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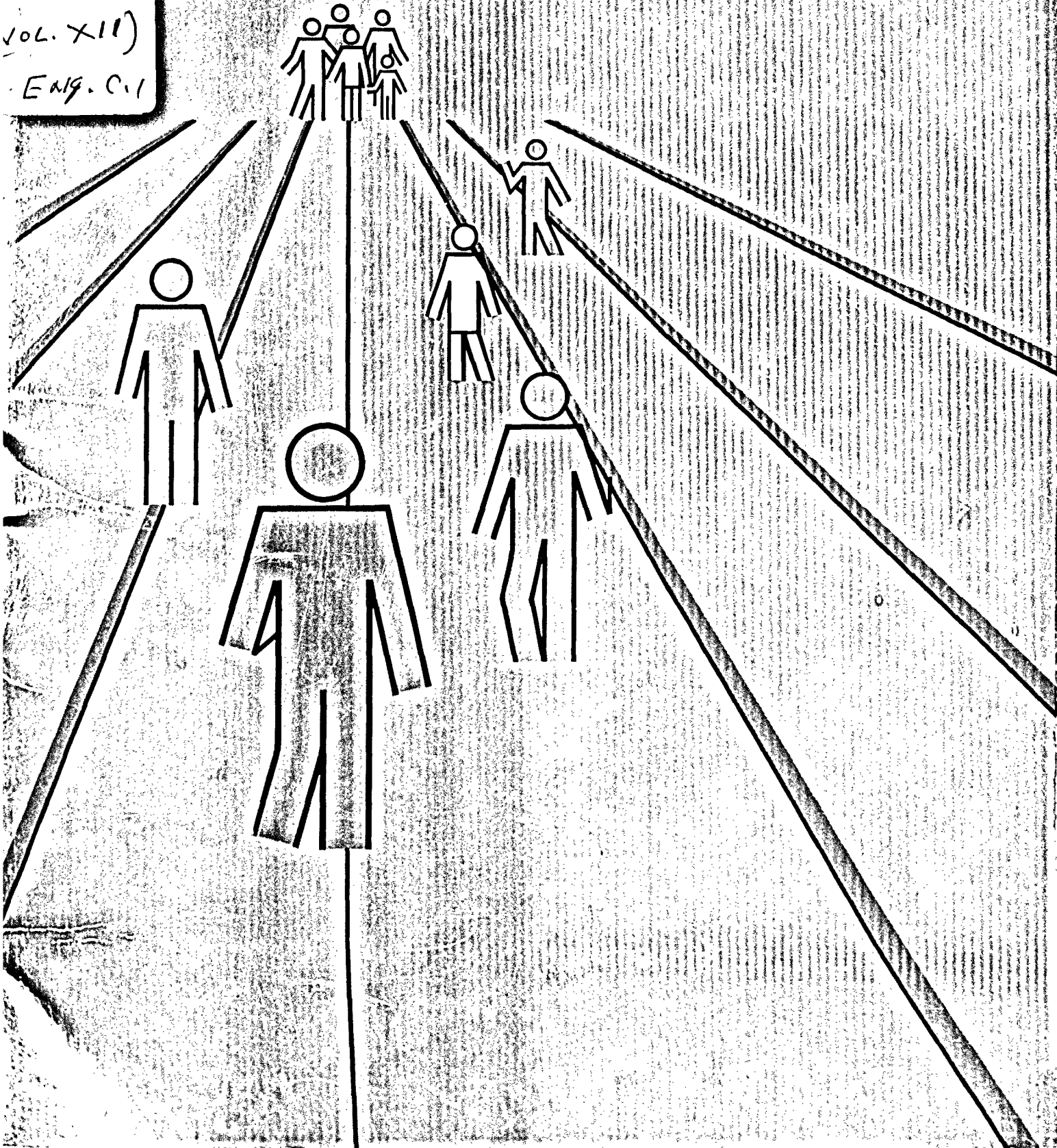
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# SOCIAL AND SOCIOLOGICAL ASPECTS

DISASTER PREVENTION AND MITIGATION VOL. 12  
A Compendium of Current Knowledge



OFFICE OF THE UNITED NATIONS  
DISASTER RELIEF CO-ORDINATOR  
Geneva

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# **Disaster Prevention and Mitigation**

**A Compendium of Current Knowledge**

*Volume 12*

***SOCIAL AND SOCIOLOGICAL ASPECTS***



**UNITED NATIONS**  
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**UNDRO**



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## FOREWORD

The Office of the United Nations Disaster Relief Co-ordinator (UNDRO) presents the twelfth volume in the series "Disaster Prevention and Mitigation". These studies have been prepared in accordance with General Assembly resolution 2816 (XXVI), which calls upon the Office of the United Nations Disaster Relief Co-ordinator to promote the study, prevention, control and prediction of natural disasters, including the collection and dissemination of information on technological developments.

Their purpose is to identify and collate existing knowledge and expertise which may be applied directly toward the prevention of natural disasters, particularly in developing countries and to identify the gaps in current knowledge which require concerted action by the international community.

During the last twenty-five years the international community has become increasingly alarmed by disasters, which have tended to be more destructive as they affect ever larger concentrations of population. While the response of the international community has been focused primarily on relief action, it is now realized that the actual and potential consequences of disasters are becoming so serious that greater emphasis will have to be given to planning and prevention. The effects of natural disasters must be analysed not only in technical and scientific terms, but in humanitarian, social and economic terms as well. Natural disasters are a formidable obstacle to development. In terms of percentage of gross national product, the losses caused by disasters in some disaster-prone developing countries more than cancel out any real economic growth. There has thus been a growing awareness on the part of governments of the need to focus more attention on disaster preparedness and prevention, and a recognition of the fact that pre-disaster planning should be an integral part of any national development policy.

The sociology of disasters is a relatively young discipline compared with those of seismology, earthquake engineering, hydrology, meteorology, etc. At the time of publication of this study, various universities and institutes in North America, Europe and Asia are establishing programmes for research and training in disaster analysis and management. The social and sociological aspects of disasters are increasingly becoming an important component of such programmes, and it is encouraging to observe the rate at which the social and economic aspects of disaster management are merging with the more traditional technical disciplines to form a unified discipline in disaster prevention, preparedness and management. Few global studies, if any, of the social and sociological aspects of natural disasters have been published to date, although many detailed social evaluations of disasters have been carried out in many countries of the world. In this study, UNDRO has sought to pool the findings of these many and varied studies, to provide a general framework for analysis and evaluation of the social content of the disaster problem. How do communities at large react to the threat of disaster or to disasters themselves? Is individual behaviour different from collective behaviour in times of emergencies? Can communities be educated and trained so as to respond predictably to a disaster? Is it always necessary to evacuate people following disasters? Are disaster victims necessarily passive by-standers during emergencies, or, indeed need they be? How can rehabilitation and reconstruction be accelerated through social planning and programming. What further research is needed to strengthen social response to disasters? These and many other questions are addressed in this volume, which should be seen as an initiative to set out basic principles of social analysis and planning to mitigate the impact of natural disasters.

All publications in the series "Disaster Prevention and Mitigation" are addressed to a broad range of users, including high-level government officials, administrators, technical experts in the field and specialists in the various areas of disaster prevention. They are also designed to guide officials at the national and regional level in the formulation of policies for preventive measures against the types of natural phenomena affecting their region.

The Office of the United Nations Disaster Relief Co-ordinator invites the readers of this volume on *Social and Sociological Aspects* to provide the United Nations with their comments

and suggestions. Although the present volume touches upon the subject of preparedness, as any sociological study of disasters inevitably must, volume 11 on *Preparedness Aspects* will provide the reader with a comprehensive and much more detailed review of current knowledge specifically in preparedness.

This study was prepared by the Office of the United Nations Disaster Relief Co-ordinator with the collaboration of Mr. Everett Ressler and Mr. Alan Taylor, and was reviewed by Professor E. L. Quarantelli of Ohio State University, USA. This series of publications has been made possible by the active co-operation and financial assistance of the United Nations Environment Programme (UNEP).

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## MEANING OF TERMS

In the numerous and varied activities associated with disaster prevention and preparedness, a number of terms and expressions are entering into common usage. In the interests of uniformity and in order to avoid confusion, it is desirable that each of these terms and expressions should have a meaning that is widely accepted. The office of the United Nations Disaster Relief Coordinator (UNDRO) has provided the following terms together with their meanings.

**Preparedness.** Disaster preparedness may be described as action designed to minimize loss of life and damage, and to organize and facilitate timely and effective rescue, relief and rehabilitation in cases of disaster.

Preparedness is supported by the necessary legislation and means a readiness to cope with disasters or similar emergencies which cannot be avoided. Preparedness is concerned with forecasting and warning, the education and training of the population, organization for and management of disasters, including preparation of operational plans, training of relief groups, the stockpiling of supplies and the earmarking of the necessary funds.

**Prevention.** Disaster prevention may be described as measures designed to prevent natural phenomena from causing or resulting in disaster or other related emergency situations.

Prevention concerns the formulation and implementation of long-range policies and programmes to prevent or eliminate the occurrence of disasters. On the basis of vulnerability analyses of all risks, prevention includes legislation and regulatory measures, principally in the fields of physical and urban planning, public works and building.

**Mitigation.** The concept of "mitigation" spans the broad spectrum of disaster prevention and preparedness. Mitigation means reducing the actual or probable effects of an extreme hazard on man and his environment. Thus an emergency plan if properly executed can have a mitigating effect on a disaster just as the proper observance of building and landuse regulations designed to avert disaster. Mitigation is, in effect, prevention to a degree.

## Chapter I

### CONTEXT AND OBJECTIVES

#### Introduction

With adequate preparedness, many emergency situations can be prevented from becoming disasters. In the past, a major limitation to more effective disaster

mitigation has been a basic lack of information about disaster-related social factors. However, this is changing. All too frequently, programmes concerned with disaster preparedness and post-disaster response have been conceived and implemented simply as technical responses to

FIGURE 1  
Victims of the Bangladesh cyclone of 24 May 1985



(Credit : Bangladesh Photo Journalist's Association)

technical problems, i.e. a preparedness plan, a medical emergency, a sanitation problem, a shelter need, a water shortage. The social considerations and the milieu within which such technical programmes must be implemented have not been adequately considered, as is substantiated by the often repeated anecdotes of ineffective preparedness planning, warning system failures, lack of anticipated public evacuation responses, need assessments which do not represent reality, relief agency structures which are not effective in emergencies and relief measures which are not appropriate. Technical "solutions" are frequently rendered useless by social realities.

Analysis of the social issues in emergencies begins with consideration of the fact that individuals act both singularly and in collaboration with others, and that groups also act both independently and in association with other groups. The social dynamic of an emergency is composed of a vast web of individual and group actions, from singular responses to international collaboration. Individual and group actions are influenced by many variables, including past experience, values and ideas, opinions and traditions, customs, desires, wishes, and resources.

Social science study of disaster-related human and group behaviour attempts to understand better what actions are taken, by whom and for what reasons, by what variables they are influenced, and what consequences they have.

It is hoped that the social considerations of disasters will be reflected in the implementation of disaster-related programmes.

### Objectives

A systematic review of experience provides the basis for a better understanding of the social dynamics of disasters, and is a necessity for effective disaster preparedness and post-disaster response. This publication attempts to :

1. Summarize various aspects of the impact of disaster on societies;
2. Review the findings of experience and social science studies regarding individual and organizational behaviour in emergency situations;
3. Suggest how social science information about individual and organizational behaviour in emergency situations can contribute to the prevention of or preparation for disasters, and to the better management of assistance in disasters.

While the general goal of this publication is to present existing knowledge about the social aspects of emergencies, it is also intended to provide a framework for raising new and additional questions. It is hoped that the materials in this publication will make the reader more sensitive to and observant of the particular social dynamics in each different situation, a process which begins with questioning.

### Scope

A comparison of disaster-related social processes, issues,

actions and problems over a period of time, between different persons, communities, cultures and countries, confirms that, while there are some unique factors, there are many important similarities which transcend individual or cultural differences. There are also many similarities in the social dynamics that occur in differing types of disasters, i.e. the human response to earthquakes, cyclones, and floods. It is the common features of human and organizational behaviour that provide a basis for proposing general principles.

To recognize the similarities is not to deny the differences. It is the uniqueness of each family, situation, community and country, the changing milieu within which people live, and the variable availability of information (to mention only a few factors) that provide a basis for *not* accepting unquestioningly conclusions drawn from another place or time. What is known today must be seen as a starting-point for further research and for additional efforts to understand better the causes of each new situation and the way in which events unfold.

While a great deal is known about the social aspects of emergency situations the limitations of present knowledge must also be acknowledged. Advances in the understanding of disaster-related problems in the last 10 years have been most significant, but disaster studies remain a comparatively new area of investigation. While studies have been and are being carried out in many countries, the bulk of the research to date has been done in developed countries. While recognizing these limitations, there is no alternative but to formulate principles on the basis of the information available, testing and challenging those principles in situations where their validity is open to question.

### Audience

This publication is written for a broad audience of persons involved in pre-disaster planning and emergency response activities, including persons engaged in programme implementation, planning and policy formulation. The social aspects of emergency situations are not simply an issue to be dealt with in local-level programming, but are an important consideration at all administrative levels, from specific programmes in individual communities to national and international assistance.

In order to make this publication as readable as possible and useful to a broad audience, every effort has been made to avoid specialized jargon.

### Focus

The primary emphasis of this publication is on the social aspects of preparedness and disaster management. The social issues of reconstruction, for example, have not explicitly been addressed. The principles of human and organizational behaviour are felt to be generally applicable across cultural, political and economic boundaries, so that the materials included should be of value to programme personnel in both developed and developing countries.

The concern of this publication is with "natural" disaster situations, such as earthquakes, cyclones, flooding, and tornadoes, and emphasis has been given to large scale emergencies, more toward the catastrophic end of the scale, than to small, localized events. While the social considerations of "man-made" emergencies such as explosions and fires, toxic substance spills, and transportation accidents have not been included, many of the observations about human and organizational behaviour mentioned in this publication are relevant. There has been a traditional practice of considering

"natural" and "technological" disasters separately, but there are in fact various reasons why the planning for "natural" and "man-made" disasters should be considered as a part of an integrated process. In many regards the social considerations in both types of emergencies are similar. "Man-made", or technological disasters, are increasingly a threat, even in the less industrialized countries.

The material presented is based on a wide range of literature and experience, and is summarized from a practical point of view.

## Chapter II

### DISASTER OVERVIEW: THE CHANGING TRENDS

#### General

In consideration of disaster trends, there is little cause for optimism. The spiralling population growth alone, in many countries, means that the number of people likely to be affected by potentially destructive natural phenomena is increasing. Another important and related factor is the increased pressure in most countries for people to live on and use marginal land which by its very nature may put inhabitants and property at great risk. Changes in the ecological balance and in the environment must also be considered a primary cause of increased vulnerability for large numbers of people.

While the extent of risk seems generally to be rising rather than decreasing, the negative trends are mitigated in part by certain positive trends including: improvements in the understanding of the technical aspects of natural phenomena and their consequences, better prediction and warning capabilities, a rising awareness of the social considerations of disasters, and greater sensitivity to the consequences of ecological degradation and population growth. Increasingly, pre-disaster planning is being given budgetary support, and there is an emerging trend to incorporate pre-disaster planning into ongoing development programmes. In this respect the last decade has been encouraging. For example, in the years following the cyclone and tidal wave disaster of 1977, the Indian State of Andhra Pradesh has established a disaster preparedness programme, enacted new legislation for post-disaster situations, initiated construction of coastal embankments, begun coastal afforestation as a shelter belt, and organized the construction of community cyclone shelters, as part of their efforts to minimize damage and save lives in future cyclones. In the Philippines a village level disaster preparedness programme, called the Barangay Programme, has been initiated and is gradually being expanded. Programmes such as these are being developed in many disaster-prone regions.

While it is useful to examine general trends, it is important to remember that vulnerability and risk vary from place to place. Disaster prevention or preparedness is most usefully examined in light of the actual risks to a particular community, family, or individual. The degree of risk (or proneness) to sudden natural phenomena varies between communities, and can vary within a community. Two entities with the same risk, e.g. cyclones, may have different vulnerability. Different hazards pose different levels of

risk. Table 1 illustrates the different risk of fatality for natural disaster and other hazards in the West Indies.<sup>1</sup>

TABLE 1

#### Risk comparisons for volcanic eruption, earthquake, hurricane and other hazards

Hazard	Risk of fatality, (per person per year)
Population living on flanks of volcanoes, Lesser Antilles, 1679-1978 .....	1 in 550
Population remaining on flanks of volcanoes during eruption, Lesser Antilles, 1679-1978 .....	1 in 15
Volcanic risk to whole population of West Indies <sup>a</sup> , 1679-1978 .....	1 in 58 000
Hurricane, West Indies, 1679-1978 .....	1 in 41 000
Earthquake, West Indies, 1679-1978 .....	1 in 79 000
Earthquake, California <sup>b</sup> .....	1 in 590 000
Flood (other than as a result of hurricane), West Indies, 1679-1978 .....	1 in 4 500 000
Aircraft accidents, West Indies, 1949-1978 .....	1 in 4 000 000
Fires, West Indies, 1800-1978 .....	1 in 46 000 000
Travelling by motor vehicle, Trinidad, West Indies, 1978 .....	1 in 3 500
Smoking 20 cigarettes/day <sup>c</sup> .....	1 in 200
Influenza <sup>c</sup> .....	1 in 5 000

<sup>a</sup> Quoted for comparison only, the whole population of the West Indies is not exposed to volcanic risk.

<sup>b</sup> Quoted in T. A. Kletz, "What Risks Should We Run". *New Scientist* 74, pp. 320-322.

<sup>c</sup> Apparently for Britain only, Kletz, *op. cit.*

The goal of disaster prevention and preparedness is to identify the risks and reduce people's vulnerability to those risks. In some communities much is being done, while in others the process of determining risk and taking steps to reduce that risk has only started and is a long way from providing tangible results.

#### Damage and loss

The annual global losses from natural disasters are significant. More than one million people are reported to have died in natural disasters during the period 1970-1981, with estimated damage in excess of 46 billions US dollars (see table 2<sup>2</sup>). Floods were the most frequent disaster,

<sup>1</sup> John Tomblin, "Earthquakes, Volcanoes and Hurricanes: A Review of Natural Hazards and Vulnerability in the West Indies", *Ambio*, vol. 10, No. 6, 1981, p. 343.

<sup>2</sup> John Tomblin, 1982.

TABLE 2

Preliminary review of human and economic losses in natural disasters,<sup>a</sup> 1970-1981

Year	Type of natural disaster							
	Windstorm (93 events)		Earthquake (67 events)		Flood (130 events)		Other <sup>b</sup> (67 events)	
	Total deaths	Damage <sup>c</sup> (\$US million)	Total deaths	Damage (\$US millions)	Total deaths	Damage (\$US millions)	Total deaths	Damage (\$US millions)
1970.....	305 159	490	88 144	569	2 628	1 155	949	
1971.....	10 131	600	1 050	818	2 205	542	231	
1972.....	734	3 542	10 400	801	1 654	228	4 250	
1973.....	3 214	360	1 060	—	1 113	918	100 000	4 000
1974.....	10 747	1 740	25 408	10	39 060	1 513	59 791	
1975.....	607	560	2 400	17	903	935	100 121	600
1976.....	1 785	1 370	282 355	5 485	945	571	948	
1977.....	15 307	1 551	3 196	801	1 812	522	1 247	
1978.....	2 440	115	15 122	—	3 551	342	1 863	
1979.....	2 185	1 630	1 441	3 504	2 874	36	848	
1980.....	1 078	620	5 954	4 762	2 730	878	301	
1981.....	698	83	5 365	1 800	4 628	1 421	1 231	1 532
TOTAL	353 832	12 661	441 895	18 567	64 103	9 061	272 133	(6 132) <sup>d</sup>

Sources : UNDR0; OFDA; Munich Reinsurance Company; Swiss Reinsurance Company; Smithsonian Institute; United States Geological Survey; and various other special reports.

<sup>a</sup> Involving 10 or more deaths and/or 1 million-dollar or more damage.

<sup>b</sup> Damage refers only to those events for which estimates of the value of property damage are available.

<sup>c</sup> Other events include volcanic eruptions, droughts, epidemics, landslides, and snowstorms.

<sup>d</sup> Few damage estimates for this category are available. Total has little significance.

comprising more than one-third of the disasters in that period. Based on the same statistics, windstorms were the next most frequent disaster, causing about one-fourth of all reported major disasters. Earthquakes, which caused the greatest number of deaths, also resulted in the highest monetary loss, estimated at over \$18,567 million.

The number of deaths in major natural disasters during the period 1970-1981 is skewed upward by very large losses in two catastrophies. More than 250,000 people were estimated to have been killed in the cyclone and tidal wave that hit Bangladesh in 1970, and over 240,000 people were killed in the 1976 earthquake in Tangshan, China. While most disasters have not resulted in loss of life to this extent, these examples serve as reminders of the potential for destruction.

The scale of physical destruction caused by disasters can also be impressive. The 1970 earthquake in Peru damaged 95 per cent of downtown Huaraz. In 1972, the earthquake in Nicaragua completely devastated the capital, Managua. The 1976 earthquake in Guatemala affected the housing of at least 1 million persons, over 15 per cent of the national population. The homes of almost one quarter of Fiji's population was damaged by one hurricane in 1976. The 1979 hurricane in Dominica damaged 80 per cent of all housing there.<sup>3</sup>

The physical destruction and social disruption can result in serious economic consequences for both affected individuals and for the society at large. For example, it is estimated that the gross domestic product (GDP) of the five countries of the Central American Common Market was reduced by 2.3 per cent over the period between 1960 to 1974 as the result of natural disasters.<sup>4</sup> Some countries have suffered damage from hurricanes equivalent to 15 per cent of their annual gross national product (GNP), e.g. the Dominican Republic in 1979, and Haiti, Saint Lucia, and Saint Vincent in 1980.<sup>5</sup> It is estimated that the Managua earthquake of 1972 would require an expenditure on restoration equal to the entire annual budget for that country's goods and services.

However, losses due to natural disasters cannot accurately be quantified solely in economic terms. Many of the consequences, such as lives lost, injuries, hardship, and missed opportunities, would be difficult to measure in quantifiable terms. Existing disaster statistics are not very helpful in this regard, for even the more obvious indicators, the numbers of people affected, injured and homeless, are seldom exact, and estimates of damage and economic losses are not very reliable.

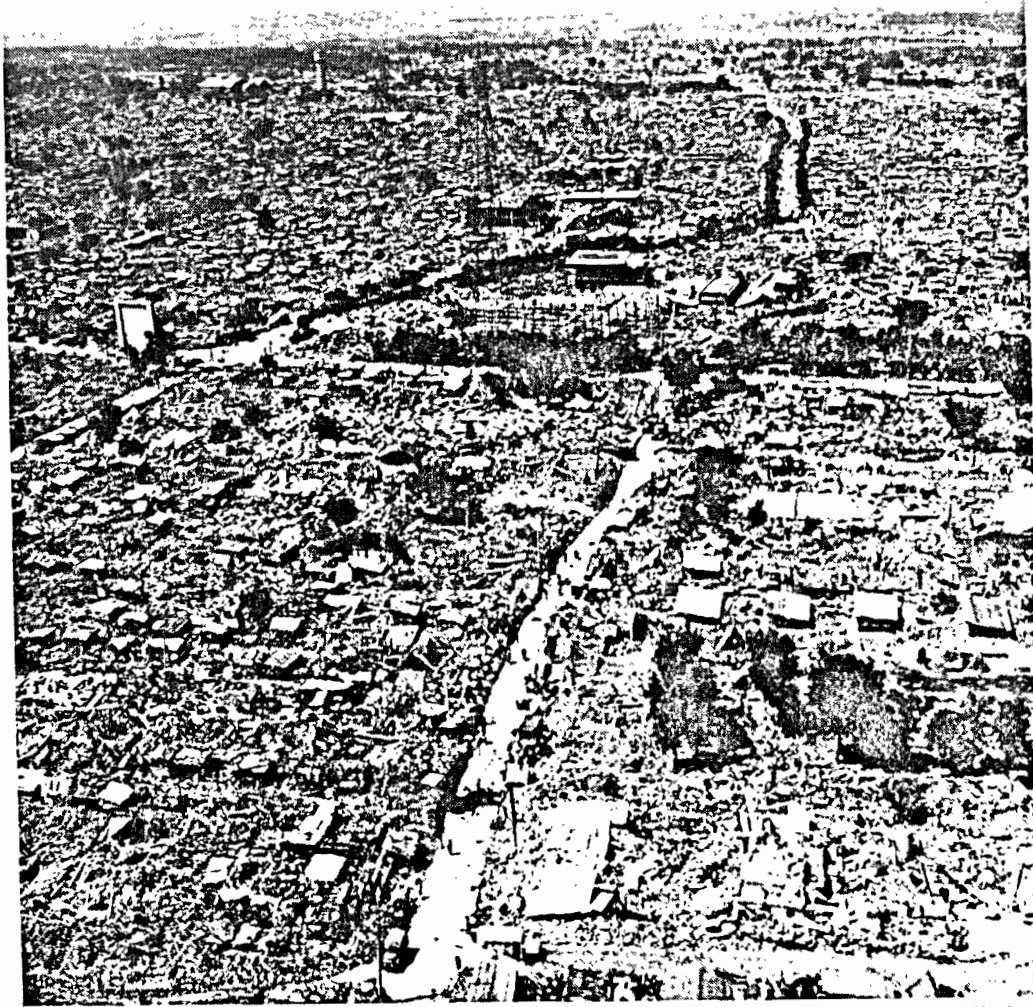
The impact (and consequences) of disasters on individuals and families is much more than that depicted

<sup>3</sup> United Nations Commission on Human Settlements, *Planning for Human Settlements in Disaster-prone Areas*, Report of the Executive Director, Fifth Session (Nairobi, 26 April-7 May, 1982), p. 6.

<sup>4</sup> *Ibid.*

<sup>5</sup> *Ibid.*

FIGURE 2



(Credit : Li Yaodong)

The Tangshan earthquake (China, 1976) left 240,000 dead and razed a major industrial city to the ground. Such are the extremes of disaster society is expected to guard against.

by productive capacity, or damage to housing, or acres of crops destroyed. The social costs are always considerable, although often hidden. For example, the sudden and forced changes brought by a disaster, the loss of a family member, the destruction of the family home, the relocation of families and/or businesses, the temporary or permanent loss of jobs, a disability, being forced to go deeply into debt, have long-term or permanent consequences which are difficult to measure.

### Patterns

Some countries are more prone to natural disaster than others, as illustrated in a comparison of reported natural disaster events (see table 3).<sup>6</sup> Certain patterns emerge : the amount of damage and lives lost usually bears a close relationship to the prevailing level of economic development. The smallest and the poorest countries are affected

most severely by natural disasters, and the poorest and most disadvantaged members of a disaster affected community are likely to experience the most serious consequences.

Vulnerability is not, however, merely an attribute of the less developed countries. The rising technology of the rich countries brings with it new risks : the more a society depends on advanced technology, the greater its potential for disruption when disaster strikes. However, that same technology also tends to provide certain important advantages, especially better monitoring and warning systems, and safer construction. This in turn contributes to the lowering of the death rate in disasters, while damage in monetary terms increases dramatically. In the United States, for example, in spite of the increase in population in the last fifty years, the number of deaths from natural disasters has declined while the damage in monetary terms has risen to an estimated 4 million dollars per life lost, with damage from a single hurricane often totalling hundreds of millions of dollars (see table 4).<sup>7</sup>

<sup>6</sup> Gunnar Hagman, *Prevention Better than Cure : Swedish Red Cross Report on Human and Environmental Disasters in the Third World* (Preliminary draft), 1984.

<sup>7</sup> Harold D. Foster, *Disaster Planning : The Preservation of Life and Property* (New York, Springer-Verlag, 1980), p. 175.

TABLE 3

Indicators of vulnerable and disaster-prone countries,  
based on USAID, OFDA, League of Red Cross and Red Crescent  
Societies, and World Bank Data

Country	Disaster events 1960-1981	People killed	Low-income economy	Middle-income economy	High-income economy
India .....	96	60 000	×		
Philippines ....	76	17 000		×	
Bangladesh ...	63	633 000	×		
Indonesia .....	59	17 000		×	
Japan .....	43	2 700			×
Brazil .....	39	4 100		×	
Iran .....	38	48 000		×	
Mexico .....	37	2 600		×	
Turkey .....	33	12 000		×	
Peru .....	31	91 000		×	
Korea, Republic of	27	2 900		×	
Burma .....	26	1 500	×		
Colombia .....	26	1 600		×	
Italy .....	24	6 100			×
Vietnam .....	22	8 800	×		
Bolivia .....	21	530		×	
Ecuador .....	21	640		×	
Pakistan .....	21	7 400	×		
Algeria .....	20	3 800		×	
China .....	20	247 000	×		
Nepal .....	19	2 900	×		
Morocco .....	18	13 000		×	
Sri Lanka .....	18	1 900	×		
Argentina .....	17	650		×	
Chile .....	17	8 000		×	
Haiti .....	17	6 400	×		
Nicaragua .....	17	106 000		×	
Costa Rica .....	16	70		×	
Ethiopia .....	16	103 000	×		
Senegal .....	16	70		×	
Upper Volta .....	16	870	×		
Greece .....	15	190		×	
Chad .....	14	2 300	×		
Yugoslavia .....	14	1 500		×	
Honduras .....	13	8 400		×	
Madagascar .....	13	420	×		
Mali .....	13	540	×		
Mozambique .....	13	1 100	×		
Afghanistan .....	12	540	×		
Niger .....	12	320	×		
Spain .....	12	1 900			×
Tanzania .....	12	590	×		
Gambia .....	11	200	×		
Laos .....	11	400	×		
Mauritius .....	11	20	×		
Panama .....	11	100		×	
Somalia .....	11	19 000	×		
South Africa .....	11	630		×	
Sudan .....	11	310	×		
Dominican Republic .....	10	3 300		×	

TABLE 3 (continued)

Country	Disaster events 1960-1981	People killed	Low-income economy	Middle-income economy	High-income economy
Hong Kong ..	10	680		×	
Malaysia .....	10	310		×	
Thailand .....	10	1 300		×	

TABLE 4

Loss of life in the United States due to hurricanes, floods,  
and tornadoes, 1925-1977

Years	Hurricanes	Floods	Tornadoes	Total
1925-1929 .....	2 114	579	1 944	4 637
1930-1934 .....	80	146	1 018	1 244
1935-1939 .....	1 026	783	921	2 730
1940-1944 .....	149	315	835	1 299
1945-1949 .....	67	304	953	1 324
1950-1954 .....	217	293	885	1 395
1955-1959 .....	660	498	523	1 681
1960-1964 .....	175	242	230	647
1965-1969 .....	412	512	705	1 629
1970-1974 .....	146	1 000	703	1 849
1975-1977 .....	62	512	200	776

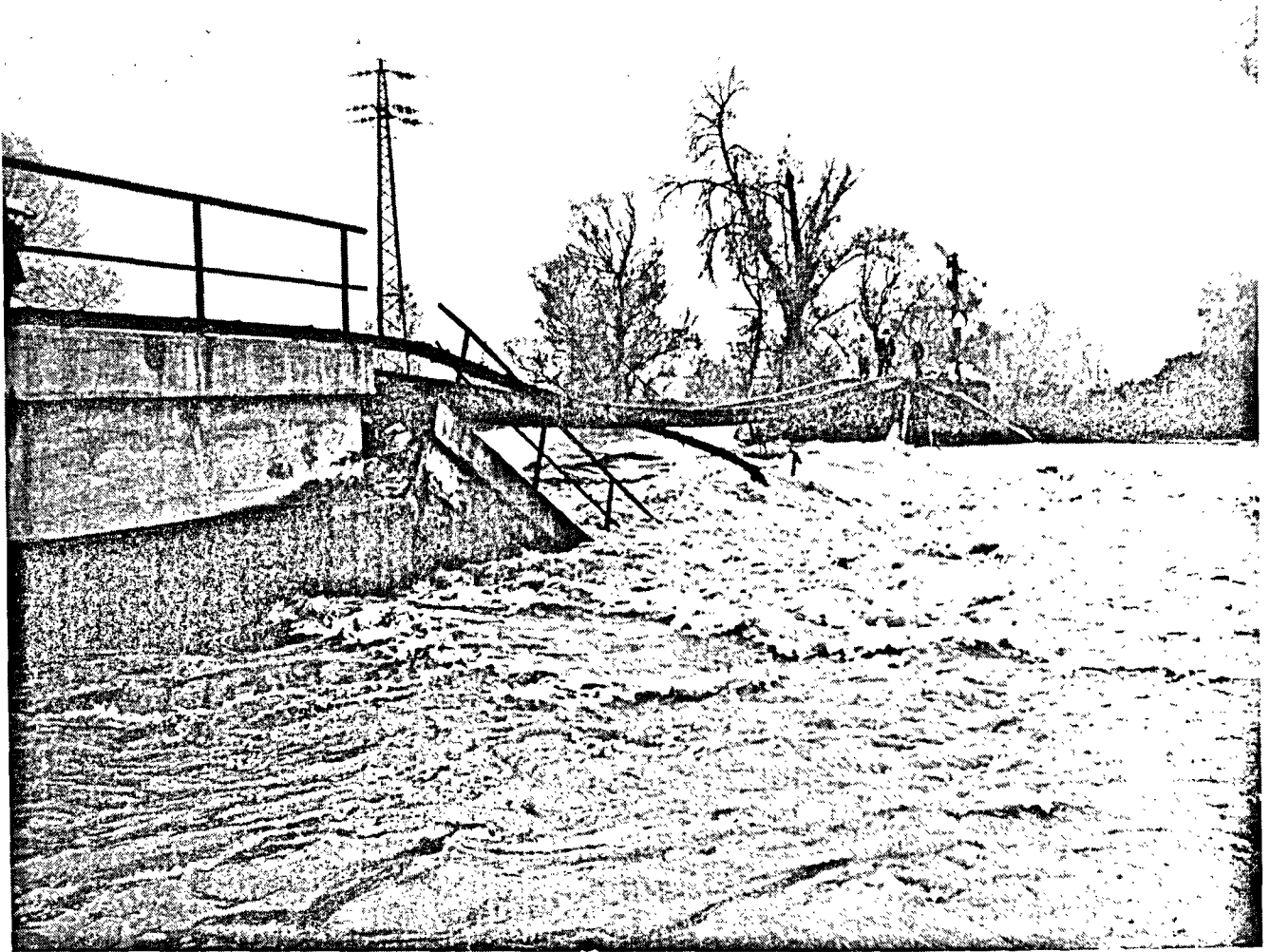
Sources : Schwartz (1979); Dacy and Kunreuther (1969); Foster (1980).

Risk patterns change over time. In addition to the already mentioned factors of population growth, development of marginal lands, continuing ecological degradation and an increasing reliance on sophisticated technologies, two other factors deserve mentioning: large shifts of the populations from rural areas to urban centres, and the changing use of building materials. The significant growth of cities, suggests that the major future disaster risks are likely to be urban related, rather than rural. This change has important implications for disaster prevention and preparedness. The changing patterns in the use of building materials will also reflect changing disaster risks. In review of future risks in the West Indies it was suggested that the general move to masonry in place of the traditional wood or tapia as a building material has resulted in houses with greater resistance to hurricanes, but conversely much greater exposure to damage by earthquakes. This observation is true of many other disaster-prone areas.

If countries are to reduce their losses rather than witness their continuing escalation, serious attention must be given to those aspects of social policy which will help, directly and indirectly, to reduce risk.



FIGURE 3



*(Credit : Vizedok Foto, Hungary)*

Floods are the most frequent of natural disasters. While generally less deadly than earthquakes, they cause considerable damage to agriculture and communications.

## Chapter III

### DEFINITION

Sociologically, a disaster is an event, located in time and space, that produces the conditions whereby the continuity of the structure and processes of social units becomes problematic. Disaster agents may differ as to their cause, frequency, controllability, speed of onset, length of forewarning, duration, scope of impact, and destructive potential (Dynes, 1975).<sup>1</sup>

#### When is a disaster a disaster?

The term "disaster" continues to be used in a variety of ways. In general usage, "disaster", implies a misfortune or calamity, hard luck, or anything of a ruinous or distressing nature<sup>2</sup> and an "emergency" implies a sudden or unexpected event requiring immediate action. However, the words "disaster" and "emergency" are used so diversely as to provide no universally accepted understanding of particular characteristics, or necessary actions. In part, the different conceptions of disaster stem from different uses by users. Thus a seismologist will define a disaster in relation to tectonic movements, relief administrators in relation to relief needs and political officials in relation to political consequences. In exploring the meaning of these terms, however, it may be useful to examine the underlying concepts.

When is a natural phenomenon, such as movement of the earth's plates or the occurrence of a high wind or heavy rain, a "disaster"? Must physical damage occur and, if so, how extensive must it be? Is loss of life necessarily a criterion of "disaster" or can temporary social disorganization also be a yardstick?

Is "disaster" determined by the magnitude of the effects? Can a "disaster" occur when only one individual is involved or only a small proportion of the population is affected, or must the effect be community-wide or further-reaching?

Is type of onset a factor? Can a chronic situation be a "disaster" or must the onset be sudden? At what point does a drought become a "disaster"? — when the rains do not come, when crops are damaged and yields decline, when crops are destroyed, when the farmer must go into excessive debt or sell personal property to cover losses, when the land is sold and the farmer is forced to migrate, or only if the farmer dies for lack of food? Is a "disaster"

at the point of inconvenience, poverty, hunger or malnutrition, or only at the point of destitution, famine, or starvation?

Is the availability or absence of resources a factor? Is a cyclone a "disaster" when houses are destroyed and victims must borrow heavily from locally available sources, or only when local resources are insufficient to meet immediate demand? Is the definition dependent upon whether or not a public authority declares the existence of a "disaster" and by what criteria are such decisions made?

How does the definition of a disaster reflect different perspectives, given that a seasonal labourer, a farmer, a merchant, a public health official, an insurance company and a Government official might each define a disaster situation somewhat differently? How does the definition of a "disaster" take into consideration the fact that the same event will affect different parties in different ways? The destruction of a single crop, for example, may be a disaster in that it might have ruinous effects for a particular family, or conversely, an emergency causing widespread destruction may be no more than an inconvenience for a family which experiences no loss of life, loss of income, or property damage.

The above questions include the different characteristics most frequently singled out in attempts to define a "disaster" more specifically. The different aspects considered are: disaster as a physical phenomenon (e.g., cyclone, earthquake); as physical impact (damage); by degree of physical impact (damage); as social disruption from the physical impact (threat as a stimulus); as a political definition (definition based on political considerations); and as a special social situation relating only to certain demands and the ability to meet those demands (collective ability to meet the requirements of a situation).<sup>3</sup>

<sup>1</sup> Russell R. Dynes and adapted from statement by E. L. Quarantelli, "Helping Behavior in Large-Scale Disasters", *Participation in Social and Political Activities* (San Francisco, Jossey-Bass Publishers, 1980), 340 pp.

<sup>2</sup> *The Oxford English Dictionary*, vol. III (Oxford, Clarendon Press, 1983).

<sup>3</sup> E. L. Quarantelli, *An Agent Specific or An All Disaster Spectrum Approach to Socio-Behavioral Aspects of Earthquakes?*, Ohio State Disaster Research Center, Preliminary Paper No. 69 (Columbus, Ohio State University, 1981), 5 pp.

## Disaster as a changing concept

The concept and definition of a "disaster" has altered over time, in accordance with changing ideas concerning cause and effect. Prior to AD 1700, for example, infectious diseases were considered inevitable natural disasters<sup>4</sup> and in many societies what were once seen as unavoidable "acts of God" are now understood to be controllable physical phenomena.

Even since the 1950s conceptions of "natural disaster" have changed. Earlier conceptions were based largely on the characteristics of the physical forces and the resulting impact or damage. For example, most disaster preparedness efforts were then concerned with improving warning equipment and with scientific study of physical phenomena. With the increasing attention given to the social science study of emergency situations, the perception of "natural disaster" has shifted from consideration of the technical aspects of the physical phenomenon as the primary focus, to a perception that the extent of deleterious effects is predominantly a social issue based on whether the people are aware of the potential threat and take the necessary actions to minimize physical destruction and social disruption. The definitions of "disaster" have reflected this change, with increasing attention being given to the social aspects of disaster situations.

The sociological definition cited at the beginning of this section reflects two fundamental characteristics of "disaster" situations. First, disasters are social phenomena (rather than mere physical events) and, secondly, while the physical event may cause social disruption it is not likely to cause social disintegration. Individuals and groups within a community can be expected to continue to function after a disaster in approximately the same way they functioned prior to a disaster. This rather positive perception of social processes in emergency situations differs from what is commonly assumed to occur, and has significant programme and policy implications in all aspects of disaster planning, preparedness and reconstruction.

In further examination of the basis of the definition of "disaster", the following chapters in this publication are concerned with providing a more systematic overview of the social processes existing in crisis situations.

### Programme implications

Consideration of the definition of "disaster" is more than a semantic exercise, as the word implies something about the nature of the situation so defined and about the response required. How the word "disaster" is defined gives meaning to such descriptive terms as "disaster prevention and preparedness", "disaster relief", and "post-disaster rehabilitation". The definition used implies a particular understanding of the social interactions of a situation, and can imply a particular operational philosophy, both of which have important programme implications.

If we believe that "disasters" are sudden, unusual events in which people are plunged into helplessness, a definition is chosen giving emphasis to the inability to cope with the situation at hand, suggesting that persons from outside the community are required to assume responsibility for the situation, and that "outside" assistance is a necessity as a directing force. But if survivors are understood to be resilient and likely to take affirmative action to cope with the situation at hand, the personnel, administrative support, and material assistance provided are likely to take this into account. If "disasters" are perceived as phenomena in which disruption and destruction are largely avoidable, the programme emphasis is more likely to be on prevention and mitigation than relief planning alone.

### Development of social science disaster research

What are the social processes in a disaster situation? What actions are people likely to take when warned of an impending emergency situation? What information is required to effectively stimulate people to take precautionary measures? What actions are survivors likely to take immediately after a disaster? How are local groups likely to respond? These are only a few of the multitude of questions raised by social science research in attempting to understand the social aspects of emergency situations.

Disaster-related studies are a comparatively new field of inquiry. Among the first empirical studies of disasters were the analysis of the effects of an explosion in Nova Scotia in 1919 by Prince, and the study of famine as an economic calamity in 1926 by Corrado Gini.<sup>5</sup> During World War II various independent studies were made on social responses in war conditions, including evacuation behaviour, morale and mental health responses in stressful environments, and psychological effects. However, it was only in the late 1950s that systematic research, centred in the United States, and in the 1960s in Japan, began to be done on organizational behaviour in natural disaster situations.

In the 1960s and 1970s, research centres were established at various universities to study disasters. During this period disaster-related social science research was carried out in many countries including Australia, Belgium, Canada, China, Colombia, Greece, France, the Federal Republic of Germany, India, Italy, Japan, Mexico, New Zealand, Philippines, Sweden, the United States, and the United Kingdom. In the late 1970s and early 1980s the field of disaster studies has grown exponentially as more and more persons around the world have become involved in the analysis of disaster situations. Efforts to establish an international information network between persons interested in social science research has resulted in the establishment in 1983 of the Research Committee on Disaster based at Uppsala University in Sweden.

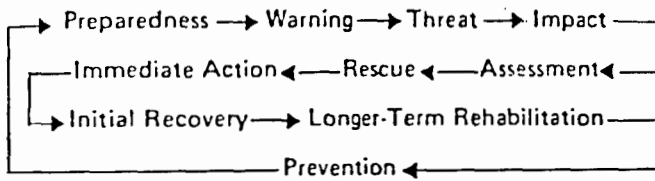
<sup>4</sup> Boris Velimirovic, "Non-Natural Disasters — An Epidemiological Review", *Disasters*, vol. 4, No. 2, 1980, 237 pp.

<sup>5</sup> V. R. Gaikwad, *Community in Disaster: A Case Study of Andhra Cyclone—1977*, UNESCO (Ahmedabad, March 1979), p. 2.

The research carried out over the last 20 years has produced a sizeable body of international literature on the social aspects of emergency situations. The largest collection of disaster-related publications exists at the disaster research centre at the University of Delaware in the United States, a collection of over 10,000 publications (in 1984).

### The disaster process

For analysis of disaster situations, it may be helpful to conceptualize the disaster experience as a process with differing phases, as follows:



In each different phase, the information, the actions required, the problems encountered and the people involved may be quite different. A better understanding of disaster situations requires analysis of the issues, actions and problems in each of these different phases. The inter-relationship of these different phases and activities must also be examined.

### Social science units

Analysis of the social issues in emergency situations requires study of each of the basic social units, including:

- |                |               |
|----------------|---------------|
| Individuals;   | Communities;  |
| Small groups;  | Institutions; |
| Organizations; | Societies.    |

It is necessary to consider how these units operate, separately and as a composite whole, what problems each is likely to face, and ways in which the contributions of each one can be supported.

## Chapter IV

### DISASTER-RELATED BEHAVIOUR PATTERNS

#### General

Pre-disaster planning is dependent in large part on what is assumed about human behaviour in emergency situations. Valid assumptions are essential for the planning and implementation of effective emergency measures and post-disaster responses.

In addition to the need for accurate projections of the physical impact of a disaster, effective pre-disaster planning is also dependent upon an accurate projection of human and organizational behaviour. Experience, supported by social science studies, has borne out the great disparity which exists between what is commonly assumed will happen, and often planned for, in emergency situations and what actually occurs. The fact that a difference commonly exists between what is expected and what actually transpires continues to limit the effectiveness of disaster-related programmes, and is often not fully recognized by the general public, planners and officials.

Analysis of various situations of differing magnitudes and consequences carried out over a period of more than 20 years in different countries confirms that there are many common patterns of human and organizational behaviour in emergency situations; similar actions following certain predictable patterns can be seen to occur in emergency situations in different communities, and in different countries and cultures. A close examination of these common points provides a basis for more accurate predictions and hence more reliable planning.

Studies have also identified a number of assumptions about the actions of individuals and organizations in emergency situations which, although commonly held to be true by the general public, officials and some planners, are in fact without sound basis. Those assumptions which do not represent the general reality of emergency situations, as proved by experience, have been labelled "myths".

#### Popular images of behaviour during disasters

The popular image of a disaster situation, often supported by anecdotes in newspaper articles, disaster films and television accounts, suggests the following scenario :

The authorities, knowing that a major disaster was imminent, decided not to warn the general public in the belief that, if an announcement was made and people were asked to evacuate, there would be hysteria, stampedes and general panic and that people could take irrational short-term actions without concern for anyone else, resulting in chaos and pandemonium.

Except for the heroics of a few, the damage and destruction left people sitting in the ruins, dazed, confused and helpless. Trapped survivors were dependent upon the arrival of the search and rescue teams, and the injured awaited the assistance of outside emergency medical teams. The traumatic shock would very likely result in significant mental disturbances in the long term.

Local organizations ceased to function or were rendered ineffective by the scale of the disaster, the damage to facilities and the traumatic effect on the employees. Officials abandoned their work responsibilities to care for their families. Unaffected persons from outside the community would be needed to assume the roles of the incapacitated organizations.

In the chaos and confusion, social order broke down as people looted everything of value, taking whatever advantage they could. The important destruction and trauma, and the social upheaval, left the community in very low spirits with most people wanting to move elsewhere.

Study and observation of many different disasters has confirmed that the above scenario does not accurately reflect the human behaviour and community response that is most likely to occur in emergency situations. While individual instances of all the above responses have been noted within emergency situations, study has confirmed that they are not typical of the general response and, as such, are not reliable as a basis for planning assumptions. Emergency planning and preparedness resting on such basis would almost certainly prove to be misdirected.

#### Historical example

A major earthquake occurred in India, in the north-east Bihar region, on 15 January 1934, and at the time was claimed to be "one of the biggest seismic disturbances in the history of the world".<sup>1</sup> It was severe enough to be felt 1,000 miles from the epicentre and caused massive destruction over an area of 15,000 square miles, with the loss of at least 7,000 lives. Assistance from outside the affected area was not available for some days because the communication system, including roads, bridges, railways and telegraph lines, had been severely damaged.

While such words as "shocked", "stunned" and "paralysed" were used by different authors to describe survivors, the account of actions taken by the public provides quite a different picture. Throughout the affected communities, people were reported to have immediately initiated rescue and relief activities. Actions taken were often related to the skills and responsibilities possessed before the earthquake, although many examples were also given of people assuming new responsibilities and roles, as the situation required.

<sup>1</sup> *Record of the Great Indian Earthquake (The Statesman), 1934.*

It was noted that "within half an hour" survivors were engaged in rescue and relief work, wherever "there was a prospect of recovering bodies". Injured persons were taken to local health facilities for treatment and when, as was often the case, such facilities were damaged, temporary facilities were established. The gaoler made temporary arrangements for guarding the prisoners as the gaol was damaged. The roads department immediately began clearing and repairing the roads. The public health department began distributing water in tankers and disinfecting water sources. A volunteer engineer took responsibility for repairing the air strip. The railway staff began repairing the railway. The police and local military personnel, in addition to performing such essential tasks as guarding the treasury, were dispatched to assist in rescue operations and help other Government services to repair the lines of communication, etc. The military provided equipment and lorries for use in transporting goods and clearing debris. Industrial workers began debris clearance and repair. The staff of the various departments were supplemented as necessary by paid labourers and volunteers recruited from survivors.

Within the first few days local administrators established a reporting system to determine the extent of damage, assigned officers to such special responsibilities as food control, sanitation and relief camps, made arrangements for the disposal of dead bodies, recruited casual labour for municipal debris clearance, fixed food prices, and tried to prevent general price rises by threats to confiscate stocks if prices were inflated. News bulletins were published, and public meetings were called. Particular mention was made of increasing the number of police by accepting volunteers, due to "anxieties of Government lest there might be outbreaks of disorder and looting in the shattered towns", but it was noted that "Actually the menace of looting came to nothing" as "there was almost a total absence of crime of this character. The extra police were, therefore, available for giving whatever assistance was required."

By the third day there were reports that the injured were all under treatment, that in most areas the dead bodies had been located and removed, and that conditions were improving, with roads being repaired and demolition crews dealing with houses considered dangerous. The treasury and the banks opened on the fifth day, when the first shipment of relief goods arrived. On the sixth day the roads were reported to be more passable "due to the unflagging energy of the District Engineer". By the ninth day the relief hospital outside the area had begun to function.

In summarizing the catastrophe, the following statement was made :

In spite of the enormity of the disaster which suddenly threw the entire structure of life and society into a state of utter confusion, the suffering people have not lost their nerve or their mental poise. There has been no outbreak or instance of crime, no abnormal manifestation of panic even under such exceptional circumstances.<sup>2</sup>

<sup>2</sup> S. K. Basu, "Bihar's Great Need, an Appeal by the Mayor of Calcutta", *Record of the Great Indian Earthquake (The Statesman, 1934)*, p. 18.

Outside the affected area, relief efforts were mobilized as news of the tragedy became known. There was a general outpouring of sympathy and support for people in the disaster-affected area from non-affected parts of India, and relief was provided from a range of sources, varying from massive assistance from the central Government to small contributions from individuals.

The above description of the North Bihar earthquake does not paint a picture of people left incapacitated and helpless by the sudden onset of massive devastation and loss of life. Nor are the examples of self-help and community actions described in this case study unique to North Bihar, or to India. Human and organizational behaviour in emergency situations in virtually all countries around the world points to a similar willingness to cope.

### Natural disaster response mechanism

What is described in the above case study might be called the *natural disaster response mechanism* that is likely to exist in every community. Human response to crisis, as depicted in the above example, is most likely to be a positive coping response in which victims themselves take stock of the situation and begin acting constructively to meet the needs of the situation, in spite of the traumatic experience. Recognition of the ability of people to cope suggests that, as a basic premise, the actions and resources of survivors must be considered in planning for, and providing assistance in, emergency situations, a point which will be elaborated more thoroughly throughout this publication.

The fact that people are adaptable and likely to take constructive action as the need dictates does not mean that major problems may not exist, that planning is not required, that people necessarily know the safest or most appropriate response to take, or that assistance from outside the community is not helpful or required. Quite the contrary. A more accurate understanding of basic human behaviour is essential for further examination of the many problems that exist, and for a better appreciation of the many factors which are likely to influence actions taken by individuals or groups. While there are important cross-cultural differences in human behaviour, there are also some universal and common human characteristics some of which can be seen in disaster behaviours.

### Review of disaster myths in the emergency period

Following is a comparison between common disaster "myths", and the behaviour more likely to occur in emergency situations :

1. THE MYTH OF PANIC FLIGHT. *People when faced with great threat or danger will panic. This takes the form of either wild flight or hysterical breakdowns. Even if the response is not intrinsically self-destructive, it will generally involve giving little consideration to the welfare and safety of others. Persons cannot be depended upon to react intelligently*

FIGURE 4



(Credit : Russ and Wilda Rosene)

Emergency shelter established by victims in Guatemala City after the earthquake of 1976. Disaster victims can be expected to take concerted action to meet their needs.

*and non-selfishly in situations of great personal danger.*<sup>3</sup>

The idea that people will panic when faced with great threat or danger is widespread, but not borne out in reality. More likely, people will stay in potentially threatening situations rather than leave, even when advised to do so. If people do flee in the face of danger they make the decision to move rationally, predictably more as family units, and even in flight often offer assistance to others. While there have been isolated examples of panic, they have been rare and limited to small numbers of people and brief periods. Panic "requires an unusual set of circumstances involving perceptions of probable personal entrapment within a limited spatial area, possible closing of escape routes, an extremely sudden and very direct threat to life, as well as abandonment of self by others in the immediate vicinity. These are a combination of circumstances that on the whole are usually not present in any degree in most disaster situations."<sup>4</sup>

2. **THE MYTH OF HELPLESSNESS.** *Those who do not act irrationally are often immobilized by major emergencies. Thus, disaster impacts leave large numbers of persons dazed, shocked and unable to cope with the new realities of the situation.*<sup>5</sup>

<sup>3</sup> Russell R. Dynes and E. L. Quarantelli, *Images of Disaster Behavior: Myths and Consequences*, Ohio State Disaster Research Center, Preliminary Paper No. 5 (Columbus, Ohio State University, 1972), p. 1.

<sup>4</sup> *Ibid.*, p. 13.

<sup>5</sup> *Ibid.*, p. 2.

While living through a disaster is likely to be traumatic, experience has shown that people are not generally behaviourally immobilized or rendered helpless by even the most severe catastrophies. The immediate response of survivors is more likely to be active participation in constructive actions to meet immediate needs, beginning with search and rescue activities. People are seldom passive; actions taken are likely to be self-initiated and are often directed to assisting others.

3. **THE MYTH OF PARALYZING TRAUMA.** *In addition to a person's initial inability to cope with the situation, the longer-run personal effects are rather severe emotional scars and mental health disturbances. Paralyzing shock is followed by numbing symptoms of personal trauma.*<sup>6</sup>

A majority of the population in a disaster area may show varying degrees of stress reactions in the aftermath of a major disaster, including periods of depression, dejection, restlessness, fatigue, nervousness, irritability, loss of appetite, sleep disturbances, and such psychosomatic symptoms as stomach upsets and diarrhoea, headaches, etc.<sup>7</sup> However, such stress reactions do not basically affect the willingness and ability of people to take initiatives and to respond well in the recovery period.<sup>8</sup>

<sup>6</sup> *Ibid.*

<sup>7</sup> Alan J. Taylor, *Disaster Prevention and Mitigation: A Compendium of Current Knowledge*, "Social and Sociological Aspects", second draft (Geneva, Office of the United Nations Disaster Relief Co-ordinator, June 1979).

<sup>8</sup> Dynes and Quarantelli, *op. cit.*, p. 17.

Characteristics of disaster situations which may increase the stress for an individual include: suddenness of the disaster; timing (day or night); prolonged duration; perception of the physical destruction; death and injury; exposure of the dead and badly injured; and uncertainty.<sup>9</sup> Many stress reactions are not responses to the impact of the emergency but stem from the difficult living conditions often existing in the aftermath of a disaster. The intensity of the emotional reaction to a disaster will also vary according to whether or not the individual is surrounded by members of his family or by some other psychologically supportive group. For this reason it is important to keep family members, neighbours, friends together.

A form of stress or shock reaction, called a "disaster syndrome", has sometimes been observed in the aftermath of relatively sudden and extensive disasters, with acute disorientation, and apparent loss of individual purpose or direction. "However, the disaster syndrome does not appear in great numbers of people; seems confined only to the most sudden traumatic kinds of disasters; has been reported only in certain cultural settings; and is generally of short duration, hours only, if not minutes".<sup>10</sup>

The question of whether disasters are likely to cause more substantive short-term and long-term psychological impairment, in addition to the stress reaction mentioned above, continues to be debated. Of the two opposing positions, the first is based on a psychiatric interpretation of disasters and suggests that disasters are likely to produce both short-term and long-term psychological impairments. The second position, more clearly supported by sociological research findings, suggests that while disasters produce acute stress reactions, these responses are not usually behaviourally dysfunctional, longer-lasting pathological responses are not likely to be the norm and that any psychological effects decrease quickly with time.<sup>11</sup>

Experience clearly demonstrates that people do not typically become incapacitated from stressful or traumatic situations. Even as survivors of a disaster are likely to experience some stress reactions, and some may have a "disaster syndrome" response or even a more pathological response, people are likely to be resilient and can be expected to act purposefully and rationally in life-supporting activities in the immediate post-disaster period and in the longer-term reconstruction period.

Evidence from the latest severe earthquake disaster, the 8.1 Richter magnitude earthquake which destroyed parts of Mexico City on 19 September 1985, clearly indicates that disasters rarely fail to mobilize solidarity and a sense of social responsibility among the stricken population. Television and press reports have praised the actions of

the public: Thousands of Mexico's citizens organized themselves into voluntary relief and rescue teams, without which the local authorities, the police and rescue services would have been severely handicapped. There were also press reports of children directing traffic with the utmost efficiency. While it is too early, at the time of going to press, to draw precise conclusions on social patterns of behaviour in the Mexican disaster, the general principles evoked in this study show strong evidence of being supported by fact.

4. THE MYTH OF ANTI-SOCIAL BEHAVIOUR. *The social disorganization of the community which is a product of disaster impact provides the conditions for the surfacing of anti-social behaviour. Since social control is weak or absent, deviant behaviour emerges and the dazed victims in the disaster area become easy targets for looting and other forms of criminal activity. Crime rates rise and exploitative behaviour spreads...*<sup>12</sup>

Media accounts and widespread rumours often suggest that looting is a common disaster phenomenon. After analysis of many reports of looting, including the examination of police records after different disasters, disaster researchers have found that while many stories of looting do circulate, very few cases of post-disaster looting have been substantiated. Most reports of looting are not accurate, or have been exaggerated. Studies have shown that crime rates during disasters are likely to decrease, rather than rise. While a cyclone, flood or earthquake is not likely to change the personality of persons with a penchant for stealing, for instance, experience has shown that people not inclined to commit anti-social acts prior to an emergency are not likely to do so in a post-disaster situation, even when obvious social controls seem to be absent. Rather than anti-social acts, the behaviour most likely to be exhibited is altruism and concern for others.

Because concern about the possibility of theft is widespread in the general public, and because the disappearance of some personal and public property has been substantiated in occasional post-disaster situations (although this is a much less prevalent phenomenon than is commonly assumed), the general public and local officials should of course take certain precautions. Symbolic presence of the police is important, as are public announcements that looters will be severely punished. In some communities public property is more vulnerable to disappearance than private property. However, understanding that ordinary citizens are not likely to exploit the post-disaster confusion to loot and pillage is important for the realistic planning of personnel and resources likely to be required. The risk of people looting and taking undue advantage in disaster situations is likely to be similar to the likelihood of such actions prior to the emergency. Profiteering in the long-run can however occur, especially by uninvolved locals or outsiders, but this is usually after the immediate emergency period.

<sup>9</sup> Dennis D. Mileti, Thomas E. Drabek and J. Eugene Haas, *Human Systems in Extreme Environments: Sociological Perspective*, Monograph No. 021 (Boulder, University of Colorado, Institute of Behavioral Science, 1975).

<sup>10</sup> Dynes and Quarantelli, *op. cit.*, p. 14.

<sup>11</sup> Gary A. Kreps, *Assumptions about Individual and Social Effects of Peacetime and Wartime Nuclear Disasters*, in press, NCRP (Williamsburg, College of William and Mary, April 1981), point 5.

<sup>12</sup> Dynes and Quarantelli, *op. cit.*, p. 2.



In disaster planning it is also important to recognize the actions which are likely to be taken by the general public as a result of their concern for loss of their personal possessions, a dominant concern and one which may cause people at times to risk lives unduly. For example, people may refuse to evacuate in order to protect personal property, or try to get back into a disaster site before it is safe, or in some societies, a family member may be chosen to remain with the property while the remainder of the family leaves for safety.

5. **THE MYTH OF THE SHATTERED COMMUNITY.** *Community morale is very low in disaster-stricken areas. Since impacted localities are filled with irrational, disorganized and helpless persons and immobilized groups, the future of such communities appears bleak and problematical. Residents, even those not directly impacted, prepare to leave and there is a reluctance to reopen and rebuild shattered businesses and industries.*<sup>13</sup>

Contrary to what is often expected, and frequently to the surprise of disaster relief workers, the morale of a disaster-affected community is more likely to be buoyed by optimism than to be shattered by despair. Studies of groups of disaster victims indicate that high morale rather than despair seems to be rooted in various psychological and social factors, including the altruism and the support of friends and associates, the fact that the cause is perceived as natural random, and affecting all equally, that less affected persons almost always outnumber more severely affected victims, and that victims are likely to consider themselves fortunate to be alive and to compare their individual plight with those around them in similar difficulties. There is also the fact that the needs created by the situation demand immediate action and are obvious, and that the actions required in the emergency phase have important value for others in the community, demand innovation, and are perceived by the community as positive and constructive. Survivors are less likely to express fatalistic and negative feelings about the outcome of the situation than are outsiders. However, while morale is usually high in the immediate post-impact period, it can drop over time especially if organized relief efforts are not well handled.

#### Why these myths persist

It is curious that the "myths" of human behaviour in disaster situations, although consistently shown to be false, continue to be widespread and held by people who themselves have experienced a disaster. Factors which seem to perpetuate these myths include mistakenly citing disasters, the aggravation of pre-disaster patterns,<sup>14</sup> generalizing from statistically infrequent cases,<sup>15</sup> assum-

<sup>13</sup> *Ibid.*, p. 3.

<sup>14</sup> E. L. Quarantelli, *Social Aspects of Disasters and Their Relevance to Pre-Disaster Planning*, Ohio State Disaster Research Center, Paper No. 103 (Columbus, Ohio State University, 1977), p. 10.

<sup>15</sup> *Ibid.*, p. 10.

ing that if the worst did not happen it was simply because of the "sterling qualities" of the community in question,<sup>16</sup> and making the common assumption that "help" is something one does "to or for", not "with" victims. Another important factor is the efforts of journalists to achieve emotional impact by choosing single events describing behaviour from a sensational, tragic viewpoint, with graphic illustrations of the myths mentioned above. This is unfortunately a common feature of the way in which the media cover disasters.

#### Planning assumptions about disaster behaviour

Following are summary statements concerning the human behaviour which can be expected in emergency situations and a brief discussion of the programme implications :

1. **RESPONSE TO DANGER.** *When danger is recognized as imminent and personally threatening, people will seek safety, and their behaviour will generally be adaptable.*<sup>17</sup>

This assumption about human behaviour is based on the observed fact that in the face of danger, adaptable and appropriate behaviour is the common response. People do not become irrational or incapacitated in sudden emergency situations, or panic without regard for others. They act very reasonably, responding to the situation as they perceive it at that time.

#### Programme implications

The fact that people can be expected to act in an adaptable and appropriate manner in the face of danger is particularly important in considering public warnings of impending danger. An assumption that people may panic, leading to social chaos, may lead some administrators to delay warnings to the public. Evidence that people do not panic supports the need for timely information to allow people the opportunity to consider and prepare for necessary actions. However, it must be stated that people often do not recognize the potential danger existing in certain situations. Experience shows that people will not act simply because they have received a warning, especially if they are not convinced that a situation is life-threatening. Factors which influence people's response to warnings and calls for evacuation are considered in more depth in chapters 7 and 8.

2. **IMMEDIATE RESPONSE TO DISASTER.** *Except for persons severely injured, disaster victims generally respond quickly and initiate a variety of personal and social recovery activities. On the community level, a*

<sup>16</sup> *Ibid.*

<sup>17</sup> Kreps, *op. cit.*, p. 3.

*vigorous and adaptive response to disasters can be assumed.*<sup>18</sup>

This assumption is based on the observed fact that immediate and constructive action, rather than inaction or helplessness, is typical of the behaviour of survivors of disasters. Inaction or unwillingness to follow the suggestions, recommendations, or orders of public officials usually occurs because the official position is seen by the victim as unreasonable, meaningless, or irrelevant. "It is therefore reasonable to assume that surviving populations following a major disaster will be very active in self-help and mutual support activities. They will also want to have a strong voice in how the disaster relief and recovery effort should be carried out."<sup>19</sup>

### *Programme implications*

Accepting that individuals in emergency situations are adaptable and social has important programme implications. Relief efforts, both local and from outside the community, can benefit from the mutual assistance efforts likely to exist within the affected community, acknowledging in planning and action that victims will mobilize certain resources, assume certain responsibilities, and have information, opinions and plans on how to solve the problems at hand.

When disaster victims are considered to be important and active participants in preparedness planning and relief programming, it will be understood that they need training and information, that their wishes and ideas should be considered, and that they should be partners in decision-making. Disaster preparedness should be perceived as a community, or family function, rather than as an activity only for formal relief agencies.

As an example, following a cyclone, emergency medical teams from outside the affected area may act on the belief that their services are required for search, rescue and emergency first-aid. However, on closer examination different needs may be identified, due to such factors as the rescue activities of local people themselves, the provision of immediate first-aid by survivors and medical personnel within the affected area, and, not least, the fact that outsiders are not normally able to enter a cyclone-affected area for days because of continuing bad weather, flooding and blocked roads.

The emergency actions taken by victims and professionals within the affected area does not mean that medical teams from outside are not useful or needed. After the 1977 cyclone in Sri Lanka, for example, when medical teams were able to reach the affected area several days after impact, their assistance was highly valued, but for services other than search and rescue or first aid. They were of most use in providing follow-up treatment for injuries, such as re-dressing wounds, providing medical care

for minor complications, dispensing treatment for secondary illnesses, monitoring disease patterns, supporting public health measures, and backing up local health professionals.<sup>20</sup> Local health institutions, while functioning even in damaged facilities, were hampered by damage to equipment and shortages of certain materials. Different assumptions about emergency needs might have resulted in the provision of different personnel, equipment and/or supplies.

There are also important preparedness considerations. If, for example, it is assumed that local residents, as the persons on the spot, are likely to provide first aid, then it naturally follows that they should be given the training and assistance they need to perform this task satisfactorily. The basic principle is to maximize or use local resources as much as possible.

The more closely related the assumptions about emergency needs are to the reality of the situation, the more appropriate the emergency assistance is likely to be. Programmes based on realistic predictions of the behaviour of victims and local professionals, damage incurred and resources remaining are likely to provide more appropriate assistance than programmes which discount or ignore the resources and capacity to cope that exist in disaster-affected communities. Conversely, emergency planning and assistance based on the assumption that victims will be helpless and totally dependent on outside intervention are likely to duplicate and disrupt local efforts, or fail to meet real needs.

3. **THE FAMILY.** *Disaster victims do not act as independent individuals, but their responses are to a high extent influenced by the families to which they belong.*<sup>21</sup> *The family unit is the most basic coping mechanism, and is likely to be operating as a disaster-coping mechanism in most, if not all disaster situations.*<sup>22</sup>

The family, is one of the most significant elements in enabling disaster victims to cope with the situation. What is considered to be the family might differ in different societies, but it is *the* most important responding social unit. Disaster response and recovery revolve around the family unit for the purposes of decision-making, provision of essential material, social and psychological support. Providing assistance to spouses, children, parents and other family members is given the highest priority. Studies have demonstrated that emergency assistance is likely to be provided first to family members, and that victims are likely to seek assistance first from other family members. When risk is perceived prior to a disaster, or if persons are thought to be trapped or in difficult straits after an

<sup>20</sup> *Sri Lanka Cyclone Handbook*, Sri Lanka Cyclone Study Technical Report No. 7, United Nations Development Programme, Office of Project Execution, SRL/79/001 (Washington, D. C., Pacdo, Inc., 1979).

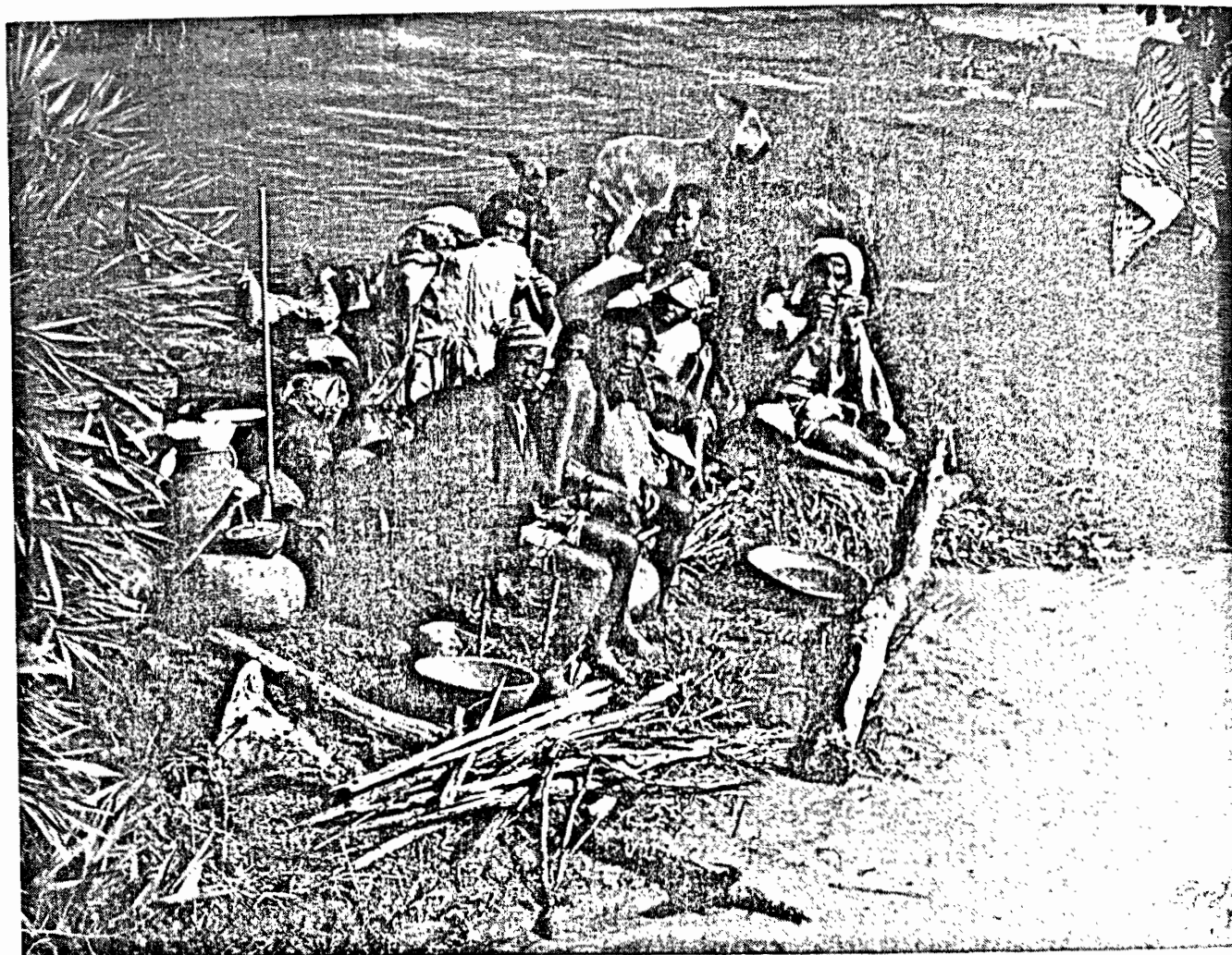
<sup>21</sup> Orjan Hultaker and Jan Trost, "Family and Disasters", *International Journal of Mass Emergencies and Disasters*, vol. 1, No. 1 (Uppsala, International Library, 1983), p. 17.

<sup>22</sup> Margaret Kieffer, *Disasters and Coping Mechanisms in Cakchiquel, Guatemala: The Cultural Context* (Guatemala, March 1977), p. 20.

<sup>18</sup> *Ibid.*, p. 4.

<sup>19</sup> *Ibid.*

FIGURE 5



(Credit : UNDRD)

The family unit is the most basic coping mechanism in times of disaster. (Photo taken during the Mozambique floods of 1977.)

emergency, every effort is likely to be made to reach the family member to provide assistance even at risk to life. In a disaster situation family members move together and attempt to stay together.<sup>23</sup>

Other family-related disaster behaviour includes family members attempting to meet as soon as a disaster has occurred or when one is impending, if possible in their own homes or sometimes in the homes of relatives or close friends. Families are likely to decide collectively how to react to a disaster, and are likely to remain together even when there is disagreement. If temporary separation is perceived as necessary, the decision for a member to leave — for instance, to search for someone — will be made with group consent and with agreement on when and where to reunite. Families also tend to filter the information received from rescue organizations and community leaders, with the result that individuals are not likely to follow recommendations from such sources unless they are supported by family decisions.<sup>24</sup>

Persons separated from their families, especially children, have been found by many researchers to register a higher frequency of emotional difficulty than persons not separated. Child-family relationships are particularly important. Although relatively little is known about the psycho-social effect of disasters on children, the studies which have been undertaken suggest that they usually suffer only minor disturbance if a parent is with them. The often quoted statement of Anna Freud and Dorothy Burlington, while related to a war-time situation, is also of relevance to natural disaster situations.

The war acquires comparatively little significance for children so long as it only threatens their lives, disturbs their material comfort, or cuts their food rations. It becomes enormously significant the moment it breaks up family life and uproots the first emotional attachments of the child within the family group.<sup>25</sup>

#### *Programme implications*

The concern and support provided by families is constructive and should be encouraged. Family solidarity may

<sup>23</sup> Thomas E. Drabek, "Social Processes in Disaster : Family Evacuation", *Social Problems*, 16 (Winter), p. 346.

<sup>24</sup> Hultaker and Trost, *op. cit.*, p. 17.

<sup>25</sup> According to Anna Freud and Dorothy Burlington's "Reactions to Evacuation", in *Uprooting and After* (Zwingmann and Pfister-Ammende), p. 67.

require certain special factors to be taken into consideration, for example the additional time likely to be needed to respond to warnings if people first discuss information and prepare to act as a family unit. This underscores the need for timely public information about an impending situation to provide families with the opportunity to reunite and make necessary arrangements. It also points to the need for reliable public information during and after a disaster, when concern for family members is likely to be particularly important.

Special services may also be required to facilitate the exchange of information between family members within and outside an affected area. Public administrators can be expected to receive large numbers of requests to verify the situation of particular individuals or families, a post-disaster requirement which is very time-consuming and usually requires personnel, communications and transport facilities. Consideration should be given to the establishment of a special programme to meet the need for post-disaster inter-family communication and verification, in order to minimize disruption of other services.

It is desirable to assist families to reunite or stay together. Separating families for such purposes as administrative convenience or to facilitate the delivery of welfare services is inadvisable. In consideration of the needs of children, every effort should be made to reunite separated children with their families and communities. The placement of orphaned or separated children should be guided by the principle of continuity, the least harmful approach being one in which the past relationships of a child are preserved in a family setting. In order to minimize the trauma of a disaster, and enable victims to cope better, the dictum "women and children first" should only be applied subject to the phrase "when accompanied by husbands and other close family"<sup>26</sup>

4. **PSYCHOLOGICAL RESPONSE.** *The psychological response of affected persons is likely to vary within any affected population. While stress symptoms are likely to be exhibited in a majority of the population, victims are not likely to be incapacitated nor are most likely to suffer psychological impairment over the long-term.*

A stressful or traumatic experience is incorporated in the broader experience of a person, just as is any other significant event. The significant impact of a disaster experience can be seen in the fact that such events commonly become a reference point for the remainder of the person's life, with annual remembrance of the day, frequent recounting of details and events, etc. However, stress or the experience of a traumatic event is not necessarily incapacitating. In fact, persons often interpret traumatic experiences later as "growth" experiences, in which inner strengths and coping mechanisms were developed.

The psychological response of affected persons is of course not uniform but will vary between persons both in length of time and degree of impairment, ranging from no impairment for some to total disfunction for others. While the "psychological effects" and the factors precipitating impairment are still being defined and debated, social science studies suggest that the stressful experience of a major disaster has not incapacitated affected populations. The basic human response to traumatic experience seems to be one of rational action and appropriate coping.

#### *Programme implications*

The assumption that disaster victims are not psychologically overwhelmed is most likely to be reflected in the way in which those offering assistance interact with the affected community. If victims are believed to be "psychologically overwhelmed", people providing assistance may be inclined to assume a directive role and make decisions that victims would normally make themselves, even about such essentials as food, clothing, shelter, etc.

Although those providing assistance may have the best of intentions, when the role of the individual is lost and the "helper" begins to make decisions which the individual being "helped" would normally make, the consequences are likely to be negative. Such assistance is likely to increase feelings of loss and disadvantage. The immediate response of victims is appreciation, but in situations where the typical roles and responsibilities of a person are assumed by those providing assistance, this sense of appreciation commonly changes to resentment.

Experience has shown that both men and women suffer disorientation if they are denied the opportunity to perform their usual roles in relation to the family. If people are provided with services over an extended period at relief centres, for example, women may find that they have neither the duties nor the status associated with care of the household, and additional anxieties may result for men who may not have the opportunity to work as the provider for the family.

However, many adverse socio-psychological effects can be mitigated by adequate training for those who may be in a position to help persons with particular problems. It can be helpful, for example, if doctors and other members of the medical profession are reminded of the many psychological and psychosomatic factors which may be encountered in the weeks and months following a major trauma. Supporting workers, providing advice on how and where to refer patients with non-medical needs, will assist other parts of the welfare system to do an effective job.

5. **NEED FOR INFORMATION.** *There are intense pressures from the public for immediate information about victims, secondary threats, and emergency needs and activities following disasters. In effect,*

<sup>26</sup> Taylor, *op. cit.*

*people seek to reduce uncertainty about the event, its consequences, and the appropriate personal actions to be taken.*<sup>27</sup>

Information collection and exchange is a major issue after emergencies, as people attempt to identify needs and facts in order to define the most appropriate courses of action. Experience suggests that post-disaster information exchange is problematic due to the widespread demand for accurate information from all sectors, and complicated by the fact that initial reports are usually fragmentary, of questionable accuracy, and that disaster needs and problems change rapidly.

### *Programme implications*

Every effort should be made to provide as factually accurate an account of damage, needs and victim behaviour as possible, since information is required not only by victims but also by administrators for the formulation of action plans.

The fragmentary nature of initial reports suggests the need for systematic assessments of places and issues, rather than merely relying upon whatever information is haphazardly provided. It is helpful to provide such information to the general public as well as within the administrative system. After the 1977 cyclone in Sri Lanka, it was noted that public meetings between local Government officials and communities were very useful in examining the effectiveness of the relief system, understanding the problems at hand, explaining the decisions taken, and informing people about the measures to be expected. Such meetings are also valuable to administrators to obtain feedback, identify unrecognized problems, and answer questions.

6. THE CARRY-OVER PRINCIPLE. *Post-disaster problems (or their absence) are closely related to pre-disaster problems (or their absence).*<sup>28</sup> *Behavioural patterns, social issues and processes which existed before an emergency are likely to exist afterwards.*

Disaster situations are seen as occasions of great change, or the opportunity for change. It is often assumed that destruction and confusion will give rise to a new social order, that disaster situations are opportunities for making substantive changes in values or correcting social injustices. While changes do occur as a result of disasters,

experience has shown that the overwhelming individual and social emphasis is on a return to pre-disaster normality. An emergency situation does not usually alter the psychological make-up or the response pattern of an individual, or change the social fabric of a community. A disaster is best perceived as a social interruption, with most social dynamics later returning to their pre-disaster norm. In predicting behaviour during or following a disaster, past conduct is still the best guide for predicting future conduct.<sup>29</sup> Victims use new behaviour for immediate emergency needs but do not change either their basic values or their priorities.<sup>30</sup>

### *Programme implications*

The "carry-over principle" is applicable to most aspects of disaster situations. Individual behaviour and social norms are likely to remain the same before, during and after a disaster, with parents continuing their family roles; people continuing to function in their working environment whether they perform manual, commercial, technical or administrative work; administrative structures and processes remaining essentially the same; and organizational modes of working and levels of effectiveness unlikely to change. Such social continuity provides the framework for anticipating the needs which may arise and the resources that are likely to exist after a disaster.

Such things as eating habits, living arrangements and forms of dress are very unlikely to change merely as a consequence of a natural disaster. This point is important for determining what relief assistance is likely to be most appropriate and acceptable. The fact that an emergency is not likely to change people's patterns or habits is substantiated by many anecdotes of relief goods which, while appropriate in one community or country, are considered inappropriate or unusable in another. Concerning the construction of post-disaster shelter and housing, there are many examples of apparently innovative housing forms which seemed like "good ideas" but were not acceptable to recipients, or raised expectations beyond the economic means of the community.<sup>31</sup>

Disasters do in some situations accelerate processes and changes already taking place within a community. It is within this framework that facilities are often upgraded and new equipment acquired. However, disaster-affected communities usually resist efforts to make major changes, and attempt instead to return to pre-disaster normality.

<sup>27</sup> Kreps, *op. cit.*, p. 6.

<sup>28</sup> Quarantelli, *op. cit.*, p. 1.

<sup>29</sup> *Ibid.*, p. 7.

<sup>30</sup> Hultaker and Trost, *op. cit.*, pp. 14-15.

<sup>31</sup> UNDRO, *Shelter after Disaster* (Geneva, Office of the United Nations Disaster Relief Co-ordinator, 1982).

## Chapter V

### GROUP AND ORGANIZATIONAL CONSIDERATIONS IN EMERGENCY SITUATIONS

#### General

Because of the disruption or widespread destruction experienced in virtually every aspect of life, disasters create situations in which a multitude of tasks must be completed immediately and simultaneously. Meeting both survival and recovery needs is dependent upon the constructive involvement of the entire community. In this respect, as was discussed in chapter IV, social science studies have shown that persons and groups customarily respond in a constructive way to a disaster.

Pre-disaster planning, in addition to accurately anticipating the needs and responses of individuals in a disaster-affected area, must carefully examine assumptions about group responses and the problems likely to confront relief organizations. This chapter examines certain myths, reviews actions most likely to be taken by groups or organizations in a disaster situation, identifies several common organizational problems, and discusses the resulting programme and policy implications.

#### Popular images

Relief assistance, particularly from outside the affected community, has often been based on certain popular assumptions about the response of local organizations and departments and their effectiveness in meeting the needs generated by a disaster situation. A post-disaster scenario based on popular assumption might be described as follows:

It is assumed that, after a disaster with widespread damage, often described by the media as total destruction, public services cease or are ineffective.

The basis for this assumption includes expectations about the effects of the disaster staff who are themselves victims, the fact that the magnitude of the destruction is beyond the local capacity to cope in a routine fashion.

Pleas for assistance spread nationally, or internationally, after the initial survey. Local consultation is often considered unnecessary or not expedient. Relief officials may believe that the safest course of action is to take it for granted that everything has been destroyed and, on this basis (without wasting time on assessment), to send into the stricken area all imaginable goods, services, personnel and equipment on the assumption that they will be needed or useful. Volunteers and outside (private) organizations may go into the affected area convinced that they are needed to provide services which the local organizations are unable to supply.

Due to the disruption of local services, the disorganization of local leadership and the general confusion that is likely to reign, strong outside leadership — a military official, for example — is needed to bring order and direct the emergency and recovery efforts. Centralized decision making is seen as vital, even if it was not the pattern in the pre-impact period.

A closer examination of many disasters suggests that the assumptions made above are often incorrect and may have important negative consequences in meeting disaster needs and managing relief and recovery operations.

#### Example

On 23 November 1978 a cyclone struck the east coast of Sri Lanka, creating a path of destruction approximately 60 kilometres wide. A storm surge calculated at 1.8 metres added to the damage along the coast, and the heavy rains accompanying the cyclone left large areas flooded and some communities stranded.<sup>1</sup>

Private homes, commercial premises, industrial plant and public offices and buildings suffered varying degrees of damage. Private domestic water sources over a wide area were contaminated by flood waters. Also damaged were the area hospital, food warehouses, electricity and telecommunications utilities. Water mains were broken by trees being uprooted, and 242 school buildings were destroyed or damaged. The extensive flooding and massive uprooting of trees blocked all roads in the affected area for at least two days, and in some remote areas for as much as seven days. In spite of the fact that the effects of the cyclone had not been anticipated either by the public or the authorities, immediate efforts, as summarized below, were initiated within the affected area.

The day after the cyclone, in a heavy downpour, most of the affected people were involved in search and rescue activities in their immediate area, attempting to assess the damage near them, taking care of family and protecting personal property. In addition to efforts by local police, various *ad hoc* groups were reportedly formed to carry out more systematic local search and rescue efforts.

While the staff of various government departments were not generally available on the first day after the cyclone, they were mobilized by the second day, by which time large

<sup>1</sup> *Sri Lanka Cyclone Handbook*, Sri Lanka Cyclone Study Technical Report No. 7, United Nations Development Programme, Office of Project Execution, SRL/79/001 (Washington, D.C., Pacdo, Inc., 1979).

numbers of additional labourers had been hired to supplement regular personnel. For example, the roads were cleared by the regular maintenance crews, supplemented by over 100 workers hired on the second day in the most severely affected area, with a major role being played by local village groups working with a "community spirit". These spontaneous efforts were carried out within the affected area, while at the same time the highway department, supplemented by heavy military equipment, worked from outside the affected area inward.

At each administrative level, senior personnel took the initiative for co-ordinating agencies and activities within their sphere of responsibility. In addition to the *ad hoc* co-ordination that took place between many groups and services, formal co-ordination groups were established on at least five administrative levels — village, area, district, national and international.

The above narrative describes only a fraction of the many actions taken by persons working individually and in groups to meet the needs of the situation. The self-initiated and resourceful response of organizations described above is not unique. It is likely to be the response in most disaster-affected communities around the world. The identification of the community actions taken does not imply that all local actions were adequate to meet the needs. Many essential goods and services were provided from outside the affected area. However, this example illustrates the fact that local agencies are not likely to be rendered ineffective by a natural disaster. Of course, if they were very ineffective before the disaster they will remain so, but not because of the disaster.

### Myths

Study of disaster situations has confirmed that there are at least two important assumptions about the characteristic response of organizations in emergencies which are not valid as planning principles, and have therefore been labelled "myths".

1. THE MYTH OF WORK/FAMILY CONFLICT. *Important officials and key personnel in a disaster-affected area are not likely to perform their responsibilities because of concern for or need to attend to their victimized families.*

Research has shown that important officials and key personnel are not likely to abandon their work responsibilities because of family preoccupations, although they are naturally concerned over the well-being of their family and will need time to deal with extreme situations. While this is particularly true of persons in senior positions and persons responsible for relevant emergency services, it may also be more generally valid. For example, the day-labourers hired immediately after the Sri Lanka cyclone chose to begin working very early in the morning and stop by early afternoon to afford time for family concerns and repair of personal property.

### Programme implications

Experience has shown that officials can be expected to carry out their tasks even where there may be a conflict between employment and family responsibilities.

Special administrative support and a humane employment policy enabling officials and others to take time off from work to attend to personal matters are likely to be greatly appreciated, and may reduce anxieties over a possible conflict between work and family responsibilities. However, assistance which is directed at unnecessarily relieving a person of his responsibilities, on the assumption that he will be incapacitated by the conflict between work and family, is likely to be resented and detrimental to the person and possibly the work.

2. THE MYTH OF OVERWHELMING IMPACT ON LOCAL AGENCIES. *Local organizations in a disaster-affected community are likely to be overwhelmed by a disaster and rendered ineffective, lacking both leadership and personnel. Therefore, in addition to the need for significant numbers of persons from outside the community to help fill the personnel gaps, there will be a need for the imposition of strong leadership by some unaffected outside person to cope with the confusion that is likely to exist.*

The assumption that local agencies will be overwhelmed has not been proved accurate. The primary needs generated by a disaster are already familiar to established organizations and form part of their responsibilities. The role and responsibilities of respective agencies and departments are not eliminated by a disaster: the fire department continues to concern itself with fires, the central pharmacy with the distribution of drugs, the highway department with road repair, the water department with water supply, etc. Of course if local agencies are very weak in normal times they will be weak at disaster times. While the tasks are likely to be similar, the magnitude of the problems faced by each organization is likely to be quite different from routine activities, but the skills required will remain basically the same. Problems are likely to arise over new tasks which the disaster may create.

Another basis for the erroneous assumption that local agencies will be overwhelmed is the over-estimation of disaster damage. The immediate visual images of collapsed buildings, streets full of rubble and widespread destruction as seen from the air or even during casual visits to the site are often misleading. What was initially assumed to be total destruction in reality is often only partial destruction, with some buildings and areas more affected than others. The unaffected or marginally affected persons, and the remaining resources that exist within an affected community are often not calculated. Immediate post-disaster descriptions and statistics seldom, if ever, provide an overall picture with damage being set off against remaining resources, but instead focus only on the damage. Remaining food stocks are often underestimated and the need for emergency drugs is frequently overestimated.

Local agencies are not usually incapacitated by the effects of a disaster on their own personnel or by a lack of additional personnel needed to carry out the sudden increase in essential tasks. The increased personnel needs can be met by diverting staff from non-essential responsibilities, using off-duty staff, hiring additional persons as needed, and enlisting volunteers. However, good use of volunteers usually requires good pre-impact planning, especially for volunteers from outside the community. The type of support the Sri Lanka experience confirmed to be needed included special authorizations and access to cash to pay workers, technical personnel and in some cases senior policy-making staff, as well as equipment. In that experience, rather than local departments being overwhelmed to the point of ineffectiveness, each mobilized extensive numbers of additional employees from within the affected population.

#### *Programme implications*

In pre-disaster planning and in consideration of relief assistance, organized community structures and local organizations can be expected to function after a disaster, and are not likely to be overwhelmed by the situation or the increased demands. This does not imply that weak administrators will suddenly become good administrators, or that ineffective services will suddenly be effective, as both strengths and weaknesses will be carried over from the pre-disaster situation to the post-disaster actions.

Two suggested guidelines for pre-disaster planning and relief assistance arise from the observed fact that pre-disaster social structures are likely to exist and that existing organizations are likely to function after an emergency.

- (i) Careful consideration should be given to ensure that the emergency assistance does not duplicate or disrupt services already being provided. When possible, such assistance should be channelled through existing local agencies, which are likely to use it more effectively.
- (ii) Every effort should be made to ensure that the staff of local organizations have received proper training, the authority to act, the necessary emergency authorizations required, and that they are acquainted with the appropriate administrative/financial guidelines and procedures. Special benefits should exist to assist staff in such difficult situations.

#### **Planning assumptions**

In a disaster special organizational planning and preparedness are likely to be important in at least three aspects :

1. **MULTIPLE-LEVEL RESPONSE.** *Disaster-related tasks, in every phase from preparedness to reconstruction, are situated at all administrative levels from village council to national policy (in some cases even international policy).*

All too frequently disaster preparedness and response is narrowly perceived as a function of one particular agency or specialized department, or a particular administrative level. Agencies or departments often have a very narrow understanding of disaster preparedness and response, perceiving it only from the standpoint of their own particular work or area of responsibility. However an effective disaster response system requires that all administrative levels play significant roles, each with their respective responsibilities and in support of the work and responsibilities of others.

#### *Programme implications*

Understanding the particular roles and responsibilities to be assigned to each administrative level (and between each different agency and party involved) is one of the essential components of effective disaster response. An effective disaster preparedness and response system is one in which the actions of individuals, *ad hoc* groups, formal organizations, persons working on different administrative levels, and agencies from inside and outside the affected area, assume mutually supportive roles. While this may seem self-evident, in practice it proves to be a difficult task. For example, while co-ordination at a particular level, such as within a village, between department heads, or at the ministry level, may be quite good, co-ordination between these different levels may be difficult. This is a very common problem and one which is difficult to resolve. Such problems are best dealt with before rather than during or after disasters.

2. **CONVERGENCE.** *A wide variety of personnel, communications and material convergence occurs at the scene of most disasters and at selected points of organizational activity. This convergence is motivated by a concern for victims, a desire to help, simple curiosity, and the search for information.<sup>2</sup>*

Convergence, characterized by the spontaneous movement of large numbers of people and large amounts of material towards the zone of impact, is a common phenomenon in all emergencies. In large-scale emergencies, convergence may include both domestic and international movement of people and material. The convergence of people to the affected area is likely to include a wide range of persons with skills and roles varying from useful and desired to undesired and disruptive. Materials are likely to range from essential to useless. This sudden convergence commonly contributes to administrative problems and inefficiency, in spite of altruism.

<sup>2</sup> Gary A. Kreps, *Assumptions about Individual and Social Effects of Peacetime and Wartime Nuclear Disasters*, in press, NCRP (Williamsburg, Virginia, College of William and Mary, April 1981), point 7.



### *Programme implications*

Convergence causes many logistic and administrative problems. While such factors as adequate planning, dissemination of reliable information and co-ordination are likely to minimize the confusion caused, it remains largely a contextual problem which cannot be avoided.

Convergence is also, in part, a necessary and positive aspect of every disaster situation. As noted above in the discussion of family considerations after disaster, victims are likely to seek assistance first from family members, and these are likely to provide invaluable support and services. Family members mobilized in support of victims are likely to comprise an essential and positive group among those converging on an impact area.

Another category of persons likely to converge on a disaster area is essential support personnel. In addition to the human and material resources that will be mobilized within affected communities, certain additional assistance from outside the affected area is both useful and necessary. Local institutions, organizations and businesses, as well as the public administrative and service departments (i.e., highways, electricity, irrigation, etc.) often find it useful or necessary to have the assistance of a top-ranking officer to help assess the damage, make plans and resolve exceptional problems. Furthermore, virtually all organizations, agencies and services are likely to require materials from outside the area (including, for example, new telephone lines, rails, building materials, replacements for damaged equipment, etc).

Established administrative structures and formal relief organizations are virtually never the only organizations from which relief assistance is likely to come. Disaster convergence typically includes a multitude of spontaneous and informal relief efforts from within the affected area, and a large influx of persons and goods from outside the affected area. One of the causes of the convergence is the popular belief that the most effective means of providing assistance is direct distribution from the donor, or his agent, to the recipient, a point which is often disputed by the official relief authorities.

Other donors may act less altruistically, making contributions for such reasons as tax breaks, monetary gain or political influence. While motive is not the issue here, such donors may be less concerned with the usefulness of the item than with the credit received from whatever is given. Certainly, many anecdotes exist about the donation of such items as out-of-date drugs, inappropriate clothes, unacceptable food and piles of relief items which are simply not useful. The convergence of such items can only compound the problems faced by local administrators, and reduces the quality of assistance received.

Volunteers from outside the affected area comprise another important group of people arriving in a disaster area. Volunteers arriving as an organized group are probably better than individual volunteers. The usefulness of volunteers is dependent upon such variables as the adaptability of the individual and his ability to deal with others, the need for the technical skills a particular person may

have, the availability of an organizational framework to channel, direct and supervise the work of volunteers, and the benefits brought by volunteers as measured against the cost of the necessary logistical support, food, housing, transportation, etc. In most disasters some outside volunteers make important contributions, but it is common to hear persons experienced in disasters warn of the limited benefits of voluntary assistance.

While uncontrolled convergence of relief goods and persons is likely to create many problems, the opposite extreme of preventing any convergence of relief goods or persons (and producing a more orderly situation), would probably not serve the public interest. The most realistic programme approach is likely to be somewhere between these two extremes, and includes such common policies as establishing criteria for the admission of people into an affected area (and preventing others such as those motivated by curiosity from entering); avoiding public requests for relief items without substantiated need and appropriate distribution capabilities; reserving the right to decline relief shipments or insisting that goods donated meet certain specifications; establishing general principles for the distribution of relief to ensure fairness; requesting that items donated should be properly labelled; and helping define appropriate roles for assisting individuals from outside the affected area. As convergence is likely to occur after every disaster, it requires careful consideration in order to enhance the usefulness of the donations and minimize the administrative and logistical difficulties. Disaster-experienced officials are increasingly tightening up so as to ensure that material goods and personnel from outside the affected area are appropriate and useful.

*Special note on "outsiders"*: In discussion of disaster assistance, it is often assumed that most of the inappropriate assistance provided can be attributed to "cultural insensitivity". However, cross-cultural examination of disaster assistance suggests that "cultural insensitivity" is a less important factor than the invalid assumptions made by most donors about most recipients. The assumptions made and the problems encountered in the provision of assistance by persons from outside the community are similar whether persons come from a different part of the state, nation, or world. Also, it should be noted that inappropriate or useless donations are a problem faced in virtually all major disasters in all countries, developed and developing. Due to the common nature of donor assumptions and the resulting problems, "outsiders" in this publication refers to any individual or group not residing within the immediate disaster impact area.

### 3. ORGANIZATIONAL RESPONSE IN EMERGENCIES. *A disaster is likely to create new challenges and problems for every agency involved, requiring modification of organizational structures and routines.*

In pre-disaster planning, disaster-related agencies often consider the tasks to be accomplished in an emergency, but give insufficient thought to organizational matters related to implementation. Research suggests that most

of the post-disaster problems encountered in relief and reconstruction activities are not technical in nature, but derive from human and organizational problems, including human error; bad judgement; lack of knowledge; inadequate training; poor preparedness; inadequate communication; confusion over responsibilities; and the failure to recognize the consequences of a decision. In avoiding many of these problems agencies, departments or groups likely to be involved in an emergency may find it beneficial to consider issues related to the types of groups likely to exist in an emergency situation, how an emergency situation is likely to affect the functioning of organizations, and common problems that organizations typically encounter in providing emergency-related services.

In anticipating the potential demands of a disaster on community organizations and their ability to respond, it is useful to examine both the types of organizations that are likely to operate in an emergency and the unique situation in which the organization must function.

### **Types of organizations likely to operate in an emergency**

Understanding the types of organizations that are likely to operate in an emergency is important because many of the tasks to be performed will require active collaboration between some or all of these entities. Methods of communication with and between such organizations will be required, and can be planned in advance.

Disaster-related actions can be categorized as *routine tasks* (e.g., fighting fires) which an existing organization would perform as part of its normal responsibilities and *new or unusual tasks* (e.g., burying the dead). There are four ways a community meets the emergency needs generated by a disaster situation: (1) through existing organizations performing their regular tasks; (2) through existing organizations performing their regular tasks but on an expanded scale; (3) through existing organizations assuming new tasks, and therefore becoming in some ways new organizations; and (4) through new organizations created specifically to cope with the situation, a common phenomenon often not anticipated but an important part of the community response to disaster.

Although the matter will not be elaborated upon in this publication, the above four types of organization are each likely to have different ways of working and different organizational structures, and to have unique personnel and management requirements.

### **Unique situations in which organizations must function**

Even as far as routine tasks are concerned, a disaster is likely to create a radically new environment in which every agency must work. Listed below are five conditions and some of the resulting consequences.

## **1. CONDITIONS OF GREAT UNCERTAINTY**

The immediate response required by most agencies must be made without a sound basis, since the extent of damage is often unknown. The official policy of the organization in a particular situation may not yet have been defined, and the limits of the organizational resources and personnel available are not known, etc. Such uncertainty may lead to delays in effective programme implementation or, conversely, to hasty commitments which may later be beyond the ability of the organization to fulfil. Organizational changes also may arise from this uncertainty, including new organizational roles, changes in patterns of authority, as well as communication and co-ordination problems.

## **2. CONDITIONS OF URGENCY**

The conditions of urgency in which most organizations must perform are likely to result in various organizational changes, *inter alia* in established patterns of working, reporting and consulting. There is also likely to be greater autonomy for individual staff members and greater scope for them to take initiatives in decision-making. The urgency factor must be taken into account in emergency administrative systems. The more an organization insists on routine maintenance of administrative tasks, the more difficulty it will have functioning during a disaster relief operation.

## **3. ADAPTABILITY IN EMERGENCIES**

Agencies must adapt to disaster-relevant tasks. This may require new procedures, new functions and new expertise. Agencies which may routinely provide a particular service (e.g., agriculture extension services, health training, etc.) may find it necessary to participate in new activities to meet needs suddenly created by a disaster (e.g., credit extension or reconstruction.)

## **4. LOSS OF AUTONOMY**

The collaboration necessary in a post-disaster situation will require organizations to work within a community context, establish new working relationships and possibly work within defined guidelines. Independent agencies, or particular levels within an organization, often believe that total autonomy is best, while those in co-ordination or administrative positions may discourage autonomy. The most constructive balance must evolve from the characteristics of the particular situation. A complete lack of autonomy for particular operative levels of an organization, as seen in highly centralized administrative structures, is likely to limit effectiveness. Conversely, total autonomy for all often results in excessive competition, duplication and confusion. In response to the problems encountered after the cyclone of 1977, the Indian state of Andhra Pradesh redrafted its legislation to define more clearly the roles and limitations of agencies working in a disaster situation.

## 5. BASIS FOR PARTICIPATION

Another change that is likely to occur in an emergency is the basis for participation by staff. All too frequently this change is made without adequate structure or support, and newly recruited staff are not provided with job descriptions, contracts or adequate instructions. Participation is likely to be based on need, resulting in changes in communications and in the structure of authority.

### Common organizational problems

#### 1. COMMUNICATIONS

An effective disaster response is dependent upon the accurate and timely transfer of information, an obvious point but a constant problem. Communication problems arise partly from the destruction or disruption of communications equipment and public systems. Persons working in disaster-affected areas often mention the need for emergency communications equipment, portable radios, etc. While such equipment is usually helpful, the communications problems that often affect disaster preparedness, disaster relief and reconstruction programmes are less related to equipment than to what is or is not communicated, to whom the information has been sent, and who has failed to receive information that he should have acquired.

Potential information problems always exist within the following framework:<sup>3</sup>

##### (a) *Within organizations*

The uniqueness and suddenness of an emergency, the unusual tasks that may have to be performed, the changes likely to occur within an organization, the sudden addition of new staff, and the conflict between the need for systematic information collection and the pressing need to engage in emergency activities, all contribute to the likelihood of certain information problems occurring within organizations involved in an emergency.

##### (b) *Between organizations*

Disasters create situations in which some collaboration between organizations is essential. Establishing effective communications between organizations which do not routinely work together requires time and considerable effort. Moreover, there is the added complication of the many newly formed groups both within and outside the affected area with which effective communications must be established. Established agencies often err in refusing to acknowledge the existence of such groups, perceiving them as competitors encroaching on their own disaster roles. New or outside agencies often err by assuming that local agencies are not likely to exist or be effective, and that their work justifies operating independently. This commonly results in a lack of communication, fragmentation and competition.

Experience and research have shown that one way of enhancing communications is to establish working relationships between disaster-relevant organizations and departments prior to an emergency. Forums in which all participating bodies, formal and *ad hoc*, can exchange information have also proved to be useful.

##### (c) *From organizations to the public*

Organizations involved in disaster-related work often seriously underestimate the importance of communicating with the public they are attempting to serve. Where there is a lack of accurate information, rumour and speculation fill the void. After the Sri Lanka cyclone already referred to, district officers found it very helpful to visit villages in order to discuss and explain the relief and reconstruction efforts under way. Not particularly helpful, and often resented, are public statements made only for an organizational purpose and in order to publicize relief activities.

##### (d) *Public to organizations*

The most effective programmes are likely to be those carried out "with" the affected population, rather than "for" people. Working "with" the public requires two-way communication, which is essential in preparedness, warning, assessment, and the establishment of assistance programmes. Organizations must anticipate the information required by the public. For example, before a cyclone, meteorological offices are often inundated with requests for information. In the cited example of the Sri Lanka cyclone, the calls seriously hampered the information dissemination process. After a disaster, local officials are frequently besieged with information requests from the public.

Another type of communication from the public to organizations which has important organizational consequences is non-routine requests for information, special assistance, etc. The flexibility to meet the needs presented without violating the organizational mandate is particularly important.

##### (e) *Organizational systems*

Quite commonly the communication process that causes the greatest difficulties is contact between different levels of an organization or administrative structure. Senior officials may feel free to make significant decisions without consulting lower-level staff, causing great problems and misunderstandings. Also, one group of agencies may not recognize the need for information by another group.

## 2. THE EXERCISE OF AUTHORITY

Due to the fact that so many self-initiated activities must occur simultaneously, often with comparative independence, the leadership in a disaster situation is likely to be very complex. Nevertheless, there is need for some agencies and persons to make decisions and assume overall responsibility. As described above, it may be expected that the exercise of authority before and after a disaster may not be radically different, that lines of authority may change but are not likely to break down, that officials will continue to carry out their normal responsibilities, and

<sup>3</sup> E. L. Quarantelli, *Human Resources and Organizational Behaviors in Community Disasters and their Relationship to Planning*, Preliminary Paper No. 76, Ohio State Disaster Research Center (Columbus, Ohio State University, 1982) p. 11.

FIGURE 6



(Credit : WFP/FAO photo by C. Sanchez)

Disaster management activities, from preparedness to reconstruction, require a participatory process. This photo shows the people of the village of Cajamarquilla in discussion with Peruvian officials about reconstruction after the earthquake of 1970, an earthquake which left some 44,000 dead.

that, in the absence of senior-level people, subordinates will assume responsibility. In spite of these positive aspects there are at least four problems which frequently occur in regard to the exercise of authority:<sup>4</sup>

- (i) Loss of top-echelon personnel because of overwork and the lack of shared responsibilities;
- (ii) Conflict over authority for new or unusual disaster-related tasks;
- (iii) Clashes between established organizations and new (or emergent) organizations, or over who has responsibility between different administrative levels, such as provincial versus national; and
- (iv) Organizational jurisdictional differences, such as between two adjoining provinces.

While some of these potential problems are not easily solved, constructive actions can be taken to minimize their occurrence and effects.

### 3. CO-ORDINATION

Co-ordination is a commonly discussed subject confused by the various assumptions about its meaning. To some it implies the sharing of information; to others co-ordination implies centralized decision-making. The implication is that a common understanding must exist between the parties involved. Co-ordination might be defined as "the mutually agreed linking of activities of two or more groups."<sup>5</sup>

The multitude of responses likely to be required in the case of a major disaster can only marginally be co-ordinated, as the needs and actions are likely to be diverse and difficult to anticipate fully. Any attempt to completely structure all community responses would be impossible, and would almost certainly be disruptive. This has been demonstrated in some situations in which the concern for rigid structure and order has resulted in martial law or the

<sup>4</sup> *Ibid.*, p. 12.

<sup>5</sup> *Ibid.*, p. 13.

total cordoning off of damaged areas, with detrimental effects upon the people concerned.

Some researchers have argued that co-ordination is concerned primarily with efficiency, and that the ultimate criterion for meeting post-disaster needs is not efficiency but effectiveness.<sup>6</sup> "Co-ordination is sometimes discussed as if it were an absolute necessity or an absolute good. That is not so; there can be relatively effective organizational responses in some disasters which do not require a high degree of co-ordination."<sup>7</sup>

Research has shown that co-ordination is *not* something that must necessarily be imposed. Co-ordination units, the sharing of information, and agreement on the joint management of resources and activities, have been shown to develop spontaneously in or near most disaster sites.<sup>8</sup>

Effectiveness and efficiency can however be enhanced by the sharing of information and mutual collaboration where this improves the quality of the work carried out.

### Co-ordination guidelines

Listed below is a sample of co-ordination guidelines taken from the *Sri Lanka Cyclone Handbook*.<sup>9</sup>

#### General considerations

1. The need for co-ordination in disasters is based on the necessity for co-operative action by all involved in order to :

- (a) Effectively and efficiently meet needs;
- (b) Avoid waste and duplication of effort;
- (c) Ensure that resources are distributed equitably and to areas of greatest need;
- (d) Ensure that the methods and goals of one programme do not conflict with those of other programmes.

2. Co-ordination must not only take place at every administrative level (such as between ministries or between the different groups of people in a village) but also between administrative levels (such as between village-level and district-level administration, or between district offices and Colombo headquarters).

#### Elements of co-ordination

There are several common operational components involved in the establishment of a co-operative working relationship, whether it be local or national, organizational or individual :

1. Operating guidelines — procedures for co-ordination must be defined and agreed upon by all parties.

2. Roles — the roles, responsibilities, authority and privileges under which each party will operate should be well defined, in writing.

3. Priorities — priorities must be clearly defined and agreed upon by all parties.

4. Data collection and reporting — effective co-ordination is largely dependent upon an effective data collection and reporting system.

(a) Information source — who is expected to provide information must be clearly defined;

(b) Communication methods — how information is to be transmitted must be understood by all parties;

(c) Definition — what information is needed must be clearly defined.

5. Time considerations — time requirements for all functions should be identified and agreed upon by all.

#### Factors which inhibit co-ordination

1. Disruption of communication facilities and lack of an adequate emergency system;

2. The difficulty of establishing an accurate assessment of the damage and needs;

3. The difference of opinions on what is needed, how it should be provided, and what the priorities should be;

4. The tendency for parties to relate to a particular target group or problem without viewing it from the perspective of the broader needs or the resulting implications;

5. The tendency of some groups to purposely avoid co-ordination for private gain in visibility.

#### Factors which improve co-ordination

1. Clearly outline and agree upon co-ordination roles, functions and contributions, etc., as part of preparedness planning.

2. Establish a physical location for the co-ordinating centre and for each functional operation, such as transport or supply depots.

3. Clearly define objectives and review frequently to monitor progress.

4. Closely monitor the effectiveness of actions, and carry out periodic reviews.

5. Establish an atmosphere of respect for the mutual sharing of goals by all parties.

6. Identify gaps or overlaps in functions.

7. Written communications will be more reliable than verbal.

8. Establish a chain of command for every operational project.

9. Remain flexible to meet diverse needs.

10. Minimize the number of co-ordination meetings.

11. Co-ordination committees should include representatives from both private and governmental sectors, including local leaders (such as village elders), religious leaders and local politicians.

12. Careful pre-planning and the development of written statements of understanding between private voluntary disaster relief agencies and the national Government will eliminate much of the potential confusion about roles and activities.

<sup>6</sup> *Ibid.*, p. 14.

<sup>7</sup> *Ibid.*

<sup>8</sup> *Ibid.*

<sup>9</sup> See footnote 1.

## Chapter VI

### SOCIAL CONSIDERATIONS IN PRE-DISASTER PLANNING

#### The problem

In spite of the fact that pre-disaster planning has been initiated in many disaster-prone countries, there continues to be significant loss of life, destruction of physical property, and disruption of social environments from natural disasters. While many steps have been taken to reduce the effects of disasters and to meet human needs in disaster situations more effectively, experience has shown that the establishment of a pre-disaster planning process is not without difficulties, and has not always produced the results hoped for. From the social point of view, it is necessary to evaluate how current disaster preparedness arrangements might be made more effective.

Analysis suggests that similar problems are faced in many countries. Some of the more common problems are summarized as follows : Pre-disaster planning often deals only with disaster impact and relief, without adequate consideration of recovery in the longer term. Disaster preparedness is often narrowly perceived as the drafting of a relief plan. Prevention is rarely perceived as an important complement of preparedness, dealing with long-range scientific, social and economic problems.

This results in a lack of integration between pre-disaster planning and on-going development. Disaster plans are often limited in their effectiveness because they are based on erroneous assumptions, and do not address certain essential disaster-related issues. Pre-disaster planning often tends to be focused on improving a particular agency's response to community needs rather than, for example, on strengthening the preparedness capabilities of a self-reliant community. Pre-disaster planning tends to be limited in scope and fragmented. These problems have been exacerbated by a lack of experienced disaster preparedness personnel.

#### Pre-disaster planning

As defined earlier in this publication, a natural disaster is an interaction between a disaster agent and a vulnerable population. The vulnerability of a population is partly determined by human behaviour. Even when disasters cannot be prevented by the elimination of the physical phenomena, or by the permanent removal of a population at risk, in almost all cases the effects of disasters can be reduced through planning and mitigation measures. Usually, a lack of appropriate disaster preparedness planning means that the disaster is not handled particularly well at any stage. The recovery and long-term rehabilitation stages are frequently the most difficult to manage.

For those disasters which cannot be prevented, the pre-disaster planning objectives should be to minimize loss of life, physical destruction and social disruption; to alleviate the suffering of people who experience such disasters; and to assist disaster-affected communities to return to normal as soon as possible. In general terms one may refer to such action as mitigation.

Prevention and mitigation, preparedness and recovery are often treated as independent concerns requiring separate actions, almost as though they were unrelated. This, however, must change in favour of a more integrated approach. Without adequate *preventive* measures the burden of relief will inevitably continue to increase.

Pre-disaster planning and mitigation have often been separated in both conceptualization and implementation. They have often been viewed only as guidelines for future action. Increasingly, the separation of planning and implementation is being challenged. Pre-disaster planning is being redefined as a long-term process in which the anticipation of potential problems, the establishment of guidelines and programmes of implementation are seen as integral parts of the same process.

#### Social principles of pre-disaster planning

*Social responsibilities* : The responsibility for disaster preparedness is often delegated to one agency or department. Such delegation may be essential for programme development, for providing special expertise, and for co-ordination to ensure that individual efforts are complementary. Nevertheless, it is important to recognize that effective disaster preparedness must be a part of the work of all departments and organizations at every administrative level. Pre-disaster planning, for example, must be carried out at the national level, the regional level, the state or provincial level, the local level and by many individuals and groups within each community. It must be an activity of all ministries, public services, private businesses and most community groups. Disaster preparedness and prevention activities should not be carried out only by specialized agencies or departments, but should be a collective effort.

While preparedness must be carried out at each administrative level, perhaps the most important is the household and community level. The success of disaster preparedness is always measured at the community level. National or regional plans are of little good if community and household measures are not implemented effectively.

Just as every individual, family, organization, business and public service within a community will be affected by

a disaster, each has a role to play in preparedness. Stated even more strongly, on a practical basis the multitude of actions that must be taken to implement an effective disaster preparedness programme requires the participation of the entire community. This of course is obvious, for if life is to be protected, people, individually, must take protective action. If homes are to be protected, the home-owners and the building industry must be involved in making the houses safer. If businesses and industry are to minimize losses, each particular establishment must take responsibility for the necessary preparedness and mitigation. If hospitals, schools, food warehouses and other public services are to be protected in an emergency, those responsible must implement the necessary preparedness and prevention efforts.

### **Planning and development**

Disaster preparedness is most effective if planned as a development process, rather than as a relief process. Development stimulates self-reliance and is participatory. Relief is something done for or given to people. Pre-disaster planning is frequently divorced from the development process within a country or community. The separation of the pre-disaster planning process from the non-emergency planning processes or the separation of disaster prevention programmes from the implementation of on-going programmes is unlikely to produce long-lasting results. The consequences of such separation is often that preparedness and prevention measures are simply never implemented. Such separation may also result in the establishment of procedures and goals which are at variance with broader community objectives, or may result in the establishment of parallel and competing programmes. Integrating disaster preparedness measures into organizational and community development programmes is likely to give the best results.

The separation of technical and social considerations in disaster planning also continues to be a major problem. Pre-disaster planning is often treated primarily as a technical exercise, with inadequate consideration of the human and organizational issues. In many communities little is known about how the general public perceives and understands disaster warnings; what is likely to motivate people to evacuate if necessary; what people believe to be the necessary precautions to be taken. These are a few of the many examples that could be cited as evidence of this separation.

One of the many causes of fragmentation, which may limit the effectiveness of pre-disaster planning for particular types of disasters, is the building up of response mechanisms independently of pre-disaster planning and response for *other* types of emergencies, for example, planning for emergency medical services without consideration of the everyday emergency services that exist in every community. Fragmentation is also seen in the actions taken for particular natural disasters (such as earthquakes) to the exclusion of others (such as fire), and in separating the planning for natural disasters from plans for man-made and technological disasters.

### **Planning with scenarios**

Effective pre-disaster planning cannot be based on the assumption that people who live in disaster-prone areas are aware of the risks, know what precautions to take for the protection of life or property, or will accurately anticipate post-emergency conditions. On the basis disaster experience alone, most community officials and the general public do not have a solid basis for making sound judgements about the possible effects of a future disaster, nor are they likely to be aware of the most effective precautions to take.

Research has shown that disaster experience itself may not be a reliable teacher. In fact, studies in the United States have shown that persons with some disaster experience are less likely to take necessary precautions than those without disaster experience. People who live through a natural disaster that causes only minimal destruction often erroneously assume that the next natural disaster will be similar. For example, people living along the coast of the Indian state of Andhra Pradesh in 1977 did not evacuate the area in response to the cyclone warning, although advised to do so. On the basis of their past experience, they were not prepared for the tidal wave which accompanied that particular cyclone, resulting in the death of over 10,000 people.

It is sometimes suggested that, through past experience with cyclones, earthquakes and floods, people in disaster-prone areas develop common-sense methods of protecting themselves and their properties, just as fishermen seem to develop a sense of the ocean. It is not uncommon to hear officials claim that local residents know what actions to take in the event of a disaster, nor is it uncommon to hear warnings which consist only of an undefined directive to "take necessary precautions". While some appropriate precautions are taken in most disaster-prone communities, much more is required than is commonly done. Damage assessments after nearly every disaster demonstrate that even simple precautions were not taken. For example, in the case of high winds, people frequently do not anticipate the consequences of roof damage, nor do they take precautionary steps to protect items within a building. This is often dramatically illustrated by damage to records, office equipment, food stocks, clothing, personal effects, machinery, tools, hospital supplies, etc., all of which could have been protected with minimal effort. Such damage does not result from disinterest but primarily from a lack of awareness of actual hazards and their effects.

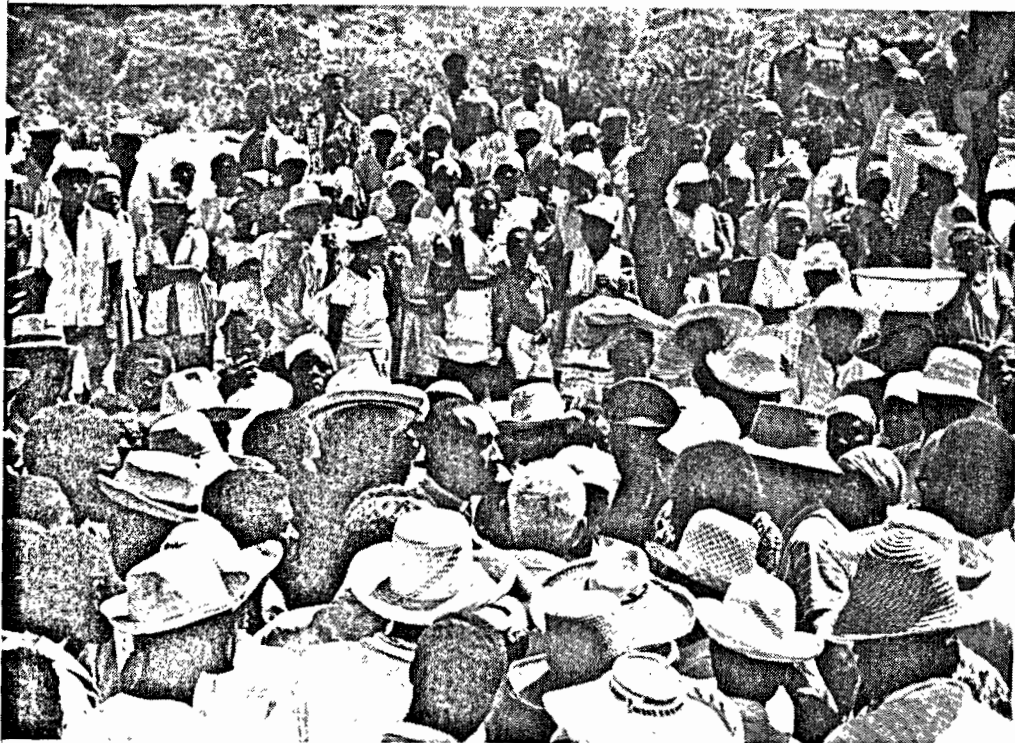
Effective measures are dependent upon an accurate projection of what physical impact the disaster is likely to have on a community, and what the response of individuals and organizations within that community is likely to be. Realistic planning and effective precautions require an informed assessment of future disaster risks and consequences, including time frames.

### **Training, awareness and public education**

Training and disaster awareness programmes are essential if people living in disaster-prone communities are to

FIGURE 7

Public participation in pre-disaster planning, relief and recovery



(Credit : C.A.R.D.)

have a more realistic understanding of the disaster risks of their community, and take more practical measures to save life and property.

Disaster training and disaster awareness programmes are gradually being established in a number of countries. A review of the materials produced in these programmes suggests that in some countries extensive and diverse efforts are being made to involve the general public, while in other countries little has been done. Disaster training and public education is a comparatively new endeavour. Much has yet to be learned about the best way to implement such programmes, and in many countries little is known about their success.

An effective disaster awareness programme for the public will :

- Be participatory in design;
- Be community-specific;
- Be based on an assessment of the information needed;
- Be integrated with existing disaster warning and response systems;
- Include information on prevention, mitigation, and long-term recovery;
- Be established as an on-going process; and
- Include as a priority the most vulnerable people.

There are several common problems encountered in disaster awareness programmes. Public education programmes are often limited to emergency assistance, first aid and relief issues. While these concerns are critically

important, the lack of attention to prevention issues continues to be a major shortcoming. The implementation of more effective ways to protect people and goods would eliminate the need for some of the relief, and would substantially reduce losses and hardship. Another important weakness arises from the fact that public information campaigns are carried out on a regional or national, rather than on a community basis. This results in disaster information that is very general and of little practical value in assisting people to know what specific actions must be carried out.

The need for hazard awareness programmes is assessed by the determination of three basic questions :

- (i) Do people know they live in a hazard-prone area ?
- (ii) Do people know the risks ?
- (iii) Do people know effective ways to reduce such risks ?

### Priorities

In every community there are certain groups of people who are more vulnerable than others, services which are considered more essential than others, and certain amenities which are critically important. Priorities must be established for those factors which are considered the most important. A list of these priorities might include the following :

1. Those people who are most vulnerable should be provided with special assistance in preparedness and in post-disaster response. The aged, families requiring



assistance and the handicapped can be singled out immediately.

2. Every effort should be made to upgrade essential public services (particularly hospitals, utilities, and communications facilities) in order to keep disaster damage to the minimum, in readiness for post-disaster demands.

### Disaster preparedness plans

Written plans are an important aspect of disaster preparedness. The development of specific plans is necessary to ensure that the required action will be carried out efficiently.<sup>1</sup> It is worth repeating that disaster preparedness plans are more effective if developed and maintained as an integral part of development programmes rather than as end products in themselves. The benefit of specific plans is that it forces explicit thinking about problems, and reduces probable unknowns.

While national-level plan is essential for over-all co-ordination and programme implementation, it is equally important that preparedness plans should be developed at every administrative level and by all parties who may participate in disaster-related activities. Most important, however, is the planning process at the community level. It is not an exclusive effort only to be completed by established emergency organizations or by head offices. It is a working tool for every agency, department, service, business and institution. In practice key governmental agencies and disaster-related organizations (both private and public) are likely to play a leading role.

Disaster preparedness plans are not always effective in improving disaster response. In many cases plans are drafted and approved by official bodies, then filed away and forgotten. All plans should have built in, mandatory provisions for updating. Some disaster plans impede rather than enhance programme implementation. Problems which limit the effectiveness of disaster plans include :

- Unrealistic assumptions about probable disaster situations;
- Disregard for potential contributions from other agencies;
- Disregard for the coping response of the general public;
- Not revising and updating plans;
- Inadequate planning for internal organizational problems;
- Insufficient planning for the prevention and recovery phases; and
- Omission of training and rehearsal procedures.

As disaster plans are developed at many different administrative levels and by many different departments and organizations, each component of the plan will be unique to the service to be provided. There is, however, a common basis for the development of disaster preparedness plans. There are at least six general categories of issues

which must be addressed, whether prepared for a hospital, the highway department, a non-governmental agency or others. They include :

### 1. ASSUMPTIONS

A disaster preparedness plan should state explicitly the assumptions upon which it is based. These assumptions should include the anticipated effects of a disaster, the projection of the needs likely to exist, and the actions likely to be taken by the general public, official departments and community groups. Historical facts about damage and the consequences of past programmes are extremely useful in explaining why certain assumptions are made. In Sri Lanka a disaster handbook was developed in which each set of recommendations was accompanied by a fact sheet entitled "Lessons Learned in the Cyclone of 1978", in which that disaster experience was summarized. However, the focus must be forward-looking as the next emergencies are not likely to be simple repeats of past experiences.

### 2. GOALS

Disaster plans must specify goals. The goals can range from detailed instructions to general guidelines, depending on the service being provided. While specific goals are usually more useful than broad generalizations, over-detailed plans may be counter-productive for lack of flexibility in unique situations. The longer and more complicated a plan, the less likely that it will be implemented.

### 3. ORGANIZATION

Many of the difficulties that commonly arise in disaster response come from internal organizational problems. Problems can be expected if a department or agency suddenly feels obliged to hire large numbers of new staff to carry out projects which have not been studied or planned for, and for which no administrative, managerial or technical support exists. The organizational considerations which must be addressed include project management, liaison, and administrative support.

### *Management*

Defining a programme philosophy is an important basis of project management. A statement of programme philosophy should include a definition of the objectives of a planned service, a description of the planned programme approach, and an explanation of why this course of action is being taken. A programme philosophy influences both the choice of programmes and their implementation. For example, a programme philosophy which supports self-sufficiency is participatory in design, and attempts to provide support for actions which will have long-term benefits. It may have quite different consequences if it is oriented only to short-term, outside assistance in the impact, and undefined programme philosophy leads to problems.

<sup>1</sup> UNDRO, *Disaster Prevention and Mitigation : A Compendium of Current Knowledge*, vol. 11, "Preparedness Aspects" (Geneva, Office of the United Nations Disaster Relief Co-ordinator, 1984).

Examples of other project management issues to be addressed in a disaster preparedness plan include :

- Staff training for disaster preparedness;
- Techniques for the assessment of needs;
- Guidelines for the identification of new activities;
- Guidelines for the programme implementation;
- Mechanisms for soliciting additional technical support;
- Reporting procedures;
- Suggestions for the termination or transition of emergency programmes; and
- Plans for project evaluation and follow-up.

### *Liaison*

Special consideration is required to ensure that an information flow is established between the authorities, other organizations and the general public. Liaison does not simply mean a one-way flow of information : successful programmes are also dependent upon feedback and comment.

### *Administration*

Special planning is also required to deal with the administrative changes that occur within organizations operating in a disaster. Examples of emergency administrative issues that should be considered include :

- (i) The definition of critical roles and responsibilities (noting position not persons);
- (ii) The need for decentralization;
- (iii) Anticipation of the need for any additional administrative support that may be required;
- (iv) The establishment of special personnel policies for staff working in emergency situations;
- (v) The development of flexible decision-making procedures;
- (vi) Defining procedures for the sudden expansion of staff;
- (vii) Guidelines for the selection, training and support of new staff;
- (viii) The consequences of structural changes within the organization arising out of new staff and new functions;
- (ix) Administrative reporting requirements; and
- (x) Procedures for the transfer of money, and for financial control systems.

## 4. INTRA-ORGANIZATIONAL FOCUS

Disaster plans are often written as though the agency developing the plan was the only organization likely to respond to disasters. However, disaster plans will be most effective if they acknowledge the plans and contributions of other parties involved in the disaster process.

## 5. TECHNICAL CONSIDERATIONS

Special technical considerations, not normally encountered in non-emergency activities, are required in the provision of most disaster-related services. The technical issues addressed in a disaster plan should be those of specific importance to disaster preparedness and response. Technical reference material may be useful in providing an informed basis for decision-making, thereby minimizing decision-making based on myth or conjecture.

For example, disaster plans for food storage warehouses could include such preventive measures as making recommendations concerning siting and building specifications; maintaining a certain level of stocks to meet emergencies; ensuring that tarpaulins and other emergency supplies are available for emergency measures; ensuring that protective cabinets are provided to secure office records and equipment; and providing training for co-operation staff, store managers, warehouse keepers and other staff on emergency procedures.

## 6. TRAINING AND PUBLIC AWARENESS

Training programmes are likely to have the greatest impact if incorporated into established organizational training programmes. Rehearsal is an important tool for acquainting people with the roles they may be asked to assume, and for identifying potential problems.

## 7. REVISING AND UPDATING PLANS

Disaster plans can be effective only if they are regularly updated and revised to incorporate changes within organizations; changes in the plans and actions of other agencies; and changes that constantly occur in any community. Disaster plans need not be lengthy. In fact the longer they are, the less likely they are to be used. As discussed earlier, disaster plans cannot be too specific for fear of not meeting actual situations. The statement of principles or general guidelines permits the implementer to make necessary independent decisions. Roles and responsibilities are best designated by position rather than a particular individual, since individuals frequently change.

## Chapter VII

### SOCIAL CONSIDERATIONS IN FORECASTING AND WARNING

The ultimate goal of a warning system is to influence people to take precautionary action. A warning provides the opportunity for people to prepare for the impact of a hazard. A disaster warning system is evaluated according to its ability to motivate actions to minimize loss of life and social disruption.

Disasters fall into two distinct groups — those that occur unheralded and others for which some prior warning can be given.<sup>1</sup>

Earthquakes are unexpected events because it is not yet possible to predict accurately when and where they will occur. While weather-related disasters are the most common disasters for which some prior warning is given, warning is also possible for dam collapses, volcanic eruptions, landslides, and tsunamis.

The amount of warning possible varies considerably from just a few minutes for tornadoes, an hour or two for thunderstorm squalls and flash floods, a day or two for tropical cyclones, up to a week or even much longer for floods in slow-moving rivers in extensive flat terrain.<sup>1</sup>

Disaster warning, as already mentioned, is an integral part of disaster preparedness. The establishment and implementation of a warning and response system is itself complex and requires co-ordinated activities by different departments for diverse audiences within very restricted time limits, and on the basis of often uncertain information. The warning system must bring together geophysical sciences, social sciences and technology.

Disaster warning systems for different hazards may differ in some ways. In spite of differences, most warning systems will include four basic functions :

- (i) Detection, evaluation and prediction of hazard;
- (ii) Formulation of forecast and warning messages;
- (iii) Dissemination of warning messages; and
- (iv) Initiating appropriate preparedness responses

The technical and social aspects of these four warning system functions constitute the largest single field of study in the international analysis of disaster preparedness. The literature is extensive. This chapter attempts to focus on what research has suggested are the major social considerations.

#### 1. Detection, evaluation and prediction of a hazard

Over the last 30 years, significant strides have been made in the capability to detect hazards earlier, evaluate them more fully, and predict more accurately what their effects

are likely to be. Advances in technology have facilitated the use of such equipment as computers, satellites, improved weather radar systems, flood monitoring devices, and advanced seismic instrumentation as part of warning systems. With satellites, for example, it is now possible to detect the formation of cyclones in their early stages, determine the flood potential from the melting of mountain snow-caps, monitor the silting of rivers, and detect seismic fault movements. These advances have resulted in the establishment of many different disaster warning systems, including early warning systems for tsunami, cyclones, flooding, winter storms and thunderstorms. Advances in science and technology offer a more reliable basis for forecasting how hazardous situations may develop, which communities are likely to be affected, and the possible effects.

#### Problems

The international community has not, to date, benefited uniformly from these technological advances. In some countries advanced warning systems exist while in other countries only minimal efforts have been made to establish effective systems for the detection, evaluation and prediction of hazardous situations. There are various reasons for this. The related sciences, for example, are still evolving; the new technologies are often extremely expensive; various countries have different levels of risk; and more active collaboration in training and in the sharing of information and technology is needed. There is significant opportunity for international co-operation to improve the capability of detection, evaluation and prediction.

While major advances have been made, there are still significant limitations to consistent and accurate identification, evaluation, and prediction of natural hazards. For many hazards, scientists can at best suggest the probability that an event will occur but cannot predict the specific time of occurrence, the intensity, or the exact communities to be affected. This is more true of cyclone prediction than is often assumed. For example, in the United States when predicting the landfall of cyclones, the average 24-hour forecast error is 100 miles.<sup>2</sup> Those who are not scientists in hazard detection may not appreciate the degrees of error existing. They often have unrealistic ideas about what instruments such as satellites and computers can do, and

<sup>1</sup> A. D. Crane, "Warning Systems: Possibilities and Problems", in *Response to Disaster*, ed. John Oliver (Townsville, James Cook University of North Queensland, 1980), p. 47.

<sup>2</sup> Earl J. Baker, "Coping with Hurricane Evacuation Difficulties", in his *Hurricanes and Coastal Storms* (Gainesville, Florida Sea Grant College, 1980), p. 13.

may have exaggerated expectations as a consequence. A realistic understanding of forecasting limitations may help in maintaining credibility of the warning service. The general public is unlikely to respond optimally to warnings if the credibility of the warning service is questioned.

### Suggestions

Experience suggests that improving hazard assessment and forecasting entails more than improving technology. For weather warning, further technological advances will only give marginal additional benefits, and at ever increasing costs.<sup>3</sup> In a study of flood warning systems, the lesson learned in both developing and developed countries is not to rely exclusively on any one system.<sup>4</sup> In rural areas where people do not benefit from reliable flood warning, there should be more consideration of the local population's empirical understanding and knowledge. Other non-technical considerations which must be taken into account include improving the personal skills of forecasters and increasing the public's understanding of the causes and development of hazardous phenomena.

## 2. Formulation of forecast and warning messages

In the past, disaster warning services issued warnings as though their only purpose was to deliver the message.

What happened to them (the warning messages) afterwards, whether they were received, believed, or acted upon, was of no concern to the warning system, which was concerned about technologically efficient and accurate forecasts about the geophysical disaster agent.<sup>5</sup>

Disaster warning messages often do not have the desired impact, a fact consistently substantiated by social science research.

The public warning disseminators usually proceed without sufficient knowledge or training in what information should be contained in public warnings, or the best means of delivery. The result is often an inadequately warned public and needless deaths and injuries.<sup>6</sup>

After the study of 31 disaster sites in the United States, it was concluded that:

Warning messages are generally not formulated in a manner which motivates optimal response. Standard messages presented by the broadcast media motivate people to seek additional information, but do not induce protective action. In fact, a standard statement may actually reduce response, unless information is given which convinces residents in susceptible areas that they are at risk.<sup>7</sup>

Examination of warning messages must include analysis of whether the message contains the necessary information, whether the message was understood by receivers and

whether the warning message stimulated receivers to take necessary action.

### Problems

The following are some of the problems associated with disaster warning messages that arise from social rather than technical issues:

(a) Warning terms are often developed as an organizational code to indicate different time phases or degrees of danger. Surveys suggest that the public often confuses or fails to appreciate the difference between the warning terms used, such as "watch" and "warning", "intensity one" and "intensity two", or "flash flood" and "river flood". The language in some warnings is too technical. For example, terms such as latitude and longitude may not be readily understood. Technical information alone, or eye-witness reports, have been shown not to be particularly persuasive in stimulating people to act decisively.

(b) Conflicting warning messages are sometimes conveyed at different times, and from different sources.

(c) People are often unable to translate general weather conditions into specific dangers likely to occur at the local level. For example, on the basis of a weather notice which forecasts the amount of rainfall, they may not anticipate that roads will be flooded.

(d) Warning messages often contain insufficient geographical information to provide meaningful reference points.

(e) Research has shown that awareness of an approaching hazard does not necessarily lead to the adoption of appropriate precautions.

The problems mentioned above were identified in a review of eight major studies of social response to cyclones cited in the noteworthy monograph of the World Meteorological Organization entitled *Human Response to Tropical Cyclone Warnings and their Content*. The problems mentioned, however, are only a sampling of the difficulties which may exist in formulating and disseminating warning messages. The social considerations which enhance or limit the effectiveness of hazard warning messages must be assessed locally, since many factors are likely to be culturally and community specific.

### Suggestions

In order to improve disaster warning messages, the information contained must include more than technical information. Greater attention must be given to information for the general public, and to the success of messages in stimulating people to take appropriate action. In consideration of the social factors, the following practical suggestions have been derived from a review of social science research:

- (i) Warning messages must convince the general public that they are personally at risk. People will find it more helpful to know they are in danger as a result

<sup>3</sup> Oliver, 1980, 50.

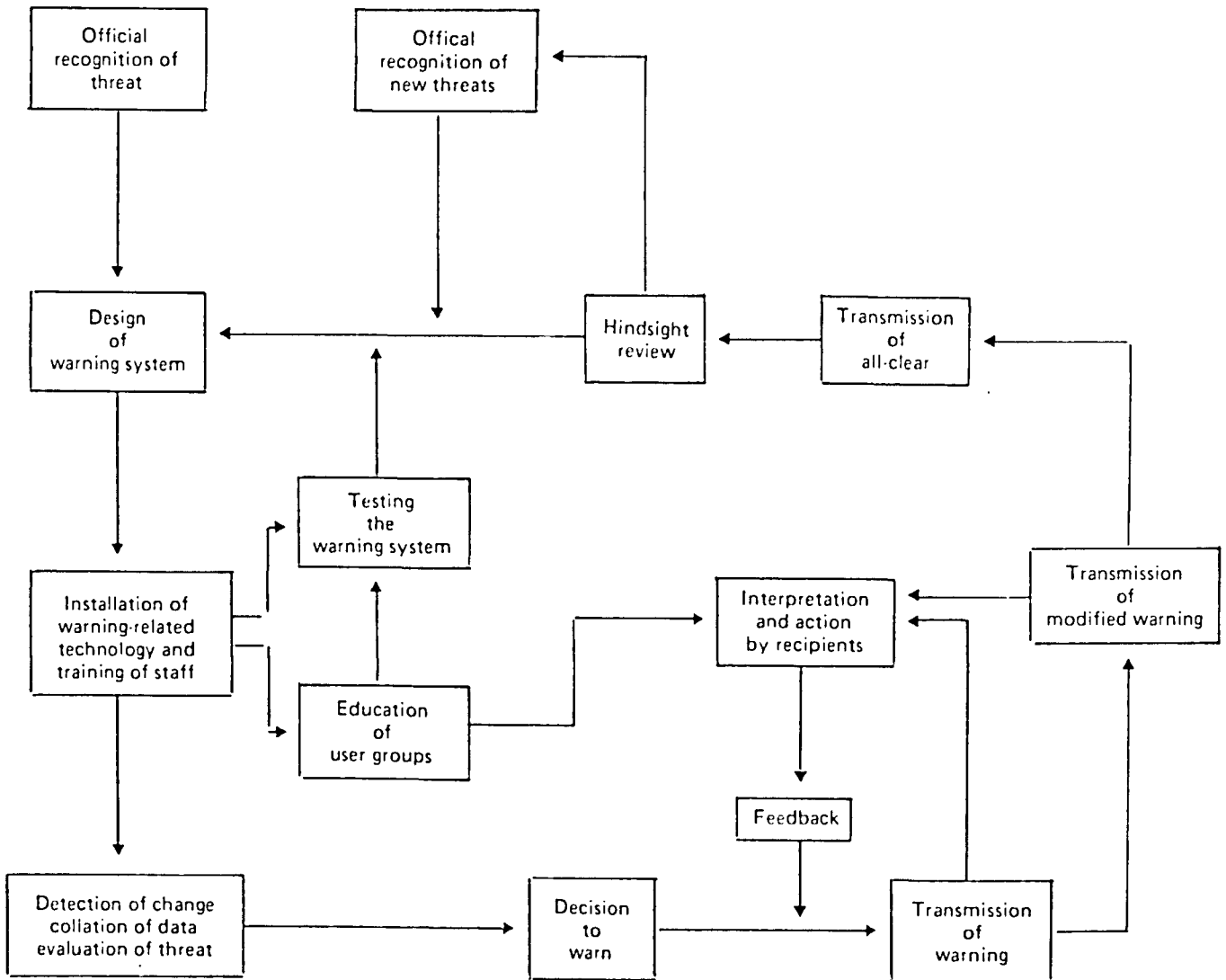
<sup>4</sup> Robert Schware, *The Folk Wireless: An Example of Indigenous Technology for Flood Information Systems* (Geneva, United Nations Research Institute for Social Development, 1982).

<sup>5</sup> Ian A. Murray, "Social and Political Aspects of Disaster Warnings", in *Response to Disaster*, ed. John Oliver (Brisbane, James Cook University of North Queensland, 1980), p. 61.

<sup>6</sup> *Ibid.*, p. 71, quoting Mileti, 1975.

<sup>7</sup> Robert K. Leik, T. Michael Carter, and John P. Clark, *Community Response to Natural Hazard Warnings* (Minnesota, University of Minnesota, 1981), p. 72.

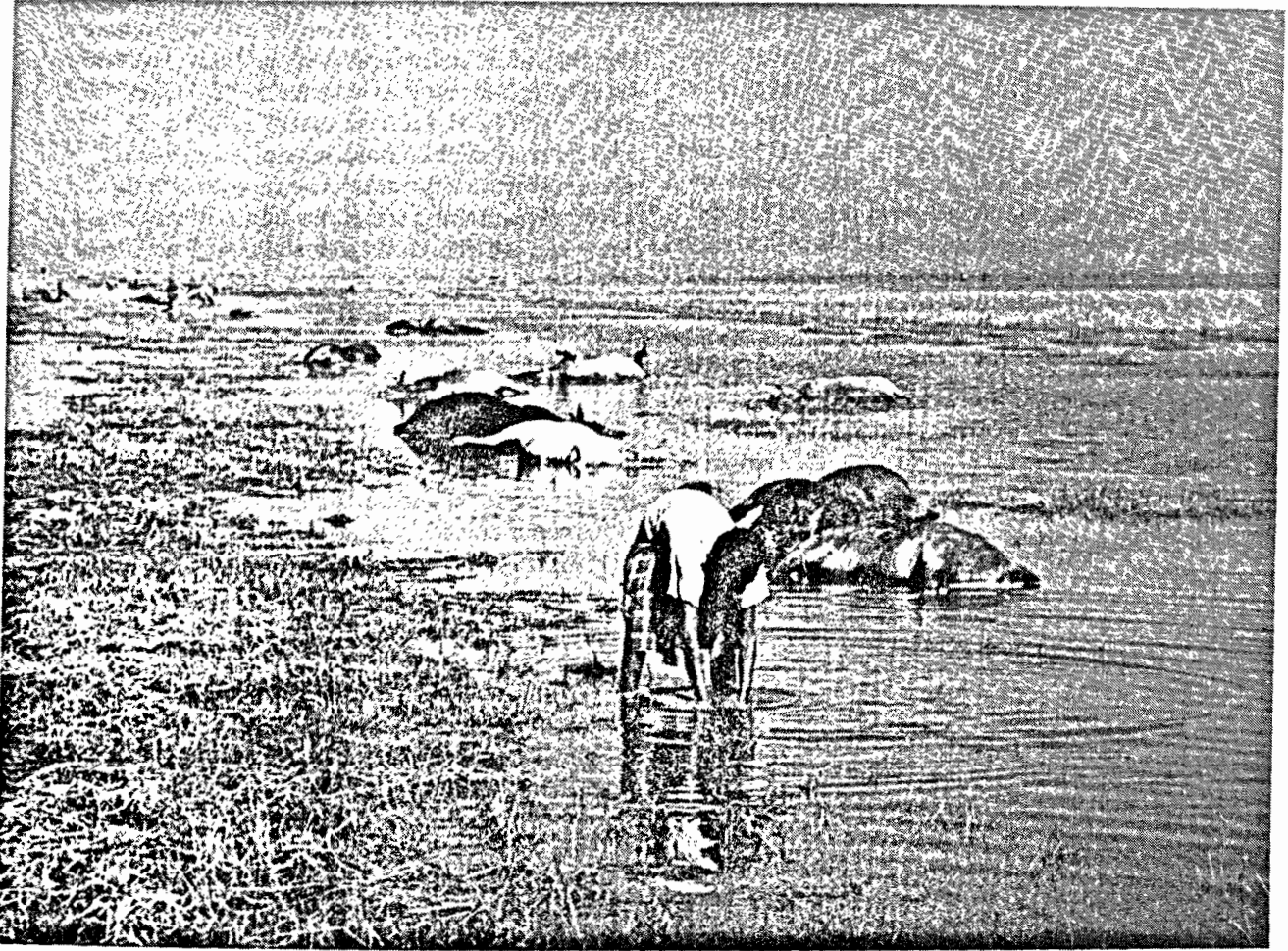
FIGURE 8  
Idealized warning system



Source : Harold D. Foster, 1980.

- (ii) Warning messages must be issued in a language understood by the receivers. In multilingual communities and in communities with migrant workers or tourists, warning messages in different languages will be required. Warnings must also be issued in a vocabulary meaningful to the average person.
- (iii) Warnings should be consistent in content. This requires a carefully co-ordinated and rehearsed warning process.
- (iv) Warning messages should not use technical terms which are unlikely to be understood.
- (v) In conveying hazard intensity, technical concepts should be supplemented with information about the likely physical consequences. Understanding of the effects of wind velocity, often indicated in metres/sec. or kms/hr, is enhanced by descriptions of the wind's effects on trees and roofs, for example.
- (vi) Warning messages are most helpful if they contain detailed information about specific community

FIGURE 9



(Credit : United Nations/Andre Bureau/Sigma)

Effective forecast and warning systems are an essential element of disaster preparedness and response, as illustrated by evidence of the destruction left by cyclones and tidal waves.

- risks. It is more helpful to know which roads are likely to be flooded than to know only that there will be general flooding.
- (vii) The warning message must state explicitly what precautions must be taken and when. It is important, for example, to be reminded of the precautions to protect property, to know which emergency provisions to adopt, and what supplies to take when evacuating.
  - (viii) Motivation should be considered in the formulation of the warning. Warnings are likely to be more effective when they include a combination of fear of consequences, factual information, and personal accounts.

### 3. Dissemination of warning messages

A disaster warning system is first an information system. Response to warning depends upon an effective and efficient network of communications between the sender of the warning messages and all parties who should receive

that warning. All must receive the information they need within a very short time. The process of sending warning messages to such a large and diverse audience in such limited time requires careful assessment and planning.

Most, if not all, disaster services have developed plans for the dissemination of disaster messages and, as written, they often appear exemplary. In actual situations, however, they seldom function as well as imagined. The cyclone which struck Bangladesh on 12-13 November 1970, killing at least 225,000 people, provides a memorable example.

Although the cyclone had been identified by neighbouring meteorological services as early as 9 November and tracked by satellite and later by radar as it moved north-eastward up the Bay of Bengal, the initial warning was not passed on by the local radio station which closed at 11 p.m. Moreover, a newly adopted streamlined system of warning was resented by officials, high and low, who blocked it.<sup>8</sup>

<sup>8</sup> Harold D. Foster, *Disaster Planning : The Preservation of Life and Property* (New York, Springer-Verlag, 1980), p. 189.

## Problems

Less dramatic examples of problems in the dissemination process are cited after all emergency situations. Sometimes the dissemination of warning messages is influenced by political or economic pressures. Some warning messages are not sent on time, or are sent to the wrong person, or are not forwarded appropriately. Communication linkages may not exist between certain organizations, or the linkages that do exist are out of date and irrelevant. In some situations the warning message is not relayed because of a damaged or overloaded technical communications system. Sometimes the warning methods have simply been ineffective, with the result that people have not received any warning. For example, studies of disaster warning response in the United States revealed that, in some disaster-struck communities, an average of one third of the general public did not receive warning messages.<sup>9</sup>

## Suggestions

(a) The success with which disaster warning messages are disseminated is influenced by such factors as :

- (i) The decision to warn;
- (ii) The source of the information;
- (iii) The dissemination network; and
- (iv) The communication methods.

(b) The decision as to when and how often to warn, is a very difficult one. There is always a tension between a meteorologist's desire not to alarm a population unduly when the risk is uncertain, and a community's need for early information in order to carry out necessary precautions. Repeated warnings for which no hazardous situations develop, the "cry wolf" syndrome, may cause people to be less willing to take precautions. Delaying a warning until there is certainty can be disastrous. The frequency of warning messages is further complicated by the fact that even when there is acute danger, the frequency of warnings influences people's decision to take action or to delay. Research in the United States suggests that people may be less likely to take action if the warnings are issued frequently.<sup>10</sup> The optimal frequency with which warning messages should be issued requires examination in each culture.

(c) The source of the warning influences people's response to the message, a point which should be noted in determining under whose name or auspices the warning message should be issued. The person or agency that may elicit the most community response may not necessarily be the head of the emergency co-ordination office. It could be, for example, a local official, the police, popular figures, representatives of technical services, national leaders, etc. In the United States, persons without hurricane experience have been shown to be most motivated by respected authorities.<sup>11</sup>

<sup>9</sup> Leik, p. 9.

<sup>10</sup> *Ibid.*, p. 49.

<sup>11</sup> WMO, *Human Response to Tropical Cyclone Warnings and their Content* (Geneva, World Meteorological Organization, 1983), p. 4.7.

(d) The communication network between the organizations that must participate in the warning system provides the basis for the transfer of warning messages. The dissemination process is judged largely by how well warning messages can be transmitted throughout the system, and by the efficiency of feedback. This, for example, is reflected in the communication channels which exist between the meteorological department, officials, the police department, area hospitals, local industries, emergency services and radio stations. The effectiveness of the communication network also depends upon the channels of communication between the various organizations and the general public. Organizations which never communicate with each other prior to an emergency will predictably not communicate well during an emergency. Dissemination therefore means more than preparing a list of telephone numbers of persons to be contacted in an emergency. It depends on the continuous testing and use of the communication channels to ensure the practicability of conveying warning messages in an emergency situation.

(e) Another aspect of the dissemination network is to define the groups and individuals to whom the warning messages must be sent. Disaster messages involve at least six categories of receivers within a community, including the technical warning service, officials, emergency services, local media, other organizations and establishments, and the general public. Within the general public there are always sub-groups who are outside the mainstream information and communication channels. Each category of receiver may require somewhat different kinds of information. Priority must be given in each category to essential emergency organizations and to the most vulnerable individuals or organizations. Special efforts will always be required to ensure that people in special circumstances are provided with warning according to their needs. People who are potentially more vulnerable may include elderly people, children, people living in isolated or remote places, and people who may face particular danger (e.g., fishermen).

(f) The technical methods of disseminating hazard warnings also require careful examination. Analysis of how these work in actual situations confirms that major problems often exist. For example, many dissemination plans are based in part on the use of the telephone for relaying warning messages. However, telephone services are often very weak links in the communication network, due to such problems as disruption of the service by the disaster itself, service malfunctions, and overload when large numbers of people are trying to use the telephone simultaneously. During the approach of the 1977 Sri Lanka cyclone, the number of people calling the meteorological office to request information prevented that office from placing calls. Studies conducted in the United States confirm the unreliability of commercial telephone services for hazard warning. As is well known, radio, television, and newspapers are extremely important channels for relaying warning information. Much more study and analysis is required to identify how disaster warnings can be effectively transmitted by these means in each disaster-prone community.

(g) In addition to the technical means of transmitting warning messages, it is important to recognize the more informal communications systems, based on social networks. People rely in part on information from friends and neighbours, local organizations and others. A study of the cyclone warning system in Australia<sup>12</sup> concluded that personal communication channels were the most important source of warning information for migrants and the elderly. As another example, warning messages conveyed through the village head may be the best way of warning everyone within the village.

(h) All warning methods must be evaluated. How many people actually hear warning sirens or see warning flags? Will dissemination be effective if the messages must be sent at night or on weekends or holidays? Do people listen to and respond to warning messages presented by radio? What visual methods of presenting a disaster warning by television are most effective? These are only some of the questions that must be asked.

### *Practical Implications*

To ensure that the dissemination of warning messages is accurate and timely, social factors which can assist or impede the transfer of warning messages must be understood. The following practical guidelines have been suggested from social science research.

- (i) The timing of warnings must be assessed. Warnings which are too early or too frequent may be detrimental and warnings which are too late or too infrequent may be disastrous.
- (ii) Communication channels for the dissemination of warning messages must be continually used, updated and tested.
- (iii) Warnings may be better if received from local authorities with high status and credibility. A personal announcement from the mayor confirming that flooding is expected and that local precautions should be taken is more likely to stimulate public response than the same announcement made by an unknown meteorologist in the capital city.
- (iv) Warnings are more likely to be heeded if personally delivered. In the United States, for example, it is suggested that disaster warnings stimulate more response if delivered "face-to-face" in a family setting.<sup>13</sup>
- (v) Warning procedures should be expanded to include as much personal, local contact as possible. Where local law enforcement and emergency service agencies cannot provide sufficient personnel, neighbourhood, friendship and family networks should be organized for action as part of the warning system.<sup>14</sup>

- (vi) Warning messages should be delivered in a personal manner which conveys the sender's certainty about the message.<sup>15</sup>
- (vii) The transfer of warning messages should not depend on a single dissemination system. For example, door-to-door personal messages may be needed in addition to warnings by siren.

These examples illustrate the social factors that might be taken into consideration to improve a dissemination system. Considering the many cultural and procedural differences that exist between disaster warning systems in various countries and communities, specific improvements are best made by analysis of each particular system.

### **4. Creating appropriate preparedness responses**

Timely and accurate warning messages disseminated quickly and efficiently to the population at risk are ineffective if that population fails to respond in a meaningful way<sup>16</sup>

It is often assumed, at least implicitly, that the public will (or should) respond automatically to hazard warnings.

Most people, however, will not take protective action on the basis of a single warning message. This is particularly true when they have previously received warnings and had no hazard materialize,<sup>17</sup>

or when there is little observable evidence of the danger.

The human response to warnings is much more complicated than simply taking action upon receipt of advice to act. There are five common reactions to hazard warnings:

- (i) Taking immediate action as directed;
- (ii) Taking some defensive action although the actions may be different to those recommended;
- (iii) Seeking confirmation that the warnings are accurate;
- (iv) Delaying to "wait and see"; and
- (v) Ignoring the warnings.

Response to warning is best seen as a decision-making process through which people attempt rationally to determine whether or not they are at risk and on that basis to decide what course of action to take. The decision to take action is influenced by various experimental, psychological, social and other factors. Consequently, better understanding of human response to warnings depends on better understanding of the decision-making process used to determine a course of action, and the factors which influence those decisions. This has been the general thrust of social science research on human response to hazard warnings.

Research has consistently shown that the initial response to hazard warnings is to seek further information, not to take immediate protective action. Additional "confirming" information is commonly sought from three categories of sources. Authorities are often contacted directly, which must be anticipated and understood as an

<sup>12</sup> *Ibid.*, p. 4.19.

<sup>13</sup> Murray, *op. cit.*, quoting Mileti, 1975.

<sup>14</sup> WMO, *op. cit.*, p. 4.14.

<sup>15</sup> Murray, *op. cit.*, quoting Mileti, 1975.

<sup>16</sup> WMO, p. 1.1.

<sup>17</sup> Leik, *op. cit.*, p. 35.



indication of recipient needs, and of its effect on the workload and communications systems of officials. The sudden barrage of telephone calls, telegrams or personal visitors that may inundate the staff of a meteorological service or local authorities indicates the need for further corroborative information. This predictable public response reflects an attempt to base decisions on as much reliable information as possible. Confirmation is also likely to be sought from family, friends and neighbours. This source of information is important because response is influenced by what others are doing or plan to do. If the neighbours are preparing to evacuate, this is an added encouragement to do likewise. Similarly, a community's refusal to evacuate is likely to be a disincentive. The third source of confirmation is the environment. If the sky is clear people are unlikely to react as forcefully as when a tornado funnel can be seen.

Even after the warning has been confirmed, the decision to take precautionary action is influenced by a variety of social and psychological considerations, all of which are influenced by past experience. Foster suggests that three generalizations can be drawn from psychological to sociological research on the way in which individuals and families respond to disaster warnings. "First, even though a wide variety of people may be listening to the same warning message, everybody hears and believes different things. Second, people respond to warnings on the basis of how what they hear encourages them to behave. Third, individuals are stimulated differently depending on who they are, with whom they are, and whom and what they see".<sup>18,19</sup>

Most of the social sciences research on factors which influence human response to hazard warnings has been carried out in Australia, Japan and the United States. Those which may have the broadest implications have been selected.

### *Experience*

There seems to be a marked difference between the response to warnings of persons with and without hazard experience. Prior experience, particularly having lived through a disaster and having received previous warnings that did not develop into hazardous situations, tends to result in a *less* cautious reaction about a present situation. This might be called "survivor's confidence". Research has shown that people with no previous hazard experience are more likely to take protective action and are likely to take such action more quickly, perhaps on the basis of the fear of the unknown. People with experience are more likely to delay in taking protective action.

### *Psychological factors*

Psychological factors which influence response to hazard warning have been labelled the "fear factor".<sup>20</sup>

The perception of risk and the feeling of personal danger are significant motivators. Certainly if people do not perceive themselves in danger they are unlikely to take protective action. Even in the face of overwhelming evidence, the response to danger differs. This varying response may be influenced, among other factors, by experience, cultural values, and personality traits. Some people deny the reality of the danger or simply refuse to take protective action. This is seen in many disasters when in a "spirit of defiance" people refuse to evacuate a threatened area.

Several noteworthy issues which influence the sense of risk and quickness of response, relate specifically to disaster preparedness. Research has shown that people who are aware of the hazard risk prior to the warning, are more likely to take protective action. This supports the need for public awareness of disaster risks.<sup>21</sup>

### *Social considerations*

Relationships between people affect their response to warnings. Research has shown that adults with dependants are more likely to take action than adults without dependants. Another common observation is that families will make every effort to stay together and will make disaster-related decisions in consideration of other family members. It is suggested that the extent to which neighbours and friends influence warning actions is dependent upon the degree to which a family is integrated into the community.<sup>22</sup> Seasonal labourers, migrants and tourists, for example, are not assisted or constrained by many social considerations.

### *Age*

Age seems to be a particularly important indicator of the categories of people who are likely to require special protective measures. It has been noted, for example, that adolescents often take undue risks and that the elderly and young children are the groups with the highest death rate.

Vulnerability tables in tropical cyclone disasters indicate a minimum death rate in the 30-40 years age group, which hopefully combines health, good sense, and mobility; a death rate 3 times greater among those under 10 years; and up to 5 times greater among those over 60 years of age.<sup>23</sup>

### **Feedback and evaluation**

An effective warning system requires two-way communication. Feedback must be received by every party involved in transferring warning messages. For a warning to be effective, a sender must know whether it was received and understood, and whether additional information may be required. Warning systems must be designed for such two-way communication since it is unlikely to occur spontaneously. Persons involved in warning others must solicit comments from receivers, in addition to providing warning messages they may think useful.

<sup>18</sup> Foster, *op. cit.*, p. 203, quoting Mileti, 1975.

<sup>19</sup> Murray, *op. cit.*, p. 68.

<sup>20</sup> Leik *et al.*, *op. cit.*, p. 68.

<sup>21</sup> *Ibid.*, p. 30.

<sup>22</sup> WMO, *op. cit.*, quoting Southern.

<sup>23</sup> *Ibid.*, p. 5.9.

Post-disaster evaluation of the warning system is essential. Disaster experience confirms which planning assumptions were correct and which were incorrect, identifies successful warning measures and unforeseen problems. In some situations there is a reticence to evaluate performance for fear of criticism or reprisals. Experience has shown, however, that unless an honest and thorough review of past experience is conducted, minimal benefit is gained from experience in improving future performance. In fact, the problem within the warning system may even be compounded by new myths.

A post-emergency evaluation of the warning system should be forward-looking. It should be seen as an opportunity to identify ways in which the system can be improved, rather than to apportion blame for mistakes or

shortcomings. While independent assessments might be required, a more significant effect may be achieved through participatory evaluations by persons who were themselves involved.

### Summary

Disaster warning is not a single warning message but rather a chain of messages set in motion at the time of identification of a hazard, and culminating in a host of community activities. An effective hazard warning system must be integrated, involving both technical and social considerations.

The following table summarizes the factors influencing response to disaster warnings.

#### Factors influencing response to disaster warnings

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1. Any warning messages broadcast, especially the early ones, will be accepted at face value only by a minority of the recipients. Most will engage in confirmation efforts for a time.
  2. The more warning messages received by an individual, the fewer the attempts at warning confirmation.
  3. The closer a person is to the target area of a warning, the higher the incidence of face-to-face communication and the larger the number of sources used in confirmation attempts.
  4. Warnings from official sources (police, fire department etc.) are more likely believed.
  5. Message content *per se* influences belief. The more accurate and consistent the content across several messages, the greater the belief.
  6. The more personal the manner in which a message is delivered, the more it will be believed.
  7. Belief in eventual impact increases as the number of warnings received increases.
  8. The recipient's sense of the sender's certainty about the message is important to belief.
  9. Message credibility is related to what happens in the confirmation process. The response of official sources to questions which call for validation, corroboration, or refutation helps determine believability.
  10. A person is more likely to believe a warning of impending danger to the extent that perceived changes in his physical environment support the contents of the message.
  11. Persons who see others behaving as if they believe a warning to be valid are themselves more likely to believe the warning.
  12. Past experience may render current warnings less credible if disaster is not part of that experience.
  13. The closer a person is to the target of warning, the more rumours he will hear and the less accurate will be his understanding of the character of the forecast events.
  14. Persons do not readily evacuate on the basis of the first warning received and the number of warnings received thereafter is proportional to evacuation initiatives.
  15. As warning messages increase in their accuracy, and/or information about survival choices, and/or consistency with other warnings, and/or clarity about the nature of the threat, the probability of positive response increases.
  16. Whether or not a person takes action depends on his belief in the warning message. But even if he believes, he may fail to take adaptive action due to his misinterpretation of the meaning of the message content.
  17. Evacuation tends to be a family phenomenon. The best way to accomplish evacuation appears to be repeated authoritative messages over broadcast media which stimulate discussion within the family and lead to evacuation (if it is going to happen at all).
  18. Persons receiving face-to-face warnings in a family setting from authorities are more likely to evacuate.
  19. Persons with recent disaster experience are more likely to take protective actions.
  20. The perceived amount of time to disaster impact is important.
  21. Belief that impact could occur at the location from which a person may be about to evacuate is critical.
  22. Older persons are less likely than the young to receive warnings regardless of warning source, and less likely to take protective actions.
  23. Regardless of the content of a warning message, people tend to define some potential impact in terms of prior experience with that specific disaster agent.
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Sources: Foster (1980); Haas (1973); and Mileti (1975).

## Chapter VIII

### SOCIAL CONSIDERATIONS IN EVACUATION PLANNING

The evacuation of a population may be the only safe action to take for the protection of life when a hazardous event cannot be avoided and the implementation of prevention and preparedness measures is not adequate to protect life. The need for pre-impact evacuation frequently arises as the most appropriate response to such natural disasters as flooding, cyclones, tsunami, and volcanoes. Evacuation before earthquakes is a sensitive issue because of the difficulties of prediction.

It is important to note that there are different kinds of evacuations. On the basis of cross-referencing two basic factors — the timing of the evacuation relative to disaster impact and the amount of time it is expected that evacuees will spend away from their homes — it is suggested that there are four kinds of evacuations:

A classification scheme based on the timing and duration of evacuation

Timing of evacuation	Period of evacuation	
	Short-term	Long-term
Pre-impact .....	...	...
Post-impact .....	...	...

This chapter only discusses pre-impact evacuation, since this publication mainly addresses preparedness issues. For further review of evacuation issues, the reader is recommended to consult *Evacuation Planning in Emergency Management* by Ronald W. Perry, Michael K. Lindell and Marjorie R. Greene.

#### The problem

Successful evacuations do occur. In the USA, for example, more than 250,000 people were evacuated from their homes prior to the landfall of hurricane Frederick on the southern coast of the United States on 12 September 1979. Due largely to the evacuation there were only five storm-related deaths, although the hurricane hit a densely populated area and resulted in more than \$2.3 billion in damage from strong winds, floodings and a 4-metre storm surge.<sup>1</sup>

At the time of going to press, news of hurricane Elena and the Mexican earthquake has reached UNDRO. Hurricane Elena formed in the Gulf of Mexico at the end of

August 1985, moving extremely slowly along a 500-mile crescent from St. Petersburg in Florida to New Orleans in Louisiana, United States. The initial cost of material damage has been estimated at \$US 2 billion. Nevertheless, hurricane Elena, which reached three on a 5-point intensity scale, left only four dead. Florida's authorities attributed the relatively low human cost to the evacuation of 850,000 people, the largest evacuation of any sort in the State's history. The evacuation affected about 60 per cent<sup>2</sup> of the residents in the hurricane-stricken area, who were moved toward higher ground, in-land from the coastline. The effective warning period of about 30 hours was sufficient to allow an orderly evacuation. Strangely, Elena struck on the 50th anniversary of the worst hurricane in modern American history: on Labour Day 1935 a hurricane struck the Florida Keys with winds reaching 250 miles per hour (100 miles an hour and more than Elena). Even with the best forecasting techniques now available, that hurricane today would provide no more than 12 hours warning, which would not be long enough for large cities such as Tampa or New Orleans. The 1935 hurricane left more than 1,000 persons dead. Only time and careful analysis of Elena will indicate the costs and benefits of the evacuation.

It should be noted that prior warning of natural phenomena other than cyclones and floods is still very difficult or impossible to achieve. For example, no warning — let alone "prediction", as is so often believed to be possible by the public — was available for the 8.1 Richter magnitude earthquake which struck Mexico on 19 September 1985, leaving thousands dead and injured. For events such as these anticipatory evacuation is not possible.<sup>3</sup>

Nevertheless, experience has shown that evacuations can be hampered by many problems. Some disaster-prone communities have not planned for evacuations, resulting in spontaneous but often ineffective actions. Some evacuations have been hampered by uncertainty as to the party responsible for issuing the evacuation order. Confusion may arise, for example, from whether the decision is expected to be taken by the weather service, the emergency services or local authorities. Another serious problem arises from delays in issuing and transmitting evacuation orders. Such delays

<sup>1</sup> Figures given by *The Economist* (London, 7 September 1985).

<sup>2</sup> Earthquake prediction is discussed in another UNDRO publication: *Earthquake Prediction Case Histories* (Geneva, Office of the United Nations Disaster Relief Co-ordinator, 1983).

<sup>1</sup> WMO, *Human Response to Tropical Cyclone Warnings and their Content* (Geneva, World Meteorological Organization, 1983).

result in inadequate time for evacuation before hazard impact. Many residents, particularly those living in more isolated locations, never receive the evacuation order.

The principal factors which determine the success of an evacuation programme are: speed of onset of a hazard; how well the warning system functions; the possibility of evacuation; and the response of the people advised or ordered to evacuate. Within each of these factors are many technical and social considerations which influence how well an evacuation is carried out:

- (i) The speed of onset of a hazard is not a variable that can usually be influenced by human decision. Effective warning systems, as we have seen, can provide notice of an impending danger early enough to enable people to take precautionary measures. One of the first successful predictions of a major earthquake which was issued with enough certainty to enable the population to evacuate is reported to have occurred in the town of Haicheng in north-east China in February 1975. Although the town had a population of about 100,000 and suffered extensive damage, few lives were lost because of the precautions taken.<sup>4</sup> While the possibility of making such successful predictions for earthquakes is extremely rare, predictions are common for meteorological and hydrological hazards.
- (ii) Problems in the warning system, as discussed in the previous chapter, affect evacuation response. Deciding when to order an evacuation, and determining who is at risk, are difficult tasks. For example, it is estimated that for cyclones only 20 per cent of the 24-hour warning area in the United States is likely to receive the storm conditions which would probably claim human life.<sup>5</sup> Evacuating all persons within the 24-hour warning area may result in as many as 80 per cent of the people leaving unnecessarily. Delaying an evacuation order until 12 hours before landfall, however, may not provide enough time for a community to evacuate.
- (iii) In some situations local officials delay evacuation orders because of the risk of error, and because of the consequences they might face if they have unnecessarily ordered an evacuation.

### Response

Although it may seem obvious, evacuation plans must be community-specific and must be based on an assessment of risk and of the physical possibility of evacuation. In some communities higher ground and safer areas may be close, and private and public transport accessible. However, in low-lying delta regions, such as many parts of the Bay of Bengal, evacuation to safe areas requires travelling by foot for many kilometres. Obstructions to

evacuation must also be considered. For example, exit may be prevented by roads blocked by fallen trees, or irrigation channels and rivers swollen or overflowing.

Public response to severe weather warnings, as discussed in the preceding chapter, is influenced by many factors. Experience has shown that people may not take necessary precautions unless specific advice is given about the precautions that should be taken. This behaviour specifically relates to evacuation. Dissemination of a weather warning is not likely to cause people to evacuate. When evacuation is recommended, the notice or order to evacuate must be explicit.

Evacuation is one of the most drastic preventive measures a person can take in response to a hazard warning. Unless people are convinced that no life-saving alternative exists, or unless they are forced to evacuate against their will, they will usually resist leaving the place where for most of their lives they may have felt safest. To leave behind all goods, often representing a life-time of work, is a decision not taken lightly, and often resisted.

Experience and disaster research have consistently shown that many people do not evacuate immediately on receiving an evacuation notice or order. For example, during the cyclone and storm surge that struck the Indian state of Andhra Pradesh on 19 November 1977, the response to the evacuation order was recorded as follows:

Two vehicles were sent for purpose of evacuation. However, it was reported that people refused on the ground that there would be no danger to them as they could survive with even a 2 metres high flood and they have experienced many such cyclones.<sup>6</sup>

While evacuation behaviour is likely to be influenced by cultural and political factors, the difficulty in inducing people to evacuate in response to hazard warnings has been similarly observed in various countries. A review of evacuation experiences by the United States Environmental Protection Agency concluded that in the United States anywhere from 6 per cent to 50 per cent of the public might not respond to an official order to evacuate an area.<sup>7</sup> The human tendency to delay, or refuse to evacuate, is of critical importance in evacuation planning, and is contrary to the popular belief which often assumes that people flee in panic. In order to devise evacuation responses, disaster preparedness planners must attempt to understand why people tend to delay or refuse evacuation.

### Variations in response

Each group of people within a community will respond differently to evacuation notices. As with other warning responses, people with the least experience tend to respond the quickest. This often includes transients in the community such as migrants, tourists and seasonal labourers. These groups also may be more at risk, because they may not receive official evacuation notices and may not be linked with informal communication channels. People who

<sup>4</sup> K. Kitazawa, "Earthquake Prediction and Public Response", *Impact of Science on Society*, vol. 32, No. 1, 1982, p. 31.

<sup>5</sup> Earl J. Baker, "Coping with Hurricane Evacuation Difficulties", in his *Hurricanes and Coastal Storms* (Gainesville, Florida Sea Grant College, 1980), p. 13.

<sup>6</sup> V. R. Gaidwad, *Community in Disaster: A Case Study of Andhra Cyclone—1977* (Ahmedabad, UNESCO, 1979), p. 59.

<sup>7</sup> Baker, *op. cit.*, p. 15.

FIGURE 10

People coping with their own emergency in the aftermath of the earthquake which struck Calabritto, Italy, in December 1980



(Credit : Agenzia Ansa)

have had past experience with the hazard, particularly if only minimal damage was experienced, are more likely to delay or refuse to evacuate.

There is debate among social science researchers as to whether evacuation notices are more effective or less effective if issued as warnings calling for voluntary action, or if they are issued as public orders and backed with necessary force to remove people if necessary. The practice varies between countries. Force *per se* has never been used in the United States for evacuations. Some researchers in the United States suggest that force is less efficient because such action would require additional equipment and personnel, which is likely to hinder the general evacuation process. A statutory basis for ordering an evacuation may be helpful in encouraging public response, even if force is not used.

#### *Risk and response*

One of the most critical factors influencing the decision to evacuate is perceived risk. The more clearly people

understand that their lives are endangered, the more likely they are to evacuate. This indicates the need for analysis of the most effective way to present the danger. The evacuation order must be written in a direct and convincing style. Television announcements, for example, may have more impact if graphics, simulations and photographs are used to support verbal statements.<sup>8</sup> Assisting people in determining personal risk requires analysis of information most useful to them. For example, knowledge of the elevation, enabling people to confirm flood risk, was shown to encourage people to evacuate.<sup>9</sup>

People often delay the decision to leave until they are convinced that evacuation is essential. "In a study of the evacuation of people in the United States during hurricane Eloise in 1975, it was found that almost three-quarters of those evacuated left only 2 to 7 hours before landfall.

<sup>8</sup> A. D. Crane, "Warning System: Possibilities and Problems", in *Response to Disaster*, ed. John Oliver (Townsville, James Cook University of North Queensland, 1980), p. 56.

<sup>9</sup> Baker, *op. cit.*, p. 15.

About a quarter of the evacuees said they encountered difficulties in reaching their destination, with traffic congestion being cited most frequently as the reason.<sup>10</sup> Such delay can be fatal.

### *Dissemination*

The method of disseminating evacuation notices influences response. Evacuation notices delivered personally have been shown to be more successful than are evacuation notices delivered by more impersonal methods. Personal methods are easiest in small communities but should not be discounted in larger communities. Community networks can be organized to disseminate evacuation notices.

### *Security*

The security of personal property is a major concern of people evacuating an area, and often a factor in their refusal to evacuate. This concern may result in such decisions as one family member remaining with family property while others evacuate, thus endangering the lives of those left behind. The implementation of public security measures may help allay fears. Concern for the protection of personal property may also result in people attempting to evacuate with cumbersome belongings which can impede evacuation efforts. For example, rural people may attempt to evacuate with cattle or heavy parcels of personal effects.

### *Confirming response*

The first response to an evacuation order is likely to be an attempt to confirm the risk. "Virtually all evacuation research reports that people attempt to *confirm* the warning message. This has been particularly important when the order called for evacuation."<sup>11</sup> The methods of confirming the evacuation order include such actions as listening to the radio, consulting family members and neighbours, and contacting authorities. "It is important to remember that people who fail to confirm a message tend not to evacuate."<sup>12</sup> Special facilities to provide confirming information required by the public may facilitate and speed evacuation.<sup>13</sup>

### *Family*

Family considerations are a major factor in evacuation response. There is very little individual evacuation — evacuation is almost always by family units or other groups. "It has long been known that families tend to

evacuate as units (cf. Drabek and Boggs, 1968) and that the separation of family members often involves anxiety and attempts by evacuees to reunite families, sometimes by returning to previously evacuated areas."<sup>14</sup> Therefore it is necessary to provide as much warning time as possible so as to allow families to reunite prior to evacuation. The existence of family message centres from which separated family members might confirm the whereabouts of other members may permit separated families to evacuate more easily.

### *Evacuation plans*

If an evacuation is to be successful, people must know where to evacuate and by routes. Social science research reveals that the existence of an evacuation plan (without regard to how detailed it may be) has a positive influence on compliance with an evacuation notice. "Studies of evacuation indicate that in order to effectively clear an area, residents must either have prior knowledge of some standing evacuation plan or be informed of such a plan at the time of warning. The problem of families *not* evacuating (or evacuating to an even more dangerous location) when evacuation routes and destinations are not well known has been widely documented."<sup>15</sup>

When and how evacuation plans should be communicated to the general public is a debated issue. Some investigators have argued that advance dissemination of plans is undesirable because :

- (i) People forget, misplace or misunderstand the detailed plans they are given; and
- (ii) The distribution of a plan creates anxiety over the possibility of disaster.

Such anxiety will be dysfunctional in an emergency. Others have countered this view by suggesting that :

- (i) Salience (not anxiety) is produced, and that sensitivity to disaster plans makes compliance more likely; and
- (ii) That a properly structured disaster plan need only involve the communication of general (easy to recall) elements to the public which can be supplemented with details at the time the warnings are issued.<sup>16</sup>

In recognition of the fact that knowledge of safe destinations and plausible routes is an incentive to evacuate, one can recommend distribution of evacuation plans as part of a community preparedness programme.

The issues discussed above are examples of factors which may influence the effectiveness of emergency evacuations. Research is required in each country to determine how evacuation response may be improved, and the extent to which evacuation is *objectively* necessary.

<sup>10</sup> *Ibid.*, p. 14.

<sup>11</sup> *Ibid.*

<sup>12</sup> *Ibid.*

<sup>13</sup> Perry *et al.*, p. 47.

<sup>14</sup> *Ibid.*, p. 46.

<sup>15</sup> Ronald W. Perry and Michael K. Lindell, "Predisaster Planning to Promote Compliance with Evacuation Warnings", in *Hurricanes and Coastal Storms* (Gainesville, Florida Sea Grant College, 1980), p. 45.

<sup>16</sup> *Ibid.*

## Chapter IX

### CONCLUSIONS

Like any other policy for public protection or social improvement, disaster prevention and mitigation requires research to support it. Yet the information which is available in the social field is scarce, especially when referring to the developing countries. If planning is to yield predictable results the acute lack of basic information must be addressed. Some of the areas in which research is most needed are outlined below.

It is clear that vulnerability to disaster is the product of interaction between the ecosystem of which man is a part and the socio-economic arrangements which he uses to win survival, and even prosperity, from that environment. An understanding of the dynamics of hazardous situations can therefore be obtained if we identify those factors existing in both the physical world and the social environment which lead to potentially disastrous situations. An acceptance of this "physical environment-social man" perspective has definite implications for future research:

1. Continued concentration of research effort on the events themselves will not systematically lead to the kind of information which will be helpful for the prevention of such events. Disasters must be interpreted not so much as problems in themselves, but as the result of other problems in the on-going socio-economic and ecological contexts. It is these contexts which need explanation. In particular, in many developing countries it will be profitable to explore the interrelationship between population size and distribution in relation to the present and future means for economic survival; patterns of land use and distribution; agricultural production and domestic food consumption; hazard and building safety; technological developments.
2. It will be necessary to redress the imbalance between the overwhelming amount of research being done in the physical sciences and that in the social sciences. Indeed, of the funds which are currently devoted to disaster-related research on a world-wide basis, by far the largest portion goes to the physical sciences in the search for technologically-oriented solutions to natural hazards. The social and economic factors which contribute to vulnerability have been largely ignored. For developing countries, with sizeable human resources and relatively restricted capital, this imbalance in current knowledge is a particular handicap. Even in the more developed countries, heavy investment in technology has not succeeded in reducing the toll of property damage suffered. In these countries too, more needs to be known of the human factors governing vulnerability.
3. An appreciation of the factors which affect both the public and the private choices of adjustments to hazards is central to the development of effective policies for risk reduction. But this is a key area in which there is currently a serious lack of usable knowledge. It is important how people make their choices in the face of the uncertainty of nature, and also how they respond when steps are taken to reduce that uncertainty. Without this kind of knowledge, it is impossible to be sure that Government policies intended to reduce vulnerability do indeed have that effect and do not actually make matters worse by inducing people to lower their own defences.
4. We need a better understanding, not only of the way in which people perceive their environment and the risks in it, but of the way different influences affect their actions. For example, does the imaginability, memorability, frequency or severity of a disaster influence what people do to protect themselves from the next one? Do people over-generalize on the basis of their experience? What are the effects of saving and other reserves on the number and type of safety measures adopted? What determines the level of knowledge about a particular hazard? Do people who are knowledgeable about hazards plan and act in any way which is different from those who are not? Most important of all, why is it that existing knowledge on the reduction of vulnerability has not been applied as well as it might have been?
5. To arrive at answers to many of the above questions will demand a model which explains, for environments of varying complexity, both awareness of hazard and behaviour. Individual and small-group behaviour in disaster avoidance has been studied rather more extensively than it has for public bodies, but it is in the public domain that some of the most crucial decisions affecting vulnerability are taken. There would appear to be a need for a thorough investigation of the ways in which policy is formulated in this area, and of the means by which policy-related research results can be fed into the system with most effect.
6. Similar to the need for a greater understanding of why people do or do not take action to protect themselves from hazard on a long-term basis, there is a need for more information on the factors which influence the effectiveness of emergency warnings, especially in the developing countries. In particular, systematic investigation is needed of the variables which influence public response when a warning is

- given. Also, studies are needed of the way in which the human factor operates to impede the effectiveness of the warning system itself. Any warning system should have means for conveying confirmatory messages, but the range of methods by which this can be done also remains to be explored. Most of the studies which have been conducted on warning systems have, to date, been in the United States, but it is not clear to what extent the results of these studies are applicable to other societies. In those places where evacuation is likely to be required when a warning is given, a critical appraisal of the means available, and of people's attitudes towards them, will facilitate an efficient operation when the time comes.
7. Information on the relatively slow build-up of disastrous situations is lacking for almost all hazards, and very little research has been carried out into the social and psychological effects of disasters having gradual onset. The social and economic precursors of famine situations are particularly worthy of attention, and could lead to the identification of disaster trigger points which might be avoided by careful social and economic planning.
  8. In the field of social health, two topics stand out as being worthy of attention. From the public health perspective, a development of the science of disaster epidemiology offers hope for guidance on useful preventive measures. In the field of mental health, with the exception of some recent work in the United States and in Australia, almost nothing is known of the incidence of psychological traumas and related disturbances following disasters. This is a much neglected area and one which needs investigation, especially in non-Western societies.
  9. The development of safe building regulations and land-use zoning practices is a technical subject outside the scope of the present monograph.<sup>1</sup> But an understanding of the processes by which codes are implemented and enforced would help greatly in framing effective legislation and in designing administrative systems to apply them. Studies of the application of zoning and safety legislation should be undertaken to determine how this might be more effectively and/or efficiently achieved. In view of the fact also that the housing inhabited by the bulk of the population in developing countries is generally outside the scope of existing building legislation, means need to be developed for improving the safety of low-cost structures without, at the same time, imposing an unwanted economic burden on the occupants. The first step in this direction is a detailed examination of traditional building processes, including the nature of their relationship with the economic and social systems on which they are dependent.<sup>2</sup>
  10. There is a wide range of techniques available to physical planners which can have the effect of reducing vulnerability, including hazard mapping, vulnerability analysis, regulating land-use zoning and densities of population and building regulations. However, there is as yet little feedback on how any of these techniques relate either to improvements effected or to post-impact conditions. If decision-makers are to be convinced that any particular method of disaster prevention, or mix of methods, is likely to work for their community, more detailed analysis will be needed of how these techniques have assisted communities to resist the impact of particular disasters. After any disaster event, therefore, the questions must always be asked: which measures did indeed prevent loss; which did not? Only in this way can informed decision-making replace conjecture and yield cost-effective solutions. In similar vein, an analysis is needed of the performance of the disaster preparedness measures which have already been instituted.
  11. The vast majority of the studies carried out into post-disaster situations have been conducted in the more developed countries and, of these, the overwhelming proportion in North America. In relation to research work into the social and economic causes of disaster, the picture is less clear, but it seems likely that a similar imbalance exists. A most important question still to be addressed is, therefore, to what extent knowledge gained of human behaviour in the more developed countries is pertinent to the explanation of disaster phenomena in developing countries. Parts of the present monograph have been constructed by taking social science observations from the former and applying them against wide-ranging and detailed observations culled from the experience of the latter. Although lacking in scientific rigour, this approach has yielded some valuable insights into universal disaster phenomena. Indeed, impressionistic evidence suggests that the cross-cultural similarities in disaster-related behaviour may be greater than the differences. However, great care must be exercised in applying the lessons obtained from the study of one society to the management of hazard in another. An appreciation of the common features and differences requires a sensitivity to both cultures and, even then, guesses can prove fatal.
  12. With such a panorama of topics in which research effort can be invested, developing countries with relatively small research budgets will need to be rigorously selective in the avenues which they pursue. Emphasis should be placed on inquiry which will increase the stock of knowledge immediately applicable and which is likely to make a predictable contribution to the lot of the population as a whole. Studies which will produce data on the basis of which policy can be formulated are therefore likely to be more relevant than those of purely theoretical interest. Bearing in mind the limited capital resources which are likely to be available for the implemen-

<sup>1</sup> UNDRO, *Disaster Prevention and Mitigation: A Compendium of Current Knowledge*, vol. 5, "Land Use Aspects"; vol. 6, "Building and Civil Engineering Aspects" (Geneva, Office of the United Nations Disaster Relief Co-ordinator, 1977 and 1981).

<sup>2</sup> UNDRO, *Shelter after Disaster* (Geneva, Office of the United Nations Disaster Relief Co-ordinator, 1982).



tation of disaster-related programmes, an effort should be made to explore ways in which damage from disasters can be reduced effectively, but at low cost. In particular, encouragement should be given to research which will increase national economic efficiency; enhance health and welfare; avoid social and economic disruption; and facilitate the equitable distribution of the costs of disasters, and of recovery aid, among the population. In the ecological sphere, special efforts should be made to slow down further modifications of the ecosystem on which potential long-term vulnerability depends.

13. In spite of the emphasis given here to the need for additional research into social risk reduction, it must be admitted that lack of knowledge is not the primary obstacle in advancing the cause of disaster prevention and mitigation. It is rather one of applying that knowledge which already exists. Only occasionally are research findings applied in practice, and there have been few systematic efforts to see that valuable insights are channelled to the government officials who might use them. The amount of risk-related research which percolates through to ordinary citizens must be even less than is the case with the public sector.

Part of the problem lies in the fact that there is little "demand" for research findings.

14. Administrators and technicians have mostly been trained to cope with disasters rather than to prevent them, and in most countries of the world disaster prevention has not hitherto been looked upon as even being within the realm of the possible. There is limited understanding of the contribution of social scientific research and its potential benefits to public policy formulation.
15. The fact that the causes of disaster are intimately intertwined with the causes of underdevelopment hardly needs restating. But it may not be apparent that many of the techniques which one would employ in an attempt to reduce vulnerability and improve preparedness are very similar to those which one would employ to promote on-going community (especially rural) development. However, given a very new orientation in disaster prevention, this type of community-level work will require both capable promoters and sensitive rapporteurs. Experimentation and the dissemination of experience in this field should be given priority in future programmes for socio-economic development at the local level.

