardized programs or program structures. The next four sections examine in detail these important tools.

Plans And Procedures

Plans and procedures are the most important tools of disaster management because they structure and guide emergency action. Plans are based on the premise that it is better to make your decisions long before a disaster strikes than in the aftermath of a disaster, when information is inaccurate and the situation is confusing and often unknown.

The primary types of plans and procedures are:

- **Disaster Plans.** These include preparedness plans, such as warning and evacuation plans; sheltering plans; disaster and needs assessment plans; search-and-rescue plans; and emergency services operations plans. Disaster plans are prepared on the basis of known risks, estimated impact areas, and predicted needs.

- **Contingency Plans.** Contingency plans are actions planned in anticipation that something unexpected might occur. For example, a government may determine that it can handle a disaster of a certain magnitude; it would then develop its plans accordingly. However, on the chance a larger magnitude disaster would outstrip its capacity to meet all the needs, a contingency plan for outside assistance might be developed.

- **Forward Planning.** This planning term concerns the development of specific plans to meet an immediate emergency. Forward planning is usually based on an early warning of an impending threat (for example, a warning from a meteorological service that a cyclone is likely to strike a certain community, or information that large numbers of refugees might soon seek asylum in another country). Forward planning usually involves the pre-positioning of emergency supplies and the preparation of emergency response services and resources for action.

- **Standard Operating Procedures (SOPS).** SOPs are developed within an organization to provide standard responses to anticipated situations. The objective of a standard procedure is to help make the response routine and to eliminate the need for a lengthy decision-making process. If certain criteria are met, the response is triggered automatically.

SOPs for specific disaster types in certain regions can often be compiled and presented in an emergency action manual. These manuals establish the tasks that must be carried out during each phase of an emergency and describe the procedure for accomplishing each in the proper sequence. They also structure the response so that everyone in the organization
knows what is expected and at what point each event should happen. They also structure the response so that each succeeding activity builds upon previous actions.

Policies

In providing assistance to disaster victims, organizations often propose many differing approaches and programs. Different approaches often result in unequitable or unequal provision of materials and services. This can cause problems for the host government and for organizations with long-term commitments to the disaster-affected area.

Uniform disaster policies are one way to avoid these problems. Such policies provide a mechanism for shaping disaster mitigation and vulnerability reduction efforts as well as emergency response and reconstruction. They also provide a basis upon which programs can be coordinated, and in some cases, integrated.

Relief and reconstruction policies should ideally be set as part of the disaster preparedness process. However, if they do not exist at the time of a disaster, they should be established during the initial stages of emergency response.

Normally, the host government is responsible for the development and implementation of policies, but all major organizations, especially those that will be providing substantial relief aid, should participate in the process.

Policies should be straightforward and concise. Simplified, brief policies increase the chances of voluntary compliance. Policies must be flexible, permitting relief agencies to adapt their programs to the specific requirements of the communities in which they are working. The objective of policies is to guide action, not to dictate the precise nature and approach of all agencies. It is also important to incorporate a consistent development philosophy and goals into disaster policies.²

Codes And Standards

Codes and standards are a primary disaster management tool used to mitigate losses and control reconstruction activities in certain sectors. In the housing sector, building codes or performance standards are used to set the minimum acceptable safety levels for houses and buildings. Specific codes and performance standards are also developed for hospitals, lifelines (water, sanitation, electrical and transportation systems), and critical facilities (government installations, communications installations, etc.).

Program standards are used to establish the minimum levels of assistance and support that should be provided to disaster victims. In famine and refugee relief programs, feeding standards are set according to nutritional requirements. For example, 1800 calories per person per day is considered the minimum average standard for food supplied to refugees or famine victims as part of a daily ration.³ Other standards may be applied to water supply, material assistance and services offered by relief agencies.
Standards are normally set by disaster managers in each relief agency, but there is a growing trend internationally to develop common, uniform standards for many of the social and humanitarian services offered universally.

**Standardized Programs Or Program Structures**

A relief agency will commonly develop a standard approach for responding to a recurring need in a specific type of disaster. Agencies trying a particular approach in one disaster will often develop a program model that can be used in similar disasters in the same region. Some successful examples of standardized programs are:

- supplementary feeding programs
- shelter-to-housing programs
- housing education programs
- materials distribution programs
- food-for-work programs.

Some agencies feel that a standard program will not meet all the needs of victims in different situations; yet they recognize the need for standardizing the management of the disaster response. These agencies often develop standardized program structures, which establish the key positions in an emergency program, develop an organization chart, and provide the preliminary resources necessary to initiate programs. Sufficient authority is delegated to the program staff to enable them to design and implement a program tailored to the particular needs of the affected community. Standardized program structures are workable only if the personnel are experienced and trained disaster managers.

**Programs**

Programs are the principal tool of relief and reconstruction. In disaster management the term "program" describes a set of activities carried out by an organization within a specified time, to accomplish predetermined objectives. A program may be made up of two or more sub-units of activities generally called projects. In a pre-disaster environment programs are usually long-term and have a small, full-time, professional staff. In a post-disaster environment, programs are usually short-term, with limited budgets and a large temporary staff formed around a small core of professionals. Some common examples of programs are housing reconstruction programs, food aid programs, preventive health programs, and food-for-work programs.

**Public Awareness**

Post-disaster programs can have an enormous impact on a community. It is essential that they are planned to be effective and appropriate for the community, that they meet only the needs the community cannot meet for itself, and that the program contribute to the development of the community. This frequently means that a program's objectives should include the participation of the victims in the program planning and design. The program should have an educational component that will upgrade the level of knowledge in the community, to prevent or reduce a future disaster. The program should also be tied to a long-range integrated development scheme.
Emergency Response

The primary purposes of public awareness activities during an emergency are to:

- alert the public
- instruct the public about the nature of the danger (repeating information from the preparedness stage)
- describe actions the public can take to protect their property and personal health, and warn people about what not to do
- explain what to do for food, shelter, medicine, or how to obtain assistance in locating missing persons.

The duration of the emergency period and its time of occurrence are functions of the type of disaster. The emergency period for an earthquake is usually the first week after the event. The period for high wind storms begins 48 hours before the storm strikes and lasts for approximately a week to 10 days afterward, depending on flooding. Slow-onset disasters such as droughts have an emergency period that continues until lives are no longer in danger. The timeframe for the emergency period is typically very compressed, and public awareness messages are usually coordinated with the civil defense or national emergency organization. The most common media are the radio, newspapers, special printed bulletins, and posters.

Emergency public awareness programs emphasize getting people to react. To do this, a well-planned and thoroughly developed system of getting timely messages out needs to be in place before the emergency occurs.

Awareness Activities for Recovery and Reconstruction

The general objective of public awareness during this period is to inform the victims how they, individually or collectively, can begin the process of recovery. Planning for these information activities should begin as soon as possible after the disaster.

The information needed includes advice about reconstruction of housing, sources of employment, or recovery in the agricultural sector. Recovery and reconstruction can and should begin immediately after the emergency has passed. Unfortunately this period is commonly characterized as one of false starts, mistakes, and waste. Accurate and timely information can help reduce delays.

As mentioned previously, the reconstruction period is often a long one, lasting several years for severe disasters. The public awareness program needs to have a similarly long perspective, and reconstruction information needs to be kept in the forefront of the public’s attention. It is also important to remember that reconstruction and recovery programs should encourage mitigation of future disasters.

The information or educational materials used for the post-disaster reconstruction period will probably be developed specifically for the reconstruction project. The public awareness program should be in support of and coordinated with reconstruction programs and government policies.
Enabling Legislation

An important tool for governmental disaster agencies is legislation to give the agency the extra-ordinary authority and resources it needs to operate both before and after a disaster. Without this legislation many agencies find themselves unable to direct or coordinate vital activities. When lines of responsibility are unclear, needless duplication of assistance may occur in some areas while other areas receive little aid.  

Letters Or Memoranda Of Agreement

Coordination between intergovernmental agencies and among some VOLAGS is often facilitated by formal letters or memoranda of agreement (or understanding). These define each agency’s role in relation to the other and set out spheres of joint activity as well as areas of sole responsibility.

References


2 Cuny and Thompson, Formulating Policies for Disaster Management, INTERTECT, Dallas, 198


4 Disaster Preparedness Guidelines, OFDA Disaster Preparedness Seminar, St. Lucia, 1979.
Chapter 5

Technologies of Disaster Management

Disaster managers should be familiar with certain technologies or sets of information used in disaster management. Among the more important are mapping, interpretation of aerial photography, communications, information management, logistics and computer applications, epidemiology and preventive medicine.

Mapping

Disaster management relies heavily on the use of maps and mapping techniques for control of disasters and for managing response. At a minimum, disaster managers must be familiar with a variety of different types of maps including topographic maps, land-use maps, hazard maps, geologic maps, vegetation maps, population distribution maps, seismic maps, and hurricane tracking maps. Disaster managers must know how to read maps. They must also know how to plot information accurately on the maps and how to interpret trends through map reading.

The introduction of microcomputers to disaster management will increase the use of computer-generated maps. Schematic maps generated through computer graphics are being used to provide updated information about disaster situations as they develop. For example, these maps can be used to monitor flooding and guide a disaster manager who must decide when to evacuate certain areas. By monitoring the stream flow and water level at an upstream location, a disaster manager can map the expected flood zone and predict threatened areas, the extent of the flooding, and areas that should be evacuated on a priority basis. The manager can likewise determine where to focus flood control activities.

Computer-generated maps are used in risk analysis, vulnerability analysis, evacuation planning, flood monitoring, damage assessment, and reconstruction planning.

Aerial Photography And Remote Sensing

Aerial photography used wisely is a valuable tool for disaster managers. It can be an expensive tool if misused. Disaster managers must know how to interpret aerial photography and how to apply it to both pre-disaster planning and post-disaster response activities. Possible uses of aerial photography include hazard analysis and mapping, vulnerability analysis and mapping, disaster assessment, reconstruction planning and management.

Remote sensing is the acquisition of information about a subject that is at a distance from the information-gathering device. Weather radar, weather satellite, seismographs, sono buoys, and videotape are examples of remote sensing systems. Aerial photography is a form of remote sensing, but in disaster management the term generally refers to the use of satellites with imaging systems that produce a computer-generated image resembling a photograph and with other electronic monitoring devices. For example, meteorological satellites track hurricanes by remote sensing. The "picture" of the hurricane is a computer-generated image made by the satellite's sensors.

The use of remote sensing in disaster management is increasing. Pre-disaster uses include risk analysis and mapping; disaster warning, especially cyclone tracking, drought monitoring,
volcanoes, large-scale fires and agricultural production; and disaster assessment, especially flood monitoring and assessment, estimation of crop and forestry damages, and monitoring of land-use changes in the aftermath of a disaster. Meteorological satellites monitor weather patterns, detect and track storm systems, and monitor frosts and floods.

**Communications**

Electronic communications are an important technology of disaster management. Electronic communications are used for coordination and control, assessment, reporting, monitoring and scheduling logistics, and reunification and tracing separated families. A disaster manager must be familiar with communications equipment and their limitations. He or she must understand the effective use of communications networks both prior to and in the aftermath of a disaster.

A disaster manager must above all know how to communicate, what to communicate, and with whom to communicate, using the different technologies available. Electronic communications too often give disaster managers the impression that they can control a situation simply by communicating. The information that comes in through electronic communications can often overwhelm and/or misinform a manager. Thus the manager must be knowledgeable about the systems, but he or she must also know how to structure the communications systems. Structuring will allow rapid communication of vital information and accurate assessment of a developing situation.

**Information Management**

Disaster management is highly dependent on accurate information collection and interpretation. Disaster managers must therefore be familiar with how to collect, structure, and evaluate information in emergency situations. This is usually done by establishing an information management system. In recent years microcomputers have provided disaster managers with a new tool for structuring information and data and analyzing information patterns and trends. Microcomputers are now routinely used for program planning, project scheduling and monitoring, management of logistics, damage assessment, casualty management, communications, and cost accounting management.

**Logistics**

Every disaster manager eventually becomes involved in logistics. Therefore, he or she must be familiar with basic logistics planning, inventory management, warehousing and stock control procedures, materials distribution methods, and accounting procedures. Logistics planning can include, for example, evaluating the capability and capacity to move supplies through the relief system identifying bottlenecks and developing alternate solutions. Logistics planning in a country struck by a disaster might include the estimation of the capacity to receive supplies at air and sea ports and to unload the supplies and reload into trucks. It might include determining the sufficiency of trucks of the right size and type, and the availability of parts and fuel for the trucks. Other considerations might be adequate roads to the site of relief, adequate warehouses at collection points, and a distribution system with the administrative capability and the methods to deliver the goods to the final point of utilization.

**Epidemiology**

Epidemiology is the branch of medicine that investigates the causes and control of epidemics. In relation to disasters epidemiology has come to mean the evaluation of all the causes of the
occurrence or nonoccurrence of a disease (and more broadly of the death and injuries) resulting from a disaster. Epidemiologic surveillance after disasters and refugee crises includes identification of diseases to include in the surveillance; the collection, interpretation and utilization of data; laboratory diagnosis of samples; development of policies and plans for a public health program; and establishment of a program for the control of communicable disease. The last two points coincide with programs in environmental health management and preventive medicine.

**Additional Technologies Of Disaster Management**

Many disaster managers become involved with disasters through their specialized job skills or through their work in a specific sector of the government or economy. For example, an engineer in a department of public works may need to know the technologies of road repair after flooding or landslides and of bridge repair after an earthquake. The following are other examples of skills or technologies for which special training may enhance the individual's disaster management capabilities.

**Agriculture, production, and food systems and technologies** that relate to disasters identify disaster-resistant crops, methods of restoring crops damaged by disaster, restoration practices for soils damaged by a disaster, and alternative crops to replace quickly the losses from disasters. The last action will minimize dependence on outside food and economic aid.

**Disaster assessment** is the technique of evaluating the damage and the needs created by a disaster. Useful disaster management assessment identifies procedures for data collection and information dissemination; it also identifies priorities for relief assistance.

**Refugee camp planning** is essentially the discipline of town planning but with the added requirements of developing a human community environment under the crisis of emergency conditions. Such planning must take into account a volatile political reality and an uncertain future for the camp's residents. Additional aspects of refugee camp planning include the technologies of sanitation, security, circulation and transportation, water and food supply.

**Meteorology** is of use to disaster managers involved with warning, communication, search and rescue in areas subject to high winds, flooding, and even drought.

The following are additional specialized technologies that will further enhance a disaster manager's skills:

- personnel administration
- cost accounting
- government and nonprofit accounting
- critical path techniques
- general geology

Such a list could be much longer, but the purpose of this section is to bring to the attention of the student the existence and the importance of these technologies. As stated at the outset of this course, a better trained and more knowledgeable disaster manager can contribute to more effective disaster services; he or she can ultimately reduce the disruption to society caused by natural and man-made disasters.
Aim & Scope of Disaster Management

Course Evaluation

This information will be used to improve the course for other students. Thank you for taking a moment to complete this form.

Date you finished the course: ________________________________________________

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☐ 0 to 6 years  ☐ 7 to 12 years  ☐ 12 to 16 years  ☐ more than 16 years

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