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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).

CONTENTS

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 Co-ordinator (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 Journalists 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.[1]

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[a], 1679-1978	1 in 58 000
Hurricane, West Indies, 1679-1978	1 in 41 000
Eartquake, West Indies, 1679-1978	1 in 79 000
Earthquake, California[b]	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 [c]	1 in 200
Influenza [c]	1 in 5 000

[a] Quoted for comparison only, the whole population of the West Indies is not exposed to volcanic risk

[b] Quoted in T. A. Kletz, "What Risks Should We Run" *New Scientist* 74 pp 320-322

[c] 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[2]). Floods were the most frequent disaster,

[1] 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.

[2] John Tomblin, 1982.

TABLE 2

Preliminary review of human and economic losses in natural disasters,[a] 1970-1981

Year	Type of natural disaster							
	Windstorm (93 events)		Earthquake (67 events)		Flood (130 events)		Other[b] (67 events)	
	Total deaths	Damage[c] ($US million)	Total deaths	Damage ($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)[d]

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

[a] Involving 10 or more deaths and/or 1 million-dollar or more damage.

[b] Damage refers only to those events for which estimates of the value of property damage are available.

[c] Other events include volcanic eruptions, droughts, epidemics, landslides, and snowstorms

[d] 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.[3]

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.[4] 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.[5] 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

[3] 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

[4] *Ibid.*

[5] *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).[6] 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).[7]

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

[7] 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		×	
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 Vizdok Foto, Hungary)

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