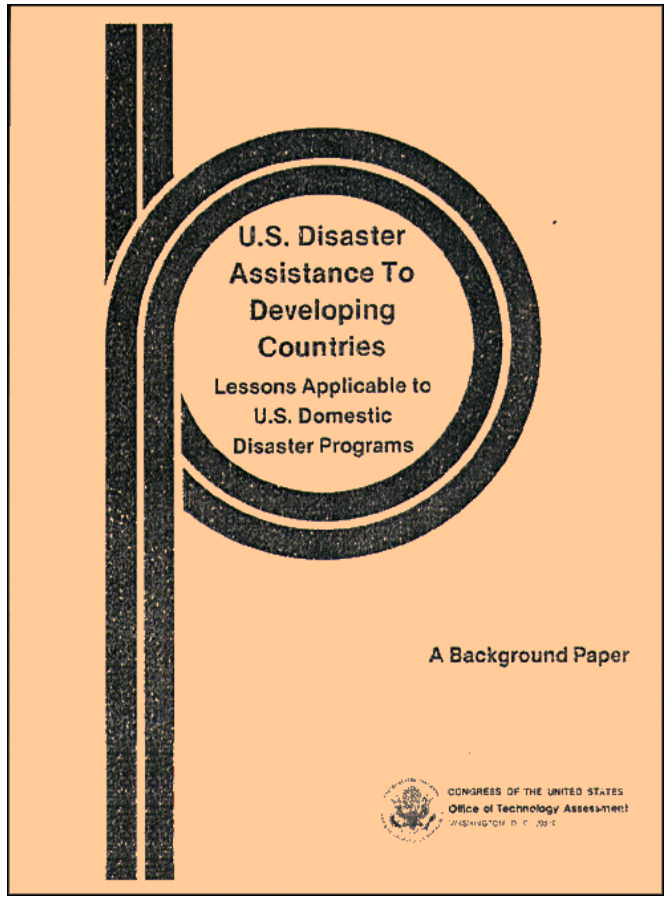
U.S. Disaster Assistance to Developing Countries: Lessons Applicable to U.S. Domestic Disaster Programs

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Preface

Congressman Thomas L. Ashley, Chairman of the House Subcommittee on Housing and Community Development and Senator William Proxmire, Chairman of the Senate Committee on Banking, Housing, and Urban Affairs and member of the Senate Committee on Appropriations, requested that the Mice of Technology Assessment (OTA) undertake a study in the area of natural hazards. In response OTA initiated a preliminary analysis to define what issues are or should be of concern to Congress and where further study couId be useful to Congress.

This Background Paper, "U.S. Disaster Assistance To Developing Countries: Lessons Applicable to U.S. Domestic Disaster Preparedness," probes the relationship between disasters in the developing countries and natural hazards in the United States. It does not look into the hazard and disaster situation in the industrialized nations.

For this study, a working paper was prepared as the basis for a workshop, which included a broad sweep of stakeholders in the public and private sectors, scholars concerned with the field, and members of various congressional committee staffs. On the basis of that workshop's recommendations, a revised working paper was prepared and sent to all participants, and to dozens of other experts, for extensive review and comment. This Background Paper is the responsibility of OTA, not of those who so ably advised us on its preparation.



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1. Summary

Although there are obviously major and manifold differences between the United States and the developing countries, people tend to respond to disasters in similar, constructive ways in all societies. And although the flow of technology as well as disaster assistance has been from the United States and other industrialized nations to the developing countries, there are some lessons that may be transferable to the United States, as a form of reverse technology transfer, from the disaster experience of developing nations.

The purpose of this report is to distill from the application of U.S. disaster assistance to developing countries those lessons that may be applicable to U.S. domestic disaster preparedness and response.

The very lack of resources among the developing countries seems, ironically, to generate lessons for the United States. For, having less, the developing nations must do more with what they have when disasters occur. Hence, the force of straitened circumstances requires that the less developed countries employ different techniques or procedures to achieve the same objectives as the more resource-intensive U.S. institutions.

This applies even to situations where a U.S. instrumentality, the U.S. Office of Foreign Disaster Assistance, is extending aid on the basic of domestic disaster principles and procedures. How those principles and procedures have been adapted to the institutions and disaster environments of the developing nations may also be the source of transferable lessons to U.S. domestic programs.

Since the key difference between disasters in developing countries and those in industrialized countries stems from wide variation in the ability to respond, institutions are, therefore, the main focus of any search for lessons transferable to the United States.

There are two major areas of lessons, the first of which stems from the fact that the term "disaster" actually is a generalization for a whole series of interconnected events, beginning with the existence of a hazard and proceeding through many steps which might be called the hazard and disaster lifecycles. Concentrating on the final phase of these lifecycles, the particular disaster event, tends to divert attention from the fact that it may be far more productive, efficient, and humane to consider possible deficiencies in mitigation, preparedness, education, training and warning capacity. The ability of the United States with its manifold resources, to respond has sometimes obscured these deficiencies. But the less developed countries do not share our ability to respond to disasters and have in many cases turned, therefore, to impressive preparedness, education, and training efforts. The United States has already begun to incorporate into its own aid programs this growing recognition that most emergency conditions share common components and a lifecycle that offers various points at which intervention may usefully occur. Hence, increasing attention is being given to the stages prior to the emergence of a disaster, through prevention, mitigation, warning and preparedness planning. Such programs can reduce the huge direct disaster relief costs as well as the indirect costs of local economic dislocation.

The second source of applicable lessons concerns specific program areas where experiences in developing country disasters may prove beneficial to U.S. domestic disaster efforts. For example, disaster aid in the developing countries emphasizes self-help assistance far more than does the U.S. Studies show that people actually prefer rebuilding advice and supplies to extensive mass shelter or temporary housing. This lesson might well be applied in dealing with domestic disasters.

In addition to self-help for disaster victims, the specific areas offering promise for helping improve U.S. domestic disaster programs are:

-Planning
-Infrequent disasters
-Information
-Evacuation
-Voluntary agencies
-Transportation
-Public contributions

-Building standards
-Emergency organizations
-Surveillance
-Practice and training
-Contingency funding
-Stockpiling
-Reserve cadre
-Adaptation during system failure

Unfortunately there are two organizational impediments hindering the U.S. from taking full advantage of the lessons available from participating in developing country disasters. The first impediment is the fact that information has not been organized for the specific purpose of facilitating transferable lessons. The second impediment is the lack of a formal mechanism to disseminate principles, practices, and suggestions considered applicable to U.S. disaster programs.

H. Introduction

Natural and manmade hazards know no political boundaries. Disaster strikes poor and rich nations alike and is a universal threat to all people, at all times, in all places.

This study distinguishes hazards, which are the dangerous circumstances found everywhere, from disasters, which are events in which hazards have undesirable effects on people or their works. Hazards may exist side-by-side with man or be contained by man for long periods.

When hazards impact on human systems, the unintended effects constitute disaster. The most common definitions of disaster, therefore, focus on the impact of unplanned events on the social structure of communities. One of the most quoted definitions reads:

> An event, concentrated in time and space, in which a society, or a relatively self-sufficient subdivision of a society, undergoes severe danger and incurs such losses to its members and physical appurtenances that the social structure is disrupted and the fulfillment of all or some of the essential functions of the society is prevented.[1]

This definition is substantially the same as the one used by the U.S. Agency for International Development (AID), Office of Foreign Disaster Assistance (OFDA) in its International Disaster Preparedness Seminar, held in 1977.[2]

The capacity to prepare for and respond to disasters varies with the internal social, political, and economic capabilities of nations. Disasters in the developing countries, therefore, reflect not only societal differences between them and industrialized countries but also wide differences among developing countries. The term developing countries, itself, includes a spectrum extending from the very poor and the largely rural to the more urban, more industrialized, and more developed.

The varied levels of development influence the capacity of the nations to prepare for and respond to disasters. As the internal capabilities of a society develop, there is less need to resort to outside appeals for aid following disaster. As a result, most of the recipients of U.S. disaster assistance have been—except for a very few major disasters, for instance, earthquakes in Italy and Romania—nations that are among the world's least developed. In the past decade, the United States has given disaster assistance to 26 of the 41 countries that the United Nations has identified as least developed or most severely affected by recent economic conditions.

Indeed, this emphasis has been reaffirmed as recently as an August 1977 joint cable from the Acting Secretary of State and the AID Administrator to all U.S. field missions. The Chiefs of Mission were instructed to "do their utmost to ensure that the needs of disaster victims be met— particularly in those instances where the Government of the disaster-affected country does not respond sufficiently to the needs of the disaster victims."

The purpose of this report is to identify lessons of U.S. disaster assistance to less developed countries that may be applicable to U.S. domestic disaster programs. Lessons of advanced countries, such as snow and cold programs of northern Europe and Canada and earthquake programs in Japan, are not examined. Further, the lessons focus on the least developed countries, rather than the more industrialized of the developing countries, because U.S. aid is largely directed to the poorest nations.

The next three chapters lead into a discussion of several program areas where developing country disasters may suggest alternative approaches or incremental improvements for U.S. domestic programs. This background covers:

[1] Charles E. Fritz, "Disaster," *Contemporary Social Problems* (cd.) Robert K. Merton and Robert A. Nisbet (New York: Harcourt, Brace, and World, 1%1), p. 655.

[2] International Disaster Preparedness Seminar, Office of Foreign Disaster Assistance, U.S. Agency for International Development, June-July 1977.

[3] *U.S. Foreign Disaster Assistance* (Washington. D. C.: U.S. Agency for International Development, Office of Foreign Disaster Assistance, January 1978), p. 3.

- the occurrence and impact of disasters in the developing countries;
- the similarities and differences between less developed countries and urban, industrialized countries in disaster preparation and response; and
- Ž the United States program of disaster assistance to the less developed countries.

III. Disasters and Their Consequences in Less Developed Countries

Conditions vary widely with regard to hazards and the risks to populations in the many countries around the world. This section focuses on those countries and disasters with which the United States, through programs of the Office of Foreign Disaster Assistance (OFDA), has interacted in the past decade. Three characteristics of international hazards—types, human victims, and economic consequences—are reviewed.

DISASTER EVENTS

A wide range of hazard agents are responsible for the disastrous impacts on people and property that have motivated U.S. disaster assistance. As table 1 illustrates, not only the natural disasters of flood, earthquake, and drought strike the less developed countries that receive the bulk of U.S. aid, but also the manmade hazards prevalent in industrialized nations have been extended to all countries. Thus, transportation disasters on land, on the sea, and in the air, and industrial disasters have joined the traditional natural threats.

The natural hazards identified in table I constitute 82 percent of all disasters to which the United States responded. The 13-year average of manmade disasters consists of more than seven events per year or 18 percent of all events. A trend toward increasing numbers of manmade disasters might logically be expected to accompany whatever development occurred over the 13-year period; however, no such trend exists. In 1965, 34 percent of all disasters were manmade, and in 1977, 13 percent were manmade. In the middle years, the percentage ranged from a low of 10 percent *(1974+-75)* to a high of 30 percent (1976), as seen in table 2.

Table I.-U.S. Disaster Assistance Types of Events

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Natural													
Cyclone	2	1	3	3	3	1	1	3	—	1	3	1	—
Drought	6	6	8	3	10	6	14	7	12	8	11	1	2
Earthquake	8	3	7	11	4	4	3	3	2	—	2	6	3
Epidemic	2	4	1	6	5	10	1	2	—	1	1	1	5
Flood	9	16	29	12	11	18	17	8	5	13	11	9	3
Famine/Food shortage	—	—	3	—	—	3	1	—	—	—	—	—	1
Hurricane	3	1	3	1	—	3	—	1	5	—	14	—	1
Landslide	—	1	—	1	—	—	1	—	—	1	1	1	—
Storm	1	1	3	2	—	1	2	—	—	—	2	—	—
Tornado	1	1	—	—	1	—	—	—	—	—	—	—	—
Typhoon	1	1	3	—	4	—	5	—	1	1	—	—	2
Volcano	—	2	1	—	1	—	1	1	1	1	1	2	2
Total	33	37	61	39	39	46	46	25	26	26	46	21	19
Man-Made													
Accident	2	—	1	—	—	—	1	—	—	—	—	1	—
Air disaster	—	—	—	—	—	—	—	1	—	—	—	—	1
Civil strife	6	1	2	5	2	5	4	6	6	2	4	5	3
Explosion	—	—	—	—	—	—	—	1	—	—	—	—	—
Fire	8	5	7	2	3	1	—	—	3	1	1	2	—
Mine disaster	—	—	—	—	—	—	1	—	—	—	—	1	—
Rail disaster	—	1	—	—	1	—	—	—	1	—	—	—	—
Ship disaster	1	1	—	—	—	—	—	—	—	—	—	—	—
Truck disaster	—	1	—	—	—	—	—	—	—	—	—	—	—
Total	17	9	10	7	6	6	6	8	10	3	5	9	4

SOURCE: Tabulations of OFDA computer printout. "'Disaster History USG Response... Feb. 13, 1978.

Table 2.-U.S. Response to Natural and Manmade Hazards

		1965	1966	1967	1966	1969	1970	1971	1972	1973	1974	1975	1976	1977
Natural	(#)	33	37	61	39	39	47	45	25	26	26	46	21	19
	(%OI	68	80	66	85	87	89	86	76	72	90	90	70	83
Man-Made	(#;	17	9	10	7	6	6	6	8	10	3	5	9	4
	(%)	34	20	14	15	13	11	12	24	28	10	10	30	13
Total	(#)	50	46	71	46	45	53	51	33	36	29	51	30	23

SOURCE: Tabulations of OFOA computer printout. "Disaster History USG Response,'" Feb. 13.1978.

Merely tallying the number of disasters, though useful as a rough index, can be misleading. Disasters vary enormously in magnitude and in disruptive capacity. For example, while OFDA reports 112,000 people killed in all disasters during 1973, this is fewer than half of the final tally of dead in one country alone, Ethiopia, during that same year, according to figures released by the government that took power after the devastating drought and famine.1 Similarly, OFDA calculated a total of $16 billion in worldwide damage from 1965 to 1975. This stands in contrast to an estimate of the Development Assistance Committee of the Organization for Economic Cooperation and Development (OECD) that typhoon damage in Southeast Asia alone was $9.96 billion between 1960 and 1970.[2]

The sources of information and mechanisms for collecting, handling, and analyzing disaster statistics are a response to bureaucratic needs for quantification and have only limited meaning. Recordkeeping in less developed countries and the chaotic atmosphere of disasters contribute to the initial use, and later institutionalization, of guesses and estimates. In the 1972-74 Sahelian Drought, one response to the news media's persistent search for **fatality statistics was: How** *can you expect a count of the dead in counties where* they *can't make a count of the living? The* U.S. Public Health Seryice finally **estimated that 100,000 people had died. That number has appeared countless times as an authoritative statistic.**

Even as an indicator of magnitude, however, the similarity between U.S. and developing country disaster frequency is marked. In the past 5 years, according to a recent survey of the Governors of the 50 States, 23 percent of all disasters to which the States responded were manmade.[3] In the past 5 years, 18 percent of the disasters to which OFDA responded were manmade.

One important difference between disaster occurrence in the United States and developing countries is civil strife. In developing country disasters since 1965, 51 percent of all manmade disasters (9 percent of the total) were civil war and civil strife. In the United States, according to the survey of Governors, only seven civil disturbance/terrorism incidents representing less than 0.5 percent were recorded in the last 5 years.[4]

THE IMPACT ON LIFE AND SAFETY

The death toll in developing country disasters is so great as to rival major wars. As a result of disasters to which the United States responded, 3.6 million people died and an estimated 474 million others were seriously affected in some fashion from 1965 through 1977. Table 3 shows the year-by-year statistics. These should be taken as indicators rather than as absolute for they are, at best, approximations.

Statistics fail to illustrate the true sense of human suffering and social disruption from disasters. They can be imagined a little better perhaps by recalling just a few destructive events and their impact:

- The earth in Guatemala shook for several minutes in 1976: 23,000 people are estimated to have died and 1 million others were affected.

[1]Stephen Green, *International Disaster Relief* (New York: McGraw-Hill Book Company, 1977), p. 16.

[2]David Holdsworth, *Present Role of the Red Cross in Assistance*, Background Paper 3, Joint Committee for the Reappraisal of the Red Cross, Geneva, 1975, p. 77.

[3]Emergency preparedness Project, *Emergency Preparedness and Response in 57 States and* Territories (Washington, D. C.: National Governors Association, 1978).

[4]Ibid.

Table 3.-Foreign Disaster Statistics (Fiscal Years 1965=77)

Year	New disasters	Number killed	Number affected
1977	23	6,602	3,500,143
1976	29	96,589	32,537,675
1975	24	48,000	44,315,000
1974	20	101,000	14,887,000
1973	25	112,000	215,240,000
1972	30	115,000	37,023,000
1971	51	522,000	68,070,000
1970	51	73,000	11,743,000
1969	36	1,019,000	32,482,000
1968	55	4,000	5,456,000
1967	52	1,518,000	14,223,000
1966	48	7,000	4,140,000
1965	50	47,000	5,504,000
Total	452	3,568.000	453,083,000

SOURCE: 1976-77 information was provided by the AID/OFDA and is based on compilations from its historical files. "Disaster History USG Response." Feb. 13. 1978. Information for 1965-75 also from AID/OFDA compiled by the National Academy of Sciences, Committee on International Disaster Assistance. *The U.S. Government Foreign Disaster Assistance Program*, p. 3.

- The Nicaragua earthquake of 1972 killed 11,000 people and affected 300,000.
- The Sahelian region of West Africa drought, which lasted 5 years, is estimated to have killed 100,000 people and affected another 23 million.
- The civil wars of East-West Pakistan and Nigeria-Biafra together resulted in the death of **1.2 million people and the dislocation of over 30 million people.**[5]

ECONOMIC CONSEQUENCES

Table + suggests the scope of the economic impact of disasters; but keep in mind this impact is on less developed countries. U.S. assistance went to 26 of the poorest countries in the world, where per capita annual income hovers around $200. Thus, direct foreign disaster assistance can produce economic impacts far in excess of some significant international financial indicators. For example:

- Three states affected by the Sahelian drought, Mali, Mauritania, and Chad, had recent (1976.77) international monetary reserves of $6.9 million, $76.8 million, and $11.87 million respectively. The total amount of aid given to these three nations in the 1973-75 period was: Mali—$90.67 million; Mauri-

5. *Review of the U.S. Government Foreign Disaster Assistance Programs* (Washington, D. C.: Committee on International Disaster Assistance, National Academy of Sciences-National Research Council, Commission on Sociotechnical Systems, 1978), p. 1.

Table 4.–Foreign Disaster Statistics and Emergency Relief Costs (Fiscal Years 1965-75)

Year	Estimated property damage (millions of dollars)	Value of assistance in millions of dollars: U.S. Government	Voluntary agencies	Other donor nations and international organizations	In-country self-help
1975	$2,769.775	$200.4	$14.9	$270.4	$74.5
1974	1,040.470	140.3	17.3	152.3	58.8
1973	2,717.400	301.4	15.5	158.9	658.1
1972	492.721	314.9	12.0	582.2	81.0
1971	2,558.860	189.0	16.7	266.6	744.8
1970	1,417.667	48.7	12.2	59.5	96.6
1969	1,978.168	102.6	12.2	16.5	131.0
1968	439.478	32.6	7.9	16.5	607.1
1967	2,720.296	81.4	12,2	173.2	2.964.7
1966	249.869	25.4	1.6	9.6	*
1965	411.389	46.3	3.8	3.6	*
Totals	$16.796.073	$1,483.0	$126.3	$1,788.3	$5.416.6

*Data not available.

SOURCE: Estimated property damage compiled from OFDA computer printout. "Disaster History USG Response.." Feb. 13. 1978. Other data from OFDA compiled by National Academy of Sciences. Committee on International Disaster Assistance. *The* u.s. *Government Foreign Disaster Assistance Program, p. 3.*

tania—$61.5 million; and Chad—$24.57 million.[b]

- The 1974 budget revenues of the nation of Cyprus totaled $135.8 million. The world donor response to the 2-month civil strife in 1974 was over $26.9 million.[7]

Table 4 shows a decade of U.S. Government assistance totaling nearly $1.5 billion and other donors contributing nearly $2 billion. Simply adding these sums to development assistance during those years would have made a positive impact. More important for the long-term economic development of these disaster-prone countries is the last column, in-country self-help. These are funds directly diverted from productive sectors of nations' economies to provide relief assistance for their disaster-stricken citizens. That self-help category is nearly $5.4 billion.

When the $16.8 billion **of** estimated property damage is added to the $5.4 billion in self-help, a net "outflow" of capital from productive sectors of $22.2 billion is computed. International donor assistance constitutes $3.3 billion in lost "development income." The resulting $25.5 billion is the total direct development "loss" due to disasters in the past decade: that is, a cash loss of funds that could have gone into productive enterprises.

As awesome as these statistics are, the economic dislocation resulting from disasters may have an even longer term effect, substantially offsetting real economic growth. For example, the Office of the United Nations Economic Commission for Latin America has estimated that the countries of the Central American Common Market have sustained disaster damage averaging 2.3 percent of the gross domestic product from 1960 through 1974.[a] William Dalton, head of the Preparedness section of the AID Office of Foreign Disaster Assistance, said recently that disaster-related losses in less developed countries had averaged $2 billion a year for the past 12 years. "Now, that may not be much in terms of the global economy," Dalton continued, "but that $24 billion added to the development efforts of those [less developed] countries could be significant" for progress.[9]

In summary, both similarities and differences exist between developed and developing countries in the nature and effect of disasters. Even in the large-scale losses of life and property, however, lessons may be available. The destructive impact of a disaster on a small national economy maybe a model of the local inflation and subsequent depression found at the site of U.S. domestic disasters. These lessons are likely to be conditioned by several factors discussed in the next chapter relating to the preparation for and response to disasters.

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[6] U.S. Agency for International Development, *Background Notes* for Mali, 'Mauritania, Chad, and Cyprus (published irregularly) and Office of Foreign Disaster Assistance.

'Ibid.

[8] Committee on International Disaster Assistance, op. cit., p. 3.

[9] William Dalton, remarks at the Conference on International Disasters and Discontinuities, Congressional Research Service, Washington, D. C., Feb. 16, 1978.

IV. Capacity to Prepare and Respond: Differences Between Developing and Industrialized Countries

The differences between disasters in the developing countries and those found in the United States result in part from different national and social capabilities. However, it is easy to overestimate the fragility of the social systems of less developed countries. Because people are poor does not mean that social relations are poor or inadequate. Social life in less developed countries maybe more easily restored than in industrialized countries. A house can be rebuilt with local labor and materials in 2 days in a developing country, while in the United States a building permit probably could not be obtained in that time. As analysis moves from individuals to institutions to national socioeconomic perspectives, the distinctions between developing countries and urban, industrialized countries become greater.

At the individual level, human beings respond as human beings whether in societies with marginal or affluent economies. Responses by people to stress induced by disasters tend to show strong cross-cultural similarities in perception and behavior. For example, panic flight is rare in any society. Severe mental breakdowns as a result of catastrophes seldom occur on any scale anywhere. Signs of impending danger tend to be perceived as normal occurrences. People tend to personalize the disaster, thinking that it has happened only to them and their surroundings, and they generally share keen anxiety over separation from family members and tend to begin an immediate, independent search for missing people. Finally, convergence of people, information, and material on the scene of the disaster immediately after it happens is seen across all cultures. *

The reference above to building permits makes the point that differences appear more sharply and clearly at the organizational and institutional level than at the human and individual level. However, with institutional differences also come institutional similarities. For example, developed countries may have greater resources, but they have no monopoly on wisdom or the ideal model of disaster-related decisionmaking. Cities are built in flood plains and on earthquake faults in both industrialized and less developed countries.

Institutions, moreover, are a reflection of the socioeconomic capacity of the nation as a whole. At the macro level of analysis, developing countries are most readily distinguished from the industrialized nations by comparatively fewer resources available to prepare for and respond to disasters.

The continuum of similarities and differences—individual to institution to national systems—**suggests** the loci of possible lessons transferable to U.S. domestic disaster programs.

Institutions become the bridge between the different resource capabilities of nations and similar human needs. Transferable lessons, therefore, are likely to be those in which less developed country disaster institutions suggest organizational, managerial, informational, or educational alternatives to the resource-intensive disaster preparedness and response methods of the developed countries.

To get a clearer focus on the adaptations likely to be necessary in transferring alternative preparedness and response approaches, it is useful to identify several pressures placed on institutions in less developed countries which affect their capacity to prepare for and respond to disasters.

RESOURCES

Growing numbers of the world's population live in a permanent state of marginal existence "where-

*Charles E. Fritz, "Disaster," *Contemporary Social Problems* (ed.) Robert K. Merton and Robert A. Nisbet (New York: Harcourt, Brace, and World, 1961), p. 655.

in the slightest natural phenomena can cause terrific loss of life and economic, social, and political disruption on a large scale,"[2] according to a study conducted by the United Nations Association, Panel on International Disaster Relief. The report continues:

> There is now a patchwork of disaster crisis areas in the developing world—regions that are so vulnerable that they are in a virtually permanent state of emergency. Haiti, Ethiopia, Nepal, Indonesia, Bangladesh, El Salvador, Afghanistan, major sections of Nigeria, and the Sahelian countries—there are large sections of the Earth where the life-support systems are so thin that the occurrence of relatively minor natural phenomena can cause major disasters with severe adverse human effects.[3]

The economic conditions of less developed countries severely limit the resources available to prepare for and recover from disaster. Additionally, the human resource base is weakened by lack of economic opportunity, thus leading to increased susceptibility to disaster consequences.

POPULATION

Urbanization and internal migration are worldwide phenomena caused by real and perceived inequities between rural and urban areas. Lack of resources and problems of unemployment have resulted in increasingly higher density living and the use of marginal lands in Iess developed countries. This has put larger numbers of people at risk from natural hazards. As flood plains, earthquake zones, marginal agricultural lands, and verdant hurricane coasts draw more and more people, the risks of greater human suffering from catastrophes increase. In 1970, 74 percent of the 2.6 billion people in developing countries lived in rural areas. By 1980, this percentage is expected to decline to 57 percent of the population, thus thrusting nearly 1.5 billion more people into urban areas in less developed countries.s

High population growth rates of the developing countries exaggerate the impact of disaster. For the entire world, the growth in population between 1975 and 1990 is expected to be 33 percent. In the developing countries, this increase will be 41 percent, and in the least developed countries—which are the more disaster-prone—the growth will be even greater: upwards of 50 percent. As a consequence, the scope of disaster impact on human settlements must increase in the coming years.

UNPLANNED GROWTH

Through inability or unwillingness, failure to plan development in the poor and disaster-prone countries will result in greater exposure to natural and manmade hazards for larger numbers of people. The failure of macro- and micro-planning leads to uncontrolled development. Macro long-range planning of the siting of human settlements and capital development projects often neglects to take hazards into account. For example, following the huge Guatemala City earthquake of 1976, which killed over 23,000 people, building began anew in exactly the same location as the old ruined city.' Similarly, Managua, Nicaragua was rebuilt on the same faultline in 1855, 1937, and 1968.[8]

The second factor in unplanned growth is micro-planning and engineering. Habitable structures in the less developed countries are often inappropriately designed for hazardous conditions. The houses of Managua and Guatemala City are largely adobe with heavy tile roofs. Furthermore, the custom in both cities is to construct the front, and often only, door to open inward for greater security against unwanted intrusion. The combination of heavy walls, the heavy roofs, and the doorway results in an inability to open the door to escape after the first earth tremors. When the quake itself strikes, the heavy tile collapses. The large majority of the dead found in both cities were jammed inside doorways.

One of the opportunities provided by disasters in developing countries is for governments to plan redevelopment. Following a disaster, international assistance is often available to plan the reconstruction of public buildings and therefore to influence the private sector growth of cities. However, in

[2] *Acts of Suture, Acts of Man: The Global* Response to *Natural Disasters, (New* York: U.N. Association, Policy Studies Panel on International Disaster Assistance, 1977), p. 19.

[3] Ibid.

[5] Martin M. McLaughlin, et al., *The United States and World Development* Agenda *1979.* (New York: Praeger Publishers, 1979).

[6] U.N. Association, op cit., p. 15.

[7] Computer printout, Office of Foreign Disaster Assistance, U.S. Agency for International Development.

[8] U.N. Association, op. cit., p. 15. Following the most recent earthquake (1972) most reconstruction has been moved several kilometers from the historic center of the city and the earthquake epicenter.

many cases where outside reconstruction planning assistance has been provided, this did not guarantee an improved planning or redevelopment process. The cases of Guatemala, Lice,[10] and Andhra Pradesh[11] have been well-documented and show inadequate reconstruction, often on the ruins of the last disaster. Parallel experiences have occurred in many reconstruction efforts in the United States, most notably in the flood-prone areas of eastern Kentucky and Johnstown, Pa.

POLITICS

The political ramifications of a disaster and its relief are usually seen to be especially influential in developing countries. This, however, may be an error of perspective. The role of politics in developing countries may appear more important than it is because of our distance from the events and lack of familiarity with the political systems. In underdeveloped countries, the domestic political systems seem less stable than in the industrialized countries, thus raising attention to political considerations in disaster. Also, ethnic, religious, and racial attitudes and rivalries are often seen to influence the functioning of disaster relief. The well-documented, apparent indifference of ruling ethnic groups to the nomadic cattle herders and other transient minorities in the drought-affected African countries south of the Sahara is illustrative.

In the United States, by contrast, the option of purposeful neglect is rarely raised. Victims may feel slighted by a bureaucracy, or an organization may move in such a muddled fashion that relief is poorly distributed; but there seems to be little conscious neglect. In the United States, there are so many organized interests advocating equity that victims eventually are served—well or badly, but served. In less developed countries, some groups. are systematically ignored and become double victims, of disaster and of official neglect.

The preceding problems in developing countries are not to suggest that urban and industrialized nations offer models of political efficiency. A major weakness of the bulk of disaster research in the social and behaviorial sciences has been a failure to recognize and study the political factors that cut across all aspects of domestic disaster planning and response. Whether warnings are issued, whether a disaster declaration is sought, what kind of short-term and long-term aid is provided, the equity or lack of equity in disaster relief and rehabilitation, are all often strongly affected by political factors. They are all political decisions in certainly one sense of the term. This stands out rather sharply in the work done on earthquake predictions. Because of the time factor involved, anyone who has to consider the social consequences of predictions with respect to planning and response is forced to recognize the pervasive political overtones of all that is involved.

TRANSPORTATION AND TELECOMMUNICATIONS

A further pressure on disaster-related institutions in less developed countries is the relative lack of a physical infrastructure. Because over half of the population is located in rural areas, communications and transportation systems are important to the efficient assessment and response to disasters. Yet, less developed countries have inadequate roads, airports, railroads, telephones, and other capital development items that are essential to preparedness and response, by the standards of industrialized nations.

For example, in the area of public communication, the broadcast media plays an important role in issuing warnings of impending disaster and conducting educational campaigns. In the less developed countries, there is an average of 17 radio stations per country and 2 television stations. Fourteen of those countries, however, have three or fewer radio stations and eight have no television at all. Among the developed countries, Italy has 795 radio stations, the United Kingdom has Z 17, and the United States has 8,100. Additionally, the United States has 985 television stations, the United Kingdom has 300, and France has 1,500.

KNOWLEDGE OF HAZARDS

Among persons who professionally deal with hazards in the United States, there are four com-

[9] Comptroller General of the United States, *Observations on the Guatemalan Earthquake Relief Effort*, ID-76-71, 1976. p. 32.

[10] William A. Mitchell, *The Lice Earthquake* in *Southeastern Turkey*. (Colorado: The United States Air Force Academy, 1976).

[11] Fred Cuny, "Recent Work in the Aftermath of the Andhra Pradesh Cyclone," Memorandum to INTERTECH member, January 1978.

mon complaints. These concern information on long-term trends, vulnerabilitv of population, short-term impact needs, and capability co respond. For the less developed countries, the information base is far worse, if it exists at all.

This inadequacy of information constitutes an additional pressure placed on planning capabilities in less developed country disaster institutions, which is shared with institutions in the United States.

The Committee on International Disaster Assistance of the National Academy of Sciences has identified several information problems, of which four correspond to the four complaints above and are reviewed here: hazard analysis, vulnerability analysis, short-term needs assessment, and disaster-relevant resource analysis.

Hazard Analysis

A hazard is defined as "a potentially harmful condition whose existence and magnitude of occurrence can be expressed in probabilistic terms. "[13] The goal of hazard analysis is the understanding of occurrence patterns and the impact of past events in order to predict both occurrence and impact for the future. This is achieved by the collection and assessment of information about the nature, causes, frequency, distribution, and effects of past, and therefore potential, disasters. Given the complexity of natural hazards—the variety of agents (earthquake, wind, hod, drought, etc.) and the interaction of agents (earthquakes may cause direct damage due to the ground shaking and secondary effects through power failures and gas explosions, tsunamis, and Landslides)—large amounts of analytical data are necessary to make accurate forecasts. Both historical data (the longer the period, the more accurate the analyses and forecasts) and current, real-time monitoring of events are necessary to achieve useful forecasts.

Currently, many forms of environmental data acquisition exist: direct observations of local informants, networks of observing stations, instrument observation, satellite observation utilizing the most advanced remote-sensing technology, telecommunctions networks, and data processing at national, regional, and world centers. For example, the world weather watch program of the World Meteorological Organization of the United Nations incorporates observation, communication, and data processing in providing member nations with meteorological data. Similarly, the Food and Agriculture Organization of the United Nations uses local ground observers, air reconnaissance, and weather information to report monthly on the crop situation in many less developed countries and warn of impending food shortages and crop failure. It was the view of the committee, however, that "The data collection methods are available, but the collection and utilization of technical data to mitigate disasters is lacking."[14] The problem, in hazard analysis, is in promoting the use of information and its dissemination in usable form.

Vulnerability Analysis

Vulnerability to hazards is a population's susceptibility to loss when a hazard event of a given magnitude occurs.

The committee asserts that vulnerability analysis is concerned with the "human response systems to natural hazards which enlightened humans may control. All human actions that either aggravate or mitigate the effects of natural hazards must be taken into account in assessing vulnerability. "[15]

Vulnerability analysis requires considerable amounts of information. At a minimum, the committee writes, the following kinds of information are necessary for "known hazard-prone areas:"

- number and geographic distribution of population, buildings, and lifeline systems (e.g., public works, medical facilities);
- measurements reflecting catastrophic loss potential (e.g., structures of high occupancy such as schools and places of public assembly); and
- measurements reflecting vulnerability to secondary losses (e.g., industrial and commercial locations, dangerous materials storage). [16]

The problems inherent in collecting these vital pieces of information are huge. In the developing world, in particular, engineering research on struc-

[12] *A Review of the U.S. Government Foreign Disaster Assistance* Programs (Washington, D. C.: National Academy of Sciences-National Research Council, Commission on Sociotechnical Systems, Committee on International Disaster Assistance, 1978, p. 38.

[13] Ibid., p. 39.

[14] Ibid., p. 41.

[15] Ibid., p. 43-44.

[16] Ibid., p. 45.

tures is often of little value. The great bulk of building-related fatalities have occurred in simple nonengineered structures, typically of adobe or other local construction. Furthermore, the large-scale migration of rural populations to urban centers makes vulnerability analysis more difficult. Finally, the records of natural events have not been kept for more than a few years; thus, the accuracy of predictions is suspect.

Short-Term Needs Assessment

No single factor hampers the ability of both domestic and international disaster agencies to respond to an emergency more than the lack of damage assessment and assessment of victims' needs. Damage and needs assessment are the vital components necessary for agencies to make sound decisions promptly. The U.S. missions in the impacted country frequently have not had the resources to make dependable assessments of damages and needs. In-country mission disaster relief officers who have had assessment training are hampered by communication and transportation difficulties. OFDA was reluctant for a long time to use U.S. military personnel to assess damage because it was believed that they might not be accepted in a disaster-stricken country. A Military Disaster Assessment and Survey Team was used in the El Salvador earthquake of 1965 for the first time. It was successful but demonstrated the need for better training and closer ties between the military and OFDA. William Dalton of OFDA has confirmed that improvements have taken place in recent years but that disaster assessments continue to be a prime concern of the Office. [18]

The National Academy of Sciences (NAS) committee report highlighted four aspects of impact and needs assessment that make the accurate interpretation of damage difficult. These aspects suggest the complexity of the problem and the paramount importance of such assessments in disaster relief. The NAS committee devoted its entire second year of activity to the study of damage and needs assessment. [19]

First, preimpact conditions of buildings, health, institutions, etc., need to be known to determine change resulting from the disaster. One of the problems with preimpact data is that, when it exists, it is often diffused throughout different administrative units. Disaster officials face difficulties in obtaining, collating, and promptly assessing such disparate information.

Second, the difficulties in collecting postimpact data revolve around inability to gain access to disaster areas, disruptions in the often inadequate communications, destruction of existing records, and the exodus of victims with potentially useful information. The NAS committee also emphasized the lack of expertise in conducting local surveys, the deficiency in methodologies for rapid ground survey assessment, the political problems involved in the use of external assessment teams, and the local and international politics involved in the assessment of needs.

Third, organizational and cultural biases enter into the assessment process. On the one hand, organizations typically commit their resources to the most visible task within their capabilities rather than assessing needs and satisfying them.[20] On the other hand, cultural standards of value place differing importance on different disaster-induced losses. For example, relief officials from developed countries may well be more impressed by industrial losses, while the people and officials of the stricken developing country might place a greater value on food, energy, and agricultural recovery. The problem of imposing the values of the relief donor on the recovery efforts of the disaster- impacted country increases with the unfamiliarity of donors with recipient cultures.

Fourth, "A major problem in damage assessment results from the fact that lack of damage is seldom reported."[21] Because disaster impact damage is virtually never complete, resources for relief and recovery may exist in proximity to the disaster zone but never be utilized. The NAS committee cites mass media reports, in particular, as tending to overlook this fact because they concentrate on the drama of destruction rather than what has been untouched. In industrial societies, certainly, large amounts of resources are undamaged and can be redirected to the emergency. "Even though the level of stored resources within developing countries may not allow the same com-

[17] Ibid., p. 18.

[18] William Dalton, interview, Feb. 13, 1978.

[19] Committee on International Disaster Assistance, *Assessing International Disaster Needs* (Washington. D. C.: National Academy of Sciences-National Research Council 1979).

[20] Committee on International Disaster Assistance, op cit., p. 28.

[21] Ibid., p. 29.

fortable margin, the same situation would probably pertain in many disasters occurring in developing countries."[22] In the Managua, Nicaragua earthquake of 1972, for example, six different medical units were dispatched to the scene by almost as many countries. The earthquake, however, had done little damage to the 16 hospitals in the area and did not merit outside resources. Nearby in-country medical facilities were more readily available. Thus, a tremendous waste of resources—which could have been avoided by an accurate needs assessment— occurred during the emergency.

Disaster= Relevant Resource Analysis

The last of the four information problems associated with U.S. and developing country disaster programs lies in the fact that response to both natural and manmade disasters requires resources, both human and material. As the committee stated: "If the primary objective of international disaster assistance is to respond to victims' needs that have not been met at the local level, it is important that agencies like AID/OFDA have documented information on the capability of developing countries to respond to various disaster-generated demands."[23]

[22]Ibid., p. 29.
[23]Ibid., p. 48.

Two types of information are necessary: first, the level of disaster preparedness in the disaster-impacted society, and, second, a general resource profile of the society.

The need for these two profiles of in-country disaster preparedness and available resources is an information problem shared by developing and developed countries.

In summary, the commonality—and transferrability—of disaster experiences from developing countries to U.S. programs lie in institutional adaptations of disaster procedures. Despite differences in resources, population, growth patterns, and political systems, which appear at the national level, all people have similar responses in disaster. Institutions link individual needs to national capabilities.

Two sources of institutional innovation are the focus of attention. On the one hand, developing countries have created alternatives to the resource-intensive U.S. disaster procedures. On the other hand, OFDA has adapted domestic disaster procedures to its international operations. Lessons applicable to U.S. disaster programs are to be found in these two sources of procedural, managerial, or informational alternatives.

v. International Disaster Assistance Programs

The c portunities for learning from developing country lisasters are based largely on the experiences of ndustrialized countries and donors in disaster mi gation, preparedness, and response. Two such or lnizations dominate disaster-related services and resources in the predisaster and postdisaster hases: the U.S. O&Ice of Foreign Disaster Assistar e (OFDA) of the Agency for International Deve loPment (AID) and the United Nations Disaster Relief Organization (UNDRO). Together with sul idiary agencies, a few other governments, and ma ~ voluntary organizations, this is the international disaster donor community.

DI SASTER ASSISTANCE IN A OMPLEX ENVIRONMENT

Interr tional disaster assistance is frequently influencec by one or more of the following factors which c act to the detriment of disaster victims' needs:

- Sov, eignty,
- mul plicity of donors, and
- poli cal nature of disaster events.

Severe jnty

In the 1972-74 Sahelian drought, the affected countrie governments refused to recognize the existenc of a severe emergency for several months during the height of the tourist season.[1] Even give n that the drought might be **an extreme** case, m: :ers of sovereignty, pride of country, and demons ations of self-reliance and responsibility are impor tant factors that enter into international disaster ssistance. In some cases, these factors stimulat positive efforts at in-country self-help. In other ca :s, however, they result in delays and increased ifficulties due to sensitivity to foreign assistance and suspicion of the motives of donor countries.

Issues of sovereignty also arise during relief efforts. Some nations are hesitant to permit the use of foreign military disaster assessment teams or permit the uncontrolled overflight of relief aircraft which, again, are often military. Whether political constraints or legitimate fears, the issue of satellite remote sensing of foreign countries also remains to be solved.

Finally, sovereignty can directly limit the humanitarian goals of U.S. assistance. What recourse would the United States have if the government of a disaster-stricken nation simply refused aid?

International Politics

The complex politics of disaster were carried to the extreme in Bangladesh. In 1970, a devastating cyclone struck East Pakistan causing over $25 million in damages and affecting 10 million people. In addition to short-term effects, the general neglect of reconstruction by the central government in West Pakistan was a major reason for the ensuing protracted civil war. Refugees of the civil strife subsequently burdened the Government of India to such a degree that it declared war on Pakistan in 1971. The conflict resulted in the independence of East Pakistan, then renamed Bangladesh. Bangladesh, since 1970 has accounted for nearly 25 percent of all U.S. assistance, beginning with relief following the cyclone and continuing through the civil war and refugee resettlement. Relief for war refugees, through September 1972, totaled $296 million and the cyclone relief added another $16 million.

Civil strife in Bangladesh is not an isolated case. Historically, the largest number of U.S. relief efforts have taken place in response to natural disasters. Hazards that have a rapid onset, such as earthquakes, tropical cyclones, hurricanes, and river floods, have especially attracted U.S.

[1]James ' . Morentz, *The* Making *of* an *International Event: Communi ion and the Drought* in West *Africa* (University of Pennsylva a: doctoral dissertation, 1976), p. 153.

emergency response. These rapid onset disasters, how'ever, have received only a minority of U.S. financial aid: approximately 30 percent since 1965. The creeping disasters of drought and epidemics account for only another 10 percent of all funds. The largest proportion of the $1.6 billion provided by the U.S. Government has gone to a category of manmade disasters: civil strife and civil war. Approximately 60 percent of all U.S. funds have gone to victims of civil strife, internal political problems, and wars. Recent examples include Cyprus, 1974-75; the Dominican Republic, 1965; Nigeria, 1969; Jordan, 1970; and the Middle East during the 1967 Seven-Day War.

The leading recipients of U.S. disaster assistance since 1975, shown in table 5, suggest the complex political nature of disaster assistance, represented especially by the four cases of civil strife. In an effort to avoid politicizing U.S. assistance in civil strife, OFDA usually makes funds available to U.N. agencies or voluntary organizations. For example, in the 1974 Cyprus civil war, all U.S. funds were channeled through the U.N. High Commissioner for Rekgees (UNHCR) and the International Committee of the Red Cross (ICRC). In the 1973 Mid-East War and Sudan civil strife, UNHRC and ICRC were again active **with** U.S. voluntary agencies in seeking an equitable distribution of U.S. Government aid to victims on all sides of the conflicts.

Table S.-Leading Recipients of U.S. Assistance Since 1965

	Bangladesh Civil Strife end Aftermath: 1971-73
i	India Drought and Famine: 1965.67
3.	Peru Earthquake: 1970
4.	Nigeria Civil Strife: 1967-69
	Bangladesh Cyclone: 1970
::	Nicaragua Earthquake: 1972
	Philippines Floods: 1972
::	Sahel Drought: 1973-75
9.	Ethiopia Drought: 1974-75
10.	Pakistan Floods: 1974
11.	Somalia Drought: 1974-75
12.	Cyprus Civil Strife: 1974-75
13.	Honduras Hurricane: 1974
14.	Lebanon Civil Strife: 1975-76
15.	Guatemala and Italy Earthquakes: 1976

Ranked by amount of U.S. relief expenditures.
SOURCE: Office of Foreign Disaster Assistance. AID.

Multiplicity of i)ot'to~s

An international disaster assistance effort may consist of several dozen donors, greatly increasing the problems of coordination. Table 6 shows the broad su'eep of got~ernment and institutional involvement in a major disaster. Through February 16, 1976, response to the great Guatemala earthquake came from 26 countries bilaterally, 8 international organizations, 1 foundation, 25 voluntary organizations, and *70* countries through the League of Red Cross Societies. Compared to domestic disaster assistance, this presents a problem of different magnitude (numbers, distances, languages, and politics) rather than kind. Yet, the difference is significant.

The diverse number of publIc and private organizations that participate in international disaster-assistance activities creates its own problem. In any major disaster, this multiplicity of involvement—for different reasons, at different levels of contribution, with different capabilities, and with different degrees of independent performance—virtually guarantees problems of coordination among the many private and governmental international donors and between the donors and the disaster-stricken nation. As the National Academy of Sciences (NAS) Committee on International Disaster Assistance \\'rote: "To talk of an international disaster-response system is inappropriate because that concept implies relatively high levels of mutual awareness, interdependence, and coordinated activity that presently do not exist."z

For example, during the international donor response to the Sahelian drought, logistics experts from the United States and other donor countries established a plan for scheduling the arrival and offloading of ships carrying relief grains and cereals into the ports of Dakar, Senegal, and Abdijan, Ivory Coast. This sci,edule was of critical importance because of the grosslv inadequate rail and road transportation to the inland-affected populations. The cooperation of nations in staggering the arrival of ships was crucial, and the system worked. One day, ships of the People's Republic of China arrived, demanded to be offloaded, and by doing so wrecked the carefully scheduled system for weeks.

In summary, the environment in which industrialized nations assist in less developed country dis-

2 A *Review of the U.S. Government Foreign Disaster Assistance Programs* (Washington, D.C,: National Academy of Sciences, National Research Council, Commission on Sociotechnical Systems, Committee on International Disaster Assistance, 1978), p. 5.

Table 6.-International Assistance to the Guatemala Earthquake of 1976

National *Donor* Assistance

Argentina	Ecuador	Mexico	Spain
Belgium	France	New Zealand	Sweden
Brazil	Germany, FRG	Nicargua	Switzerland
Canada	Haiti	Norway	United Kingdom
Colombia	Honduras	Panama	United States
Costa Rica	Israel	Peru	Venezuela
Dominican Republic	Italy		

International Organization Assistance

Organizations of American States (OAS)
League of Red Cross Societies (liCROSS)
European Economic Community (EEC)
Pan American Health Organization (PAHO)
United Nations System
- World Health Organization (WHO)
- World Food Program (WFP)
- United Nations International Childrens Fund (UNICEF)
- United Nations Disaster Relief Organization (U NDRO) through United Nations Development Programme (UNDP)

Voluntary Agency **Assistance**

Assemblies of God	Interchurch Medical Assistance	World Relief Commission
Baptist World Alliance	Lutheran World Service	World University Service
CARE	Mennonite Central Committee	World Vision International
Catholic Relief Services—United States Catholic Conference	Medical Assistance Program	American Friends Service Committee
	Salvation Army	American National Red Cross
Christian Reformed World Relief Committee	Seventh Day Adventists World Service	Christian Aid
	Southern Baptist Convention Foreign Mission Board	Help the Aged
Church World Service		British Red Cross
David Livingston Foundation	World Neighbors, Inc.	Mormon Mission
Food for the Hungry		

League of Red Cross **Societies**

Afghanistan	Dominjcan Republic	Japan	Peru
Australia	Equador	Korea Rep.	Philippines
Austria	Egypt	Kuwait	Poland
Bahamas	El Salvador	Lebanon	Romania
Barbados	Ethiopia	Liechtenstein	Singapore
Belgium	Finland	Luxembourg	South Africa
Bolivia	Fed. Rep. of Germany	Malaysia	Spain
Brazil	France	Mauritius	Surinam
Bulgaria	German Dem. Rep.	Mexico	Sweden
Canada	Great Britain	Monaco	Switzerland
Chile	Greece	Morocco	Thailand
China	Honduras	Netherlands	Trinidad and Tobago
Columbia	Hungary	New Zealand	Turkey
Costa Rica	Iceland	Nicaragua	Uruguay
Cuba	[ran	Norway	United States
Cyprus	Ireland	Panama	U.S.S.R.
Czechoslovakia	Italy	Paraguay	Yugoslavia
Denmark	Jamaica		

Other Assistance

Pan American Development Foundation

SOURCE: Compiled from: Office of Foreign Disaster Assistance, U.N. Disaster Relief Organization, League of Red Cross Societies, and the American Council of Voluntary Agencies for Foreign Service.

asters provides many opportunities for U.S. disaster programs to observe and learn about complex disaster behavior and organization.

U.S. POLICIES ON DISASTER ASSISTANCE

Faced with the complexities of assistance to developing countries, the United States continues to observe the primary and traditional motivation of disaster assistance, humanitarianism. Only a few of the countries to which assistance is given each year are of strategic importance. The humanitarian concern was reemphasized by the Carter administration. A cable in August of 1977 instructed all U.S. Ambassadors to ensure that the needs of disaster victims were met. Particularly stressed were those instances where the government of the disaster-affected nation was not responding sufficiently to the needs of the victims. According to an OFDA document, "This policy linked disaster assistance with the protection of the most fundamental human right— the right to survive.

Among the other key elements of the U.S. foreign disaster assistance policy are eight activities designed to:

- Render emergency relief, in coordination with other governments, international agencies, and voluntary organizations, to victims of natural and manmade foreign disasters. Such assistance can be provided to the people of any nation affected by disasters and must, to the greatest extent possible, reach those areas most in need of relief and rehabilitation.
- Monitor all potential and actual disaster situations.
- Assist in rehabilitation when such rehabilitation is beyond the capacity of local resources.
- Encourage and participate in foreign disaster preparedness through the provision of technical assistance and international training programs.
- Consider on a case-by-case basis longer term reconstruction assistance, where there has been severe social and economic disruption, and implement the program as a development tool.
- Support the efforts of international organizations and voluntary agencies involved in foreign disaster assistance.
- Increase U.S. technical capacity to define disaster-prone conditions and to recommend disaster avoidance measures.
- Initiate, within international fora, efforts to increase other donor participation in disaster relief, preparedness, and prevention.

Implicit and explicit donor country values affect the crucial decision of what, where, when, and how foreign disaster assistance will be provided. Because these **values** motivate decisions and help to establish the general framework within which organizations operate, the necessity of having a clear rationale for involvement in international disaster assistance should be evident.

The Committee on International Disaster Assistance recently suggested that the AID Office of Foreign Disaster Assistance focus on several questions (table 7) in developing an explicit rationale for the U.S. Government programs. These questions illustrate the complexity involved in merging individual donor country values into a consistent international donor community value. Furthermore, they point out the need for the potential recipients to make clear their views on the expected role of the donor nations and their own in-country programs during disaster.

In its analysis of U.S. disaster assistance to the developing countries, the NAS Committee attempted to state its "basic value premises. " These in general summarize many of the congressional attitudes of recent years. Furthermore, they express a rationale for U.S. participation in developing country disasters which is "essentially the rationale of the Office of U.S. Foreign Disaster Assistance which was accepted by the Academy," according to former OFDA Director Anne Martindell.

> The Committee believes that the policy framework, strategies, and ethics of international disaster assistance should be guided by the basic principles of humanitarianism, evidenced by a concern for the response to the human needs of disaster victims. The Committee also believes that the fundamental purpose of international disaster assistance should be to respond to the locally unmet needs of disaster victims. Thus the nature and quantity of

[3] *U.S. Foreign Disaster Assistance* (Washington, D.C.: U.S. Agency for international Development, Office of Foreign Disaster Assistance, January 1978), p. 3.

[4] Letter from Anne Martindell, Director, U.S. Office Of Foreign Disaster Assistance, January 1479.

Table 7.-Ouestions for Developing U.S. International Disaster Programs

1. **What types of disasters should be included in a U.S. program of international disaster assistance? Should key criterion be the magnitude of the damage? If so, what measure or combination of measures should be used-death, injury,property damage?**
2. **To what extent should foreign disaster relief be used as a vehicle to enhance foreign policy goals? The pursuit of foreign policy goals implies criteria that have only marginal relationships to the magnitudes of disaster impacts or to the capability of a country to meet its own disaster-induced needs. The potential conflict between these two sets of objectives needs to be carefully considered.**
3. **At what point in the disaster process should assistance be provided? Should assistance be restricted to the emergency period? Or would it be more productive to provide assistance in the development of disaster mitigation techniques or for the organization of preparedness measures? Should the type and timing of emergency assistance take into account its potential utility in longer term rehabilitation and recovery? What types of recovery aid will be cost-effective in enabling the society to be better prepared to cope with future disasters?**
4. **What type of aid is needed most? A concern with disaster victims is certainly appropriate but victim populations can be defined in various ways—as individuals, families, tribes. and as local, regional, and national governments. In fact, to think of the "victim" as society is often important. If this is done, societal needs would become a much more important focus. Society-focused needs would shift types of assistance toward the replacement of "damaged" societal resources (e.g.. thereplacement of roadbuilding equipment or communications facilities). In light of the fact that international disaster assistance is usually provided to nations that are struggling to achieve greater self-sufficiency, should the avoidance of future dependency relationships, (particularly technological ones) be one of the criteria used in determining the type of assistance rendered?**
5. **How should disaster needs be determined? Should needs be specified by the affected country or should the needs be determined by what the donor wishes to give? Should needs be determined by an international body which then solicits contributions from the international community? Do affected countries have the right to refuse assistance, particularly if donor countries stili perceive unmet needs?**

;OURCE: The National Academy of Science, Committee on International Disaster Assistance, pp. 3S-37.

international disaster assistance should be conditioned not only by the intensity of impacts and the vulnerability of human settlements, but aIso by the capability of the affected community to meet its own disaster-generated needs. Outside disaster assistance should complement, not duplicate, the existing resources and response activities of the recipient country. Donors should help but not overwhelm, assist but not create a dependency relationship, provide for genuinely needed goods and services but not disrupt the natural adjustment mechanisms in the disaster-stricken population. Finally, we believe that the external contributions to the stricken nation should be the result of coordinated rather than disjointed effort.[5]

THE STRUCTURE OF U.S. ASSISTANCE

The Government's international disaster assistance over the last two decades has greatly expanded in resources allocated, in skill, in its professional response, in its expanding knowledge base, and in sophistication as reflected in an awareness of broader needs for policy and program improvement.

The National Research Council recently noted that:

> In the past decade a rapid evolution has occurred in the need for and the organization of international disaster assistance. During the last 12 years, the U.S. Government has responded to disasters in other countries in which over 3.6 million people lost their lives and 474 million people were seriously affected. It has contributed $1.6 billion out of a total of $3.6 billion donated for foreign disaster assistance. Seventy-five percent of all U.S. Government disaster assistance has been expended in the 1ast 5 years, and since 1957 the public sector share of U.S. disaster assistance has expanded from 15 percent to more than 80 percents

A review of the structure of the U.S. disaster assistance program must consider three items: the organization of OFDA and its capabilities, the "triggering" mechanism by which assistance is initiated, and OFDA'S coordination with both international organizations and private voluntary organizations.

Organization of the Office of Foreign Disaster Assistance

The first major effort to coordinate the U.S. Government's response to international disasters

[5]Committee on International Disaster Assistance, *Assessing International Disaster Needs* (Washington, D. C.: National Academy of Sciences-National Research Council 1979), p.6.

[6]*Annual Report,* (Washington, D. C.: National Academy of Sciences, National Research Council, 1977), p.177.

was made in 1964. Previously, not only did the disaster response capability suffer but no accumulation of experience nor continuity of expertise was maintained. Following the designation of a Foreign Disaster Relief Coordinator in AID in 1964, interagency relief coordinators were appointed in the Departments of State; Defense; and Health, Education, and Welfare, and the initial Government-wide response capability was begun.

Several reorganizations of this capability have taken place, most recently in 1977. Today, two divisions exist: Operations, which conducts actual relief efforts, monitors all potential disasters, and evaluates and plans disaster relief efforts; and Preparedness, which develops early warning systems, strengthens disaster preparedness, and plans in the long term.

The capabilities and resources of this organization include:

- a staff of about 20 people,
- a budget that averages about $25 million,
- stockpiles of emergency supplies in four locations around the world,
- Mission Disaster Relief Officers in embassies,
- a discretionary disaster relief authority of $25,000 for each Ambassador,
- access to Food for Peace (Public Law 480) food commodities,
- an Emergency Operations Center with round-the-clock monitoring and communications capabilities,
- a reserve cadre in AID regional and bureau personnel,
- an information system of historical data, and
- an integrated evaluation system that permits "lessons learned" in past disaster performance to be systematically incorporated into future decisons.

The Triggering Mechanism

The process by which U.S. assistance is given to a disaster-stricken country begins with the U.S. Ambassador. It is the Ambassador, or Chief of the Diplomatic Mission, who determines if a particular event "is of a magnitude to warrant U.S. help and whether such aid would be acceptable to the stricken country.'" Upon such determination, two immediate resources become available. First, the Ambassador's discretionary relief authority of $25,000 can be used as a cash donation to the government, to voluntary agencies, or to make local purchases of goods, transport, or labor. Second, with the approval of AID, the Ambassador can shift Public Law 480 food commodities that are already in the country to the emergency operations, usually as a gift.

If the scope of the disaster exceeds the two immediately available resources, the Ambassador communicates the needs to OFDA. Supplies must be approved by OFDA, usually only after an on-site assessment of needs and available resources. Coordination of supply, transportation, in-country distribution, and personnel is the responsibility of OFDA. When the requirements of the disaster greatly exceed the capabilities of OFDA, special allocations from Congress are often forthcoming.

Coordination With Other Disaster Organizations

In recent years, the requirements for effective coordination have increased as the volume of international disaster assistance and the number of participants have greatly expanded. As the Committee on International Disaster Assistance reported:

> ... there has been an increase in the number of participants looking for meaningful roles to play. It is obvious that disasters create genuine human needs. Responses to these needs create further demands for personnel, equipment, transportation, and communications facilities, and for organizational and coordinative mechanisms to mobilize disaster-relevant resources. What is not obvious is the degree to which present international disaster assistance programs comprise an effective response to disaster-generated needs.[8]

Within the United States, OFDA has taken steps to meet the demands for coordinative mechanisms. In 1974, a new plan was developed for bringing structure to the massive and sometimes indiscriminate humanitarian response of the American public that often follows extensive news media reporting of serious foreign disasters. This new plan provided a means for coordinating the collection, screening, and shipment of relief supplies from communities throughout the country. State Governors have appointed foreign disaster relief representatives, and the Defense Civil Preparedness Agency, the Red Cross, and volun-

[7] Office of Foreign Disaster Assistance, op. cit., p. 8,

[8] Committee on International Disaster Assistance, op. cit., p. 4.

tary agencies have offered the use of their communications systems and disaster-experienced personnel. This plan was activated during the relief effort for the Guatemala earthquake in 1976.

Within the U.S. Government as well, OFDA has coordination responsibilities which have been exercised for several years. Among the agencies that often are involved in relief efforts are:

- Department of Defense (DOD), which transports supplies and provides such specialized services as the construction of bridges, erection of temporary shelter, and the provision of medical care;
- Department of Health, Education, and Welfare (HEW), through its Center for Disease Control (CDC), which provides assessment of the immediate medical needs and overall health situation;
- U.S. Geologic Survey (USGS), which provides teams of geologists and volcanologists to assess the extent of earthquake or volcanic damage and the probability of recurrence;
- National Oceanic and Atmospheric Administration (NOAA), which provides early warning of storms and has released personnel to develop drought projections;
- Smaller agencies such as the Peace Corps, whose volunteers provide an assessment of needs and, in some cases, assistance.

Internationally, OFDA supports the relief operations of the United Nations, International Committee of the Red Cross, and the League of Red Cross Societies, through cash grants, logistical backup, emergency food, relief supplies, equipment, and personnel. In particular, the United States has been a supporter of the U.N. Disaster Relief Organization (UNDRO) since its inception in 1972. Funded primarily by voluntary contributions from U.N. members, UNDRO offers the opportunity to enhance global coordination of disaster relief not only in the role of an international organization but also as a functioning, operational unit. Since late- 1976, a permanent disaster coordination center in Geneva has served as a central information exchange during emergencies.[9] The United States, through AID and the State Department, has publicly supported the improvement of this capability and provided funds specifically located to improve UNDRO.[10]

U.S. DISASTER PROGRAMS IN REVIEW

A review of disaster programs sponsored by the United States is largely a review of OFDA. As the chief agent of the Government's response disaster-related needs around the world, OFDA has sought to coordinate the many government and private voluntary resources of the United States. During its 15 years of existence, OFDA h coordinated this response to over 500 disasters and has formalized the response procedures used U.S. missions in foreign countries. OFDA has tablished stockpiles at four locations worldwide and has created procedures to speed the delivery these and other disaster-related goods and ser ices. Moreover, OFDA has undertaken efforts apply science and technology to foreign disaster preparedness and relief and has launched signi cant efforts in disaster preparedness planning through both direct technical assistance and Int~ national Disaster Preparedness seminars. It through the actions of OFDA that the United States has participated in developing count disasters, thus offering the potential benefits such experience to U.S. domestic disaster pr grams.

[9] United Nations Disaster Relief Organization, *UNDR Newsletter*, Number 3 (May 1977), pp. 1-2.

[10] Department of State and Agency for Internatio Development comments in Reports to the Congress by t Comptroller General of the U.S., *Need for an Internatio Disaster Relief Agency* (Washington, D. C.: U.S. Gover ment Printing Office, May 1976) and *Observations on Guatemala Earthquake Relief Effort* (Washington, D. C.: U. Government Printing Office, August 1976).

VI. Lessons From Disasters in Less Developed Countries for U. S. Domestic Disaster Programs

The United States, for more than the past three decades, has tried to lead the less developed nations into modernization. For better or worse, the flow of knowledge, technology, and innovation has been from America. In the disaster field, experience gained by U.S. participation with the developing countries may present a useful counter trend. In small but significant ways, developing country adaptations of informational, organizational, managerial, and educational practices could benefit U.S. domestic programs.

The first chapters of this report described the context of disasters in less developed countries and pointed out that individuals respond similarly under the stress of disaster across cultures and place similar demands on institutions. The key difference between disasters in developing countries and those in urban and industrialized countries lies in the internal capability to prepare and respond. Thus, institutions are the focus of a search for transferable lessons.

The existence of possibly useful lessons need not imply a deficiency in U.S. domestic efforts. Indeed, many of the models for disaster programs in less developed countries were derived from industrialized countries. These lessons, however, represent alternative forms of organizational and managerial performance that may be useful in assessing and improving domestic disaster actions.

The most import element in transferring lessons to domestic programs, a transfer mechanism, is missing. Neither lessons derived from institutional adaptations in developing countries nor from the international operations of OFDA will be readily incorporated into domestic programs without an explicit transfer mechanism. Even the aggregation and evaluation of possible lessons is made difficult by the lack of a systematic overview of all practices in less developed countries which may be applicable to domestic programs.

The first area of possible transferability of lessons involves dealing with the entire hazard lifecycle. The second area is a cluster of 16 topics directed to particular program adaptations and improvements.

THE HAZARD AND DISASTER LIFECYCLES

In the United States, a major emphasis over the years has been response to and recovery from disasters. As a result, deficiencies in mitigation, preparedness, education, training, and warning were, in many ways, "obscured" by our capacity to respond and reconstruct. Poor preparedness was seldom an issue because the U.S. infrastructure is vast and recovery capability abundant. In time of emergency, local capacity is supplemented by that of the State, which can be supplemented by Federal resources. Thus, a strong political system can guarantee the dispersal of an individual community's loss across an entire nation.

Less developed countries often lack both abundant resources and a political system that can assure special consideration for every victim. As a result, less developed countries have turned, in many cases, to impressive education and training in preparedness. The United States is only now recognizing that mitigation and preparedness may be less expensive in the long-run than continued reliance on recovery. A good base of experience in this programmatic approach to predisaster activities lies in the Office of Foreign Disaster Assistance (OFDA) which has, for several years, been directed toward the full lifecycle of hazards.

In dealing with disasters and their impact on populations and property, emergency response to the event itself is increasingly seen as insufficient and a misuse of scarce and valuable resources. To simply deliver goods to disaster-stricken people

fails to recognize that the hazard exists long before the disaster strikes and that it will recur unless things change. An exclusive focus on the emergency phase ignores contributions that can be made to the mitigation or avoidance of the hazard. Figure 1 suggests one approach to illustrating the events in the lifecycle of a hazard. Emergency relief and short-term recovery are only small, but important, parts of the hazard lifecycle. Recognition of the other events in the lifecycle (such as steps 9 through 15) can result in positive benefits for populations living in risk areas. Figure 2 presents the OFDA image of the disaster cycle.

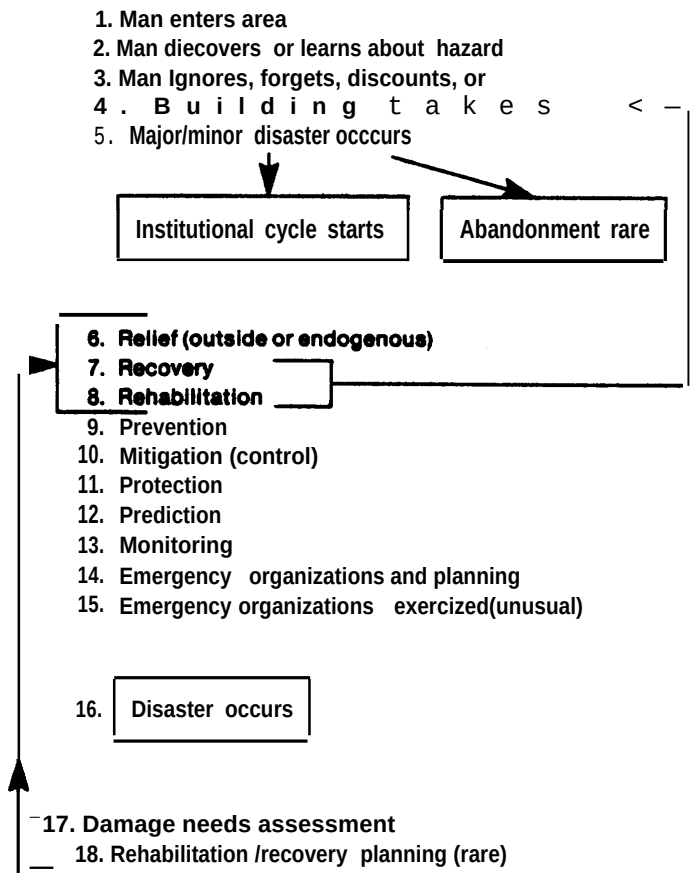
According to a document prepared by OFDA:

> From the beginning, responsibilities of the AID Disaster Relief Coordinator were recognized as being twofold: 1) coordination and direction of the U.S. Government response to foreign disaster emergency requirements; and 2) development, in advance, of plans and policies for improved preparedness for foreign disaster emergencies, both in the United States and in foreign disaster-prone countries.[1]

Even with those original intentions, the early emphasis of the Agency for International Development (AID) /OFDA disaster program was directed toward emergency response. As the OFDA officials freely admit, in the early years the limited staff size and the large number of disasters (averaging nearly 50 a year) prevented even a brief look at preparedness and planning.

The Disaster Office began to train disaster relief officials from foreign countries in 1967 when a single disaster relief official from Jamaica came to the United States. Six weeks of training with OFDA and the American National Red Cross led to the development of the first International Disaster Preparedness Seminar for foreign officials. Held every year since 1969, the 6-week seminars have involved 132 foreign disaster officials from -H nations.[2] Beginning in 1979, a series of regional preparedness seminars have also been held to bet-

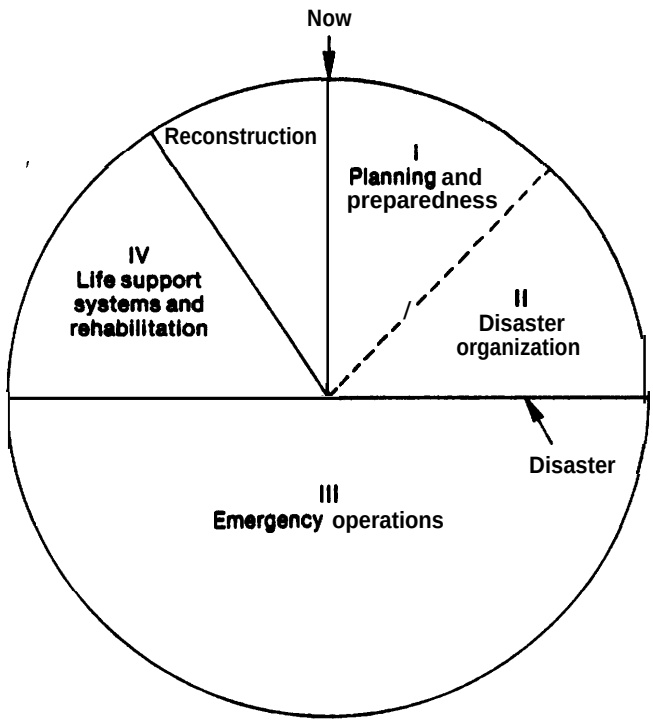
Figure l.-Lifecycle of a ● Hazard



SOURCE: Office of Technology Assessment

[1] *U.S. Foreign Disaster Assistance* (Washington, D. C.: U.S. Agency for International Development, Office of Foreign Disaster Assistance, January 1978), p. 6.
[2] Ibid., p. 14.

Figure 2.-"The Disaster Cycle"



SOURCE: *Instruction Guidelines,* international Disaster preparedness Seminar. OFDA Disaster Technical Assistance Branch, Agency for International Development (Washington. D. C., 1977), p.iv.

ter address specific common problems of a small group of neighboring nations. The foci o these seminars are to encourage countries to p pare, improve, and test national disaster plans; to make hazard and disaster resource analyses; to reate permanent disaster organizations; to en; national disaster emergency laws; and to mantain systematic working relationships with Voluntary agencies.

The Instruction Guidelines for the 1977 ainar explicitly described "The Disaster Cycle" IS in- eluding five stages. Beginning with "NOV ' the foreign disaster relief oficials were told the : two steps in the cycle precede disaster "Planni : and Preparedness" and "Disaster Organization The disaster impact signals the beginning of s ge 3; "Emergency Operations," followed by stag four, "Life Support Systems and Rehabilitation and finally, "Reconstruction."3 The seminars fo as on the two stages prior to disaster.

In addition to the Disaster Prepal dness Seminar, OFDA *offers* direct technical *ass* :ance to disaster-prone countries. Personnel of FDA spend periods of time in the countries, of n ac- companied by experts detailed from other 'part- ments and agencies of the U.S. Governmet con- ducting hazards analyses, training progran , and organization planning sessions with the host governments.

U.S. disaster programs also attempt tore gnize and cope with the whole lifecycle of intern ional hazards by the application of science and hnol- ogy. Beginning in 1974, efforts were made to ncor- porate scientific and technical knowledge clud- ing hazard mitigation and preparedness, saster prediction and warning, and weather stems research into the disaster relief process. Curren ntly, several areas have the attention of the Offi , par- ticularly satellites and high-level aerial ph ogra- phy for hazard monitoring and damage ssess- ment, predictive early warning, and corer [nica- tions systems.[5]

The National Academy of Sciences (NAS Committee endorsed the idea of disaster prepa dness but strongly emphasized the use of availab local resources and capabilities rather than hig y developed science and technology for predisaster efforts. The Committee wrote:

> The rationale for these predisaster preventive, protective, and preparedness measures is straightforward. Disaster relief officials assume that the degree of disruption to a society caused by a disaster will largely be determined by the extent to which the society has developed realistic expectations about the problems to be confronted. If the continuity of social life is to be maintained with minimal disruption, a society should be organized to anticipate the probable kinds of disaster it faces and take adequate preparatory measures prior to their occurrence.[6]

In summary, the U.S. international disaster assistance program was, for many years, concerned primarily about immediate postdisaster emergency relief. In recent years, with the growing recognition of the repetitive patterns of natural disasters and the inherently common components of most emergency conditions, increasing attention has been given to the preimpact programs of prevention, mitigation, warning, and preparedness planning. These programs offer considerable benefit in reducing the net costs of disaster. The international disaster program has accepted the tradeoff of direct investment in predisaster efforts. The huge direct costs of relief and the indirect costs of inflation and Ioca[economic depression are likely therefore to be reduced. U.S. domestic disaster policy makers may profitably examine the outcome of these decisions in the future.

SPECIFIC PROGRAM AREAS

There are 16 program areas where experiences in developing country disasters may pro~~e beneficial to U.S. domestic disaster programs. Since no readily available technique exists for the transfer of 1essons into U.S. programs, of learning from developing country disasters has merit.

The 16 program areas are:

- Planning
- Building standards
- Self-help for victims
- Emergency organizations

[3] *Instruction Guidelines,* International Disaster Pre redness Seminar, Office of Foreign Disaster Assistance, U.S. Agency for International Development, Washington, D.C..D.), p. IV.

[4] Ibid., p. 11.

[5] Office of Foreign Disaster Assistance, op. cit., p.

[6] *Review of the U.S. Government Foreign Disaster Assistance Programs* (Washington, D. C.: National Academy of Sciences, National Research Council, Commission on Sociotechnical Systems, Committee on International Disaster Assistance, 1978), p. 3.

- Infrequent disasters
- Surveillance
- Practice and training
- Information
- Evaluation
- Contingency funding
- Voluntary agencies
- Stockpiling
- Transportation
- Public contributions
- Reserve cadre
- Adaptation during system failure

Planning

There is **lack of** coordination between disaster plans and State development plans according to a recent study conducted by the National Governors' Association. While some States, notably Hawaii, are advanced in this notion, in general, development planners see few links between disaster emergency planning and community development plans.[7] As a result of this relative isolation of the two plans, few States have more than a cursory overview of the hazards of development.

The situation in planning institutions in the less developed countries is sometimes different, not by considered effort but because of scarcity of human resources. The developing countries cannot afford separate planning; development and emergency plans are often undertaken by the same organization. Developing countries, therefore, offer a body of experience on the coordination of planning which could be examined to determine the desirability of such integration for U.S. planning.

Building Standards

In several recent earthquakes (Italy, Romania, and Guatemala), National Bureau of Standards (NBS) teams have traveled to the disaster site to conduct research and offer assistance. New reconstruction techniques have sometimes been experimented with, thus adding to the body of knowledge available to U.S. disaster operations. For example, following the Romania earthquake the NBS Center for Building Technology sent a team that was able to observe the use of a plastic adhesive injected into unstable walls. This successful innovation will almost certainly be integrated into U.S. planning.

[7] *Final Report* (Washington, D. C.: National Governors' Association, Emergency Preparedness Project, 1978), p. 79.

Self-Help for Victims

Compared to postdisaster behavior in the developing countries, self-help is often minimized in U.S. disaster recovery efforts.

For instance, both domestic and foreign studies have shown that people want houses rebuilt as rapidly as possible and will do extensive work themselves if provided with proper materials. People prefer advice and supplies to extensive mass shelter or temporary housing, people want advice and supplies. Such supplies are particularly important since they can help prevent further damage to structures weakened by the disaster or exposed to the elements. In international disasters, providing steel roof sheeting contributes to this end. While the solution internationally may not be completely suited to the United States, the enhancement of the self-help concept deserves further review as an aid in postdisaster recovery from domestic catastrophes.

Emergency Organizations

In the United States, five types of organizations have responsibility for State emergency operations: (a) Governor's office, (b) department in the executive branch, (c) civil defense council, (d) Adjutant General, and (e) State police.[8]

The international environment offers an observatory in which to examine additional alternative organizational structures and interorganizational relationships that can benefit domestic as well as international disaster efforts. The international disaster arena permits the development of a comparative body of knowledge and a frame of reference against which domestic organizations can be measured. This body of knowledge can highlight both similarities and differences in human and organizational response and suggest other effective organizational forms.

Infrequent Disasters

Terrorism, civil strife, and kidnapping are examples of events from which U.S. cooperation in international disasters can provide benefits in knowledge for domestic disaster policy. In such events, developing countries offer lessons about response because, from an organizational view these events occur so infrequently in the United States as to lack response precedents.

[8] Ibid. p. 8.

Testing techniques of preparedness and hazard reduction in this world laboratory also offer potential benefits to the United States. Long-range hazard mitigation efforts can be measured in terms of alternative organizational structures, effectiveness of implementation, and utility in actually lessening damage to people and property.

Scientific research, hypothesis testing, and the development of monitoring instrumentation for several types of hazards would be more difficult without the opportunities presented by U.S. activities in developing countries. The research opportunities on earthquakes in this country are supplemented by foreign disaster studies. U.S. Geological Survey (USGS) teams have engaged in close scientific exchange on recent earthquake sites in Guatemala, Nicaragua, Italy, and Romania. In Romania, USGS actively engaged in warning of the possibility of a second quake based on several previous incidents of "double" earthquakes (a second strike occurring shortly after the first) in that region. Such exchanges of information benefit both U.S. and foreign country preparedness programs.

Surveillance

Any form of warning system incorporating the observation of events with remote-sensing satellites or aircraft would be most effective when international in scope, because weather patterns, earthquake faults, and ocean currents are global. Similarly, the effective utilization of such technologies as satellite photography, computer models, and long-range forecasting necessitates close international cooperation. Lessons learned from U.S. involvement in helping other countries build a data base will enhance the ability to interpret domestic long-range trends. This is especially true in research on climate change. Only when meteorological organizations in all countries can provide valid input to scientific research will clear interpretations of future weather patterns be possible. The U.S. role in developing such expertise will, in the long run, benefit U.S. domestic disaser programs.

Training and Practice

Linking preparedness and response through exercises, practice, or training enables organizations to measure performance and engage in corrective measures. Disasters in developing countries offer two contributions to domestic training and exercises.

First, several countries appear to be more adept at training their people in effective disaster responses. For example, while we have a relatively sophisticated weather prediction system, the associated organizational system for implementing disaster warnings in many areas is inadequate. Public education and training programs for disaster preparedness in the United States suggest that there may be lessons to learn from how developing countries organize for preparedness and response. Because some of the nations from which lessons might be transferred have dictatorial or semidictatorial forms of government, with concomitantly greater ease in mobilizing social control mechanisms, these education and training techniques must be examined cautiously.

Second, disasters in the developing countries offer an opportunity for U.S. organizations to utilize some functions that are infrequently called into action. Specifically, voluntary organization fund-raising, mass food and clothing collection, coordination among organizations, and transportation of large volumes of material would occur only in a large domestic mass emergency. However, these efforts can be practiced as frequently as desired in support of foreign disasters.

Information

No cohesive disaster information coordination system currently exists in the United States, although the establishment of the Federal Emergency Management Agency in 1979 is expected to improve existing data bases in mitigation, preparedness, and response.

Two types of information would be useful in such a system: (1) real-time disaster monitoring and (2) applications of research. The former category involves monitoring hazards and disaster-response resources. A proposal of the U. N'. Association to create a food-monitoring system for the developing countries might offer models for U.S. development of a domestic information svstem.[9] Research applications **suggest** an information clearinghouse that specializes in coordination of disaster-related research and engages in the translation of such research into operationally useful information for disaster managers.

[9] *Acts of Nature, Acts of Man: The Global Response* co *Natural* Disasters (New York: U.N. Association. Policy Studies Panel on International Disaster Assistance, 1977), **pp.** 67-68.

Evaluation

Effective emergency operations are vital to success in delivering disaster-related services to victims. The evaluation of experiences in disasters in the developing countries can contribute to the development of effective procedures which, in turn, can be applied in the response to domestic disasters.

The Office of Foreign Disaster Assistance has recently developed an integrated evaluation system called "Lessons Learned." The system employs a set of evaluative criteria to identify performance characteristics and recommendations for fhture improvement of disaster response. The use of this computer-based information permits the analysis of consistent areas of successful and unsuccessful performance across several disasters. These findings can be incorporated into management decisions instantaneously. Both the "Lessons Learned" system design and the substantive findings of the performance evaluations should prove of interest and benefit to domestic disaster professionals.

Contingency Funding

The power to "mobilize contingency finds in a fast, efficient manner" is of such importance, according to a recent study by the National Governors' Association, that the report recommended each Governor have such authority.l" In disaster assistance to developing countries, each U.S. Ambassador has a contingency account of $25,000 available for distribution within the host country immediately upon the declaration of disaster. Thus, there is a body of experience about the utilization of these funds in disaster response. Despite the widely divergent sums of money likely to be involved domestically, the methods used and results of foreign contingency funding could provide models for applications in the United States.

Voluntary Agencies

Voluntary agencies with ongoing programs in the less developed countries are an effective channel for disaster assistance by international donors. In the United States a similar, if not more extensive, voluntary infrastructure exists in most communities. The domestic attitude, it seems, is to make use of these capabilities during the emergency period, but use them only minimally during recovery and reconstruction.

Internationally, in the India cyclone of 1977, OFDA channeled all aid through existing voluntary agency programs, making them responsible for meeting eligibility, budgeting, and accounting requirements. Effective contributions were made to meeting victims' needs with speed, efficiency, and administrative economy. Domestically, a contrary example exists. Disaster officials reconstructing after the eastern Kentucky floods of 1977 found little use for voluntary agencies with established links to the affected communities. Federal agencies set up one-stop centers, requiring the relocation of already operating service organizations and the transportation of victims. Furthermore, the Federal agencies monitored all activities themselves, maintaining some presence for nearly 1 year.

The comparative capabilities in relief and reconstruction management of voluntary organizations must, of course, be measured in individual cases. However, the experience of international disaster assistance with third-party relief management may be instructive domestically.

Stockpiling

The experience of OFDA in the development of its four regional stockpiles may offer benefits for domestic logistical systems. Problems of expiration dates on drugs as well as material maintenance have been addressed through a computerized accounting system. Similarly, experience in frequency of turnover and quantity of items may be of use in domestic preparedness.

Transportation

Experience with various forms of transport in emergencies is held both domestically and in developing countries. The individual domestic city or locality, however, probably has limited experience with transport compared to that gained across the whole spectrum of activities in developing country disasters. For example, experience with several different types of helicopters in the Guatemala earthquake has led the Department of Defense to recommend that OH-58 helicopters be used in future disaster relief operations rather than the UH-l H helicopter because of maneuverability

[10] *Final Report*, op. cit., p. 212.

and economy.[11] An inventory of similar experiences in developing countries might prove useful in selecting appropriate military and other transport support in domestic emergencies.

Reserve Cadre

Full-time staff for emergency management can be effectively supplemented with a trained reserve cadre, as shown in the experience of several donor countries, including the United States. These reserve emergency officials are drawn from subject or geographic area divisions. Thus, their specialized knowledge plus disaster-related training offer useful complements to professional disaster staffs. State emergency offices across the country might review the experience of OFDA with reserve cadres to determine the benefits to be derived from that approach. If found useful, the cadre training program of OFDA might be an adaptable source of training methods and materials.

Public Contributions

A well-publicized disaster in the developing countries often initiates an overwhelming response from the American people. During relief operations following Hurricane Fifi's devastation of Honduras in 1974, OFDA developed a plan for addressing the problem of indiscriminate donations. This plan involves appointment by each State Governor of a foreign disaster assistance coordinator who is responsible for disseminating news of foreign disasters. If the disaster-stricken country has not requested some form of material aid, the foreign disaster assistance coordinators encourage the public to give cash donations to voluntary agencies. If specific material aid is requested, the State coordinators join with the Red Cross, other voluntary agencies, and the Defense Civil Preparedness Agency in collection, screening, and shipment of supplies from communities throughout the United States. This procedure has been used following the Guatemala and Italian earthquakes of 1976 and the Mexican hurricane of the same year.

This system is readily transferable to domestic disaster operations because in domestic disasters the same tendency to ship used c:hing and other materials must be combated.

Adaptation During System F lure

In the United States, a consid able proportion of emergency-response capabili s is dependent upon technical systems which art themselves, vulnerable to disasters. For example epidemiological surveillance techniques rely on I ale models and computerized information system In the event of an emergency, technological sys ms may be unavailable. Domestic response per ~nnel may then experience conditions not unlike daily life in less developed countries.

Institutional adaptations to a imited resource base may yield transferable lessc to the United States in the event of technolo al systems failures. For instance, in a recent e demic in Zaire, an international epidemiological serveillance team developed effective surveillance ethods adapted to a rural village environment. Those methods might well prove a useful backu in domestic in". stances where computer facilitie u-e unavailable. Similar examples of forced-resour fulness are likely to be available for considerat- in alternative forms of domestic preparedness.

CONCLUSION

Taking advantage of the available lessons from U.S. participation in developing country disasters requires that two organizational Requirements be addressed.

First, a body of information t be organized in a framework which seeks tra ferable lessons. This should include the system; c evaluation of existing studies plus origini research, as necessary.

Second, a dissemination mech: ism is necessary that creates, out of cross-nationa esearch, principles, practices, and suggestions a dicable to U.S. disaster programs. This mechal m should produce the results of research in a t mat specifically directed to disaster planners anc operational personnel.

This combination of tailor(research and problem-oriented diffusion of ad ~tations and innovations could materially cent mte to the improvement of U.S. domestic disa~ r programs.

[11] *Guatemala Disaster Relief Operations—After Action Report* (Washington, D. C.: Department of Defense, Apr. 23, 1976), p. 23.