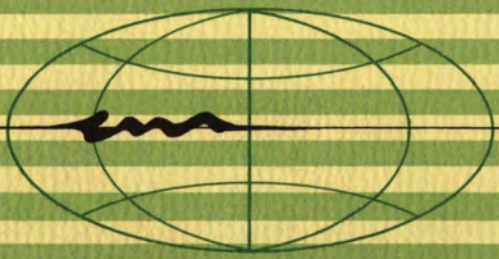
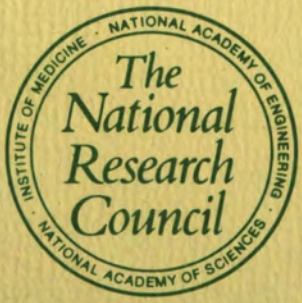
The U.S. Government Foreign Disaster Assistance Program





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The U.S. Government Foreign Disaster Assistance Program

Committee on International Disaster Assistance
Commission on Sociotechnical Systems
National Research Council

NATIONAL ACADEMY OF SCIENCES
Washington, D.C. 1978

NOTICE: The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the Councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the Committee responsible for the report were chosen for their special competences and with regard for appropriate balance.

This report has been reviewed by a group other than the authors according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

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Foreword

On October 6, 1975, Daniel S. Parker, at that time Administrator of the Agency for International Development (AID), Department of State, wrote to Dr. Philip Handler, President of the National Academy of Sciences (NAS), inviting the Academy to submit a proposal for a program of studies on international disaster assistance. The invitation expressed Administrator Parker's concern that American technical and scientific developments were not being brought to bear with full effectiveness in assisting disaster-prone nations of the world in their preparations for the inevitable occurrences of future disasters or in the relief efforts that follow such emergencies. Preliminary discussions with the staff members of the AID Office of Foreign Disaster Assistance (AID/OFDA) suggested that an NAS committee composed of representatives of many disaster-related fields could assist greatly in identifying problems in disaster prevention, preparedness, planning, and relief operations to which scientific and technical knowledge could be applied. An NAS proposal to form such a committee was submitted to AID in March 1976 and subsequently approved on May 17, 1976. A Committee on International Disaster Assistance (CIDA) was formed in the National Academy of Sciences-National Research Council, Commission on Sociotechnical Systems, during the summer of 1976; it began its deliberations in September of 1976. The Agency for International Development has provided financial support for all activities of the Committee and its Panels.

As defined in the original proposal, the Committee's mandate has been to provide the AID/OFDA with guidance and assistance on (1) the U.S. role in international disaster assistance, (2) the identification of major problems in the AID/OFDA international disaster assistance program toward which scientific and technical knowledge can be applied, (3) an assessment of the state of the art in scientific and technical fields relating to disaster assistance, and (4) the identification of deficient areas of scientific and technical knowledge of disasters that need to be addressed in future research and development activities.

These tasks have encompassed some extremely complex problems in the application of scientific and technical knowledge to national and international policy issues. International disaster assistance[1] involves the identi-

[1] Throughout the report the phrase "international disaster assistance" will be used to mean the following: "efforts on the part of several nations and the United States to give assistance to a country, often a developing country, that has suffered a disaster."

fication of techniques to monitor a wide range of disaster needs; the collection and processing of a wide variety of information that is relevant for determining an appropriate response; the design and organization of complex delivery systems; the development of techniques necessary to coordinate the actions of individuals, organizations, and governments; the responses of other donor governments and international organizations; and the delivery of goods, services, and information between societies that have quite different technological capabilities and patterns of social organization and culture.

In light of the complexities of the tasks that confronted it, the Committee decided to concentrate its initial efforts on two kinds of activity. First, the Committee determined that a thorough review and assessment of the U.S. government role in international disaster assistance was a fundamental prerequisite for identifying problems in the U.S. program toward which scientific and technical knowledge might be applied. This report is based on that review and assessment. Second, the Committee simultaneously began to assess the state of the art in several scientific and technical fields that related to frequently mentioned disaster problems—problems that were also of interest to the AID/OFDA staff. In that regard, a special workshop was held on March 28-29, 1977, to review the state of the art on emergency shelter, emergency communications, search and rescue, and the use of space satellites for hazard monitoring, warning, and damage assessment. Participants included scientific and technical experts in the various topics chosen, the members of the CIDA and its special Panels, the AID/OFDA staff, and disaster response officials from other countries.[2]

After extensive deliberations, the Committee determined that the future application of scientific, technical, and administrative knowledge to international disaster assistance requires a much clearer conception of the foreign disaster context and the historical relationship of the U.S. government program during the past 13 years to that context. Thus a major first-year task of the CIDA was to examine and to interpret the historical evolution of the U.S. government program—its primary foci of attention, the content and meaning of its activities in light of the pre- and postdisaster problems that could be addressed by disaster relief efforts, and the relationship of the U.S. government program to that of other international donors.

The Committee's approach to this problem was to create four panels whose assignments were to consider a series of related issues implied by their titles:

Panel 1—Review and Assessment of Available Information
Panel 2—Role of Technology in International Disaster Assistance

[2]The proceedings of the "Workshop on the Role of Technology in International Disaster Assistance" is being published separately.

Panel 3—Coordination of International Disaster Assistance
Panel 4—Relationship of International Disaster Assistance to Long-Term Development

The work of Panel 1 was instrumental both for examining the historical record of the AID/OFDA activities and for isolating the role of technical information in disaster assistance programs. Panel 2 organized the previously mentioned workshop and contributed many ideas about the problems of technology application. Panel 3 considered the complex problems of communication and coordination among the many public and private international disaster assistance organizations, both foreign and domestic. As a result, the Panel provided a clearer understanding of the historical relationship of the U.S. government program to that of other international donors. Finally, Panel 4 identified the broad range of pre- and postdisaster problems that are amenable to international disaster assistance and outlined possible reciprocal relationships between short-term disaster relief programs and longer-term development programs.

This report is designed to serve two basic functions. First, it summarizes the Committee's review and assessment of the U.S. government role in foreign disaster relief,[3] one that has resulted in a number of specific recommendations for the improvement of the AID/OFDA's disaster assistance program. Second, the report outlines in considerable detail a perspective on international disaster assistance. That perspective is both analytical and normative—analytical in the sense that it gives the Committee's interpretation of the complexities of disasters and international disaster events, normative in the sense that it outlines issues relating to the underlying values and objectives of international disaster assistance.

The report is organized into five chapters and an appendix. Chapter 1 outlines the key technical and value problems that need to be addressed in international disaster assistance programs. Chapter 2 discusses the history of the U.S. foreign disaster relief program and briefly summarizes the more recent development of the United Nations Disaster Relief Office. Chapter 3 discusses both the concept of disaster and its implications for international disaster assistance policies. Chapter 4 outlines the committee's conception of the information required for effective pre- and postdisaster responses and then describes the various types of information currently being collected by the AID/OFDA. Chapter 5 summarizes the findings and recommendations of the Committee's first-year studies. An appendix supplements the basic recommendations by providing a detailed set of recommendations on the AID/OFDA information-management system.

[3]Throughout the report and especially in Chapter 2 the phrase "foreign disaster relief" will be used to mean the following: "efforts on the part of the United States, acting unilaterally, to give assistance to a foreign country that has suffered a disaster."

In preparing this report, the Committee reviewed the existing studies, case materials, and technical literature on foreign disasters (bibliographies are presented at the end of the report) and developed a series of working papers on selected aspects of the problem. The report represents a summary of the consensus views reached in many discussions of the Committee and its Panels. The Committee did not intend to secure agreement of all of its members and the members of its four Panels to every word in this text. However, this text is believed to reflect accurately the major concerns that have been expressed by the Committee and Panel members and to present the recommendations that the Committee wishes to bring to the attention of the AID/OFDA and other national and international agencies involved in international disaster assistance programs.

This presentation should be viewed as the beginning of a process of clarifying the goals of international disaster assistance programs and of insuring a more effective utilization of scientific and technical knowledge in the administration of those programs. The Committee hopes that the perspectives and findings reported here will contribute to the continuing efforts of many public and private agencies to prevent, to mitigate, and to relieve the damaging human, ecological, and physical consequences of disaster.

As Chairman, I thank the Committee and Panel members for their many hours of hard work. On behalf of the Committee, I also want to pay special thanks to the Committee staff for their many valuable contributions to this study. Charles E. Fritz, Executive Secretary, was largely responsible for launching the Committee's efforts and, based on his many years of experience in disaster research, he provided wise counsel and assistance throughout the course of the study. Gary A. Kreps, Staff Officer, carried daily responsibilities for administering the work of the Committee and made major contributions both to the analytical work and to the preparation of the final report. Helen D. Johnson, Administrative Secretary, and Sharon D. Carpenter, Secretary, provided cheerful and efficient administrative support for all the Committee's activities throughout the course of the study.

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Chapter 1

Disaster Response as a Decision-Making Problem

Statement of the Problem

A decision to respond to a particular foreign disaster incident—whether made by the United States, other national governments, the United Nations, or voluntary agencies—involves complex social, economic, and technical problems. Ideally, any disaster response should be guided by clearly stated objectives and by accurate information about the disaster situation. In reality, however, responding to disaster provides a classic example of decision making under conditions of uncertainty—where the values underlying the response are often unclear and the information needed for rational judgments is, at best, imprecise and, at worst, nonexistent.

The problems created by foreign disasters and responses to them can only be approximated by aggregate statistics. In the 11-year period beginning in 1965 and extending through 1975, the U.S. government provided assistance to disaster-struck nations in which the estimated number of disaster-caused deaths totaled more than 3,500,000 (see Table 1).[1] The number of people affected by disasters ("victims") during the same period was reported to be 450,000,000, or about twice the population of the United States. These figures, of course, do not reflect the additional forms of human suffering, of property damage, and of social disruption.[2]

International disaster assistance programs have traditionally concentrated on providing relief in the immediate postdisaster period. More recently, with

[1] It should be noted that the validity and reliability of disaster impact data, such as those reported in Table 1, are unknown. The figures on U.S. government assistance are assumed to be accurate but those under the headings "Voluntary Agencies," "Other Donor Nations and International Organizations," and "In-Country Self-Help" are, at best, crude estimates.

[2] Examples of recent disasters of major magnitudes include the following: the Guatemala earthquake of 1976 (estimates of 23,000 deaths and 1,000,000 people affected); the Sahel drought of 1972-1975 (estimates of 100,000 deaths and 23,000,000 people affected); the Nicaragua earthquake of 1972 (estimates of 11,000 dead and 300,000 people affected); the East-West Pakistan civil war of 1971-1972 (estimates of 200,000 deaths and 27,000,000 people affected); the East Pakistan (Bangladesh) cyclone and tidal wave of 1970 (estimates of 224,000 deaths and 600,000 people affected); the Nigerian-Biafran civil war of 1967-1969 (estimates of 1,000,000 deaths and 3,500,000 people affected).

TABLE 1 Foreign Disaster Statistics and Emergency Relief Costs–Fiscal Years 1965-1975[a]

Year	New Disasters	Number Killed	Number Affected	Value of Assistance in Millions of Dollars			
				U.S. Government	Voluntary Agencies	Other Donor Nations and International Organizations	In-Country Self-Help
1975	24	48,000	44,315,000	200.4	14.9	270.4	74.5
1974	20	101,000	14,887,000	140.3	17.3	152.3	58.8
1973	25	112,000	215,240,000	301.4	15.5	158.9	658.1
1972	30	115,000	37,023,000	314.9	12.0	582.2	81.0
1971	51	522,000	68,070,000	189.0	16.7	266.6	744.8
1970	51	73,000	11,743,000	48.7	12.2	59.5	96.6
1969	36	1,019,000	32,482,000	102.6	12.2	95.5	131.0
1968	55	4,000	5,456,000	32.6	7.9	16.5	607.1
1967	52	1,518,000	14,223,000	81.4	12.2	173.2	2,964.7
1966	48	7,000	4,140,000	25.4	1.6	9.6	*b*
1965	50	47,000	5,504,000	46.3	3.8	3.6	*b*
TOTAL	452	3,566,000	453,083,000	1,483.0	126.3	1,788.3	5,416.6

[a]Information for this table was provided by the AID/OFDA and is based on compilations from its historical files.
[b]Data not available.

the recognition of the repetitive patterns of natural disaster occurrence, increasing attention is being given to predisaster measures of prevention, mitigation, and warning and to disaster-preparedness planning. 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.

Although there is increasing attention to the full spectrum of time phases in disaster, action relating to the emergency and short-term rehabilitation phases clearly predominates. There are many reasons for this. The level of knowledge about natural disasters has been minimal until quite recently. The immediate demands presented by the disaster impact are often quite severe. Basic human needs and human suffering are involved, the needs and suffering are well publicized, and there are a variety of motivations and pressures to respond to them. While the constraints on the development of predisaster preventive, protective, and preparedness measures are great and the justification for them often unclear, no such problems confront response during the emergency period. Agent-generated demands present an image of stark specificity. The dead and injured must be cared for. Entrapped persons must be rescued and taken to places of safety and assistance. The basic human needs of survivors must be met. Essential community services must be restored, and community order must be maintained. Although these problems have a kind of common sense clarity to them, this report will emphasize that their nature and magnitude vary greatly from one disaster to another. Thus disaster-caused needs can never be automatically assumed.

The avenues of disaster response also extend far beyond the immediate emergency and short-term rehabilitation phases. Recovery is a general term used to refer to longer-term responses to disaster, including attempts to mitigate any long-term direct or indirect effects of the disaster and to restore normal conditions to the community. Although statistical data on the long-range effects of disasters are quite scarce, these effects appear to be of growing concern to the international community. Especially in the developing countries, the losses from natural disasters may substantially offset real economic growth.[3]

[3] For example, the office of the United Nations Economic Commission for Latin America (ECLA) in Mexico has estimated that in the five countries in the Central American Common Market, disaster damage has averaged 2.3 percent of the gross domestic product in the 1960-1974 period. This figure does not take into account the indirect effects, such as the higher incidence of certain diseases, nor many small events, such as limited floods, which, taken in the aggregate, reach major proportions.

The distinctions among various time phases of disaster are admittedly arbitrary, but each of them captures different sets of disaster-caused demands, each implies different types of activity, and each suggests alternative roles for international disaster assistance. Although certain of these demands presently receive greater attention than others from the international community, there is no simple logic or empirical evidence that dictates clear, unequivocal priorities for international disaster response. Thus the appropriate roles for different groups and organizations and the priorities for international disaster assistance should be openly analyzed and debated.

Although Table 1 provides only aggregate figures, the number of public and private organizations that contribute to international disaster assistance is in the hundreds. Thus the United States is only one participant among many although the dollar value of its assistance is quite large. It should be noted that historically the *largest number* of U.S. government disaster relief operations have been in response to disaster agents that have rapid onset (e.g., earthquakes, tropical cyclones, hurricanes, and river floods), but the *largest amount of money spent* by the U.S. government has been for conflict disasters (e.g., civil strife or civil wars) and for the so-called creeping disasters (e.g., droughts and famines). In the past 15-20 years the volume of international disaster assistance and the number of participants have greatly expanded. Some of this expansion has undoubtedly resulted from the large amount of publicity directed to a few major disasters in the past several years in which the widespread suffering of victims has been dramatized. However, as we shall indicate in several ways in this report, the increased international attention devoted to disasters cannot be explained solely by the identification of victim needs in a few major disasters. The U.S. presence has grown, but so has that of other governments, voluntary agencies, the United Nations, and other international and regional organizations. Thus 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. Response to these needs creates 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.

A key set of problems centers on the delivery of external goods to the impacted country during the emergency period. Drawing on both the case materials referenced in the bibliography of this report and the considerable experience of the Committee members and staff, the following are illustrative difficulties that occur repeatedly: (1) goods irrelevant to disaster-induced needs arrive in large amounts; (2) relevant goods arrive but in insufficient quantities; (3) relevant goods arrive but their quantities are far in excess of actual needs; (4) goods that are unlabeled and unsorted arrive, and they are

therefore difficult to distribute and use; (5) goods arrive concurrently from several nations, creating congestion at transportation facilities; (6) the inadequacy of internal transportation and distribution systems delay the delivery of needed external goods; and (7) there is no systematic evaluation of the logistics of delivery or use of goods and services provided.

These problems derive, in part, from the lack of adequate damage and needs assessment data during the emergency period, combined with perceived pressures to act quickly. They are also the result of the diverse number of public and private groups and organizations participating in assistance activities. In any major disaster, this diverse involvement virtually guarantees problems of coordination among international donors and between the donors and the disaster-stricken society. 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. Nor can one assume that both offers of and requests for external assistance are guided purely by humanitarian motives. The Committee cannot document the extent to which the seeking or offering of assistance is politically motivated or competitive. However, we believe that the present pattern of international disaster assistance has elements of both competition and cooperation and that both selfless and selfish motives operate. These opposing tendencies are difficult to unravel and frustrating to deal with.

As noted at the beginning of this chapter, both technical problems and value issues are involved in making decisions to respond to a foreign disaster. Improvements in this decision-making process will require the more effective utilization of scientific and technical knowledge by the agencies that actually carry out international disaster assistance operations. There is an obvious need to identify more clearly those problems toward which scientific and technical information can be fruitfully applied. However, improvements in decision making will also require a clarification of the value issues involved. Value premises obviously affect the decisions on what, where, when, and how foreign assistance will be rendered, and these decisions, in turn, establish the framework for determining feasible applications of scientific and technical information. The following types of value and policy questions thus need clarification: Which of the many disasters that frequently occur throughout the world merit outside interest, attention, and involvement? What criteria should be used to guide a decision to render external assistance? Should the decision be based on the magnitude of the impact? On the request of the nation affected? On what the country can do for itself? On what other donors might do? Who should coordinate the assistance activities that come from donor countries? Should the United States, other donor nations, and the United Nations pay greater attention to predisaster problems of prevention and preparedness and also to postdisaster problems of reconstruction and development? Both these value questions and the problems of applying sci-

entific and technical knowledge to the decision-making process will be addressed in subsequent chapters of this report.

We conclude this introduction by making several basic value premises explicit. 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 and 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 international disaster assistance should be conditioned not only by the intensity of impacts and the vulnerability of human settlements, but also 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.

Chapter 2

History of the United States Foreign Disaster Relief Program

Early History

The United States has provided disaster relief to foreign countries since the beginnings of the nation. Although disaster relief has usually come from a variety of private groups, the first recorded governmental involvement came after an earthquake in Venezuela in March 1812. Even though Congress was then preoccupied with the War of 1812 with England, it passed "An Act for the Relief of the Citizens of Venezuela" soon after receipt of news about the quake. It authorized the President to purchase goods up to $50,000 and to tender these to Venezuela in the name of the government of the United States. This act, however, did not set an immediate precedent. On several occasions Congress defeated foreign disaster relief bills on the grounds that the Constitution did not give Congress power to use public funds for foreign relief. On several occasions, however, Congress did allow naval vessels to be used to transport private gifts of food to countries suffering famines.

From the beginning of the nation to the close of the nineteenth century the bulk of disaster relief was provided by nongovernmental agencies. Each disaster was handled on an *ad hoc* basis with little formal connection with previous relief activities. A major foreign disaster was usually followed by public meetings in the United States, sponsored by chambers of commerce, boards of trade, and business firms. At such meetings speakers pointed out the consequences of the latest disaster and special collections were taken. Bazaars, musicals, and theatrical productions were organized. Donations of food were solicited from farmers and millers. Americans were asked to respond to the needs of the disaster victims across the seas. Of particular importance during this period was the development of the foreign missionary movement supported by permanent church organizations. The movement raised funds not only for its own religious activities, but also for disaster relief and for displaced persons.

A second period of American overseas philanthropy, from the Spanish-American War to the end of the 1930's, was characterized primarily by a greater magnitude of giving.[1] High-level government officials, such as the

[1] See M. Curti, *American Philanthropy Abroad: A History* (New Brunswick, New Jersey: Rutgers University Press, 1963).

President, often issued appeals for disaster assistance. Many disasters evoked major responses. Great interest was shown in the Cubans caught in the last phase of their struggle for independence from Spain. The earthquake in Sicily and Calabria in 1908 stimulated large voluntary donations, as did the floods in France in 1910. Throughout this second period the Red Cross was particularly active. The Red Cross also initiated efforts aimed at disaster prevention. In 1911 an engineering survey was made of the Hsai area of China, with a view toward developing flood control measures in that area. This effort was delayed by the start of World War I.

During this period the U.S. government frequently provided transportation for the voluntary goods donated for foreign disaster relief. In some disasters it also provided funds to the governments of the stricken countries. President Theodore Roosevelt requested government aid for Martinique and St. Vincent in 1902; he also provided transportation for goods privately donated. Also during this period several new nongovernmental agencies, such as the American Jewish Joint Distribution Committee and the American Friends Service Committee, came into existence and began to develop a cadre of trained administrators and field-workers in various relief activities.

Toward the end of the 1930's efforts were made to encourage coordination among several agencies concerned with disaster assistance. Then, in March 1941, a Presidential committee was appointed to review public relief for warring countries. Coordination efforts were accelerated during World War II, when the federal government increased its control over the activities of the nongovernmental agencies that were aiding victims of the war. The President's War Relief Control Board was given the power to coordinate the activities of fund-raising agencies, thus giving the government a wider role than ever before. After World War II a member of the War Relief Control Board proposed some continuation of this coordination effort, which resulted in a Presidential directive to establish the Advisory Committee on Foreign Aid. In a related development after the war, the American Council of Voluntary Agencies for Foreign Service was organized as a clearinghouse for private agencies involved in foreign assistance. Although disaster relief comprises only one of its activities, the Council has developed channels of communication with private and public organizations involved in foreign disaster response.

The developing mixture of governmental and nongovernmental efforts is further evidenced by the activities of the Cooperative for American Relief Everywhere (CARE), Inc. CARE initially took shape as a cooperative organization concerned with unsnarling the complexities of sending private donation packages to Europe. When CARE learned that the U.S. government was ready to declare some army food as surplus, it sought to have the food channeled through its member organizations for shipment and distribution to other countries. This pattern was expanded when government agricultural surpluses became available in 1949. Coordination also characterized efforts of

other sectors of nongovernmental agencies. In 1946 the Church World Service became the first fully unifying instrument for overseas relief and reconstruction in the history of American Protestant and Jewish Orthodox churches. The growth of this organization was paralleled by the development of Catholic Relief Services. While still maintaining many of their traditional individual programs, these church agencies cooperated with other groups and with governmental bureaus in a wide scope of activities, which included disaster relief. The cooperative efforts between governmental and nongovernmental agencies was not without some degree of strain. Religious groups were sometimes reluctant to enter into some types of activities, fearing violations of church-state relationships and wishing to avoid a close identification with some programs specifically oriented to political purposes. Government agencies were often suspicious of religious groups, fearing they might use goods for other than immediate humanitarian purposes. Disaster relief, however, was often a common meeting ground, because disaster-induced needs were "obvious" and did not contain many political or religious overtones.

Recent History

As the previous section has indicated, efforts within the United States to provide disaster relief to foreign countries have existed from the very beginnings of the nation and have involved many different groups and types of assistance. This segment of Chapter 2 examines the recent developments of the U.S. government foreign disaster relief program, which was formally organized in 1964.

Structural Development of the Program

The Office of Foreign Disaster Assistance[2] in the Agency for International Development was established to coordinate the diverse and often contradictory forms of emergency disaster assistance within AID and the Departments of State, Defense, and Health, Education, and Welfare. For several years the staff assigned to the Office to administer the program was quite small relative to the magnitude of tasks to be accomplished. Dealing with a wide range of disasters, the disaster relief program has been primarily concerned with one time phase in the disaster process—the emergency period (defined by the AID as a 60-day period following the disaster declaration). Although the largest number of U.S. government disaster relief efforts have

[2] Although the name of the office was changed from Disaster Relief Coordination (DRC) to Foreign Disaster Relief Coordination (FDRC) to OFDA, we will use the present title. A more detailed history written by Stephen Tripp is on file in the office of the NAS-NRC Committee on International Disaster Assistance.

been in response to natural disasters, the greatest percentage of U.S. government disaster assistance expenditures in the past has gone to civil strife and civil war. The Office has made significant progress toward a coordinated national response at the same time that international interests have been working toward a coordinated international response.

The actual work of developing the disaster relief program was delegated to Stephen R. Tripp, who had previously been with the Latin American Bureau of the Department of State. In 1965 Tripp became Foreign Disaster Relief Coordinator. Over the years the disaster relief program was attached to different units in the AID, such as the Office of Material Resources within the Office of Voluntary Foreign Aid, the Office of Private Resources in 1968, and the Bureau for Population and Humanitarian Assistance in 1971. Eventually the Office became independent and became known as the Office of Foreign Disaster Assistance. The AID Administrator in 1976 was appointed the President's Special Coordinator for Foreign Disaster Assistance, and the head of the AID/OFDA was ordered to report directly to the Administrator. This arrangement has been continued with the present AID Administrator, and the Director of the AID/OFDA has been given the additional title of the President's Deputy Special Coordinator for International Disaster Assistance. The present Director is Ms. Ann Martindell, who was appointed in June 1977. The Office presently has four operating subunits: the Office of the Director, with three professionals and four support staff members; the Operations Division, with seven professionals and two support staff members; the Planning Division, with three professionals and one support staff member; and the Technical Assistance Branch, with two professionals and one support staff member.

The functions of these operating subunits are as follows: The Office of the Director is involved with policy development, overall direction of the Office and representation to the Congress, the private sector, foreign governments, and international organizations. The Operations Division directs needs assessment and relief operations during disasters. The Planning Division develops contingency planning concepts, conducts state-of-the-art studies, and maintains computer and other information systems. The Technical Assistance Branch develops preparedness planning and training concepts for transfer to foreign nations, coordinates U.S. with other international training programs, and conducts an annual International Disaster Preparedness Seminar.

Over the years Congressional committees and government officials have discussed the location of the disaster relief program within the AID and the State Department; some officials maintained that the disaster relief program would be more appropriately located in the Department of Defense or in the Department of Health, Education, and Welfare. The following reasons have been given to support the present location of the AID/OFDA: (1) the financing and administering of disaster relief falls within the foreign assistance

mandate of the Department of State; (2) with its worldwide system of embassies and AID missions, the Department of State has the organizational and political mechanisms to assess disaster-induced needs and to administer aid; (3) the Department of State is sensitive to the foreign policy goals of the United States and is intimately involved in the international political arena; and (4) both the AID and the Department of State are staffed with personnel having the cross-cultural knowledge and skills necessary to relate well to the social, political, and cultural sensitivities of disaster-stricken societies.

Present policy and procedures for disaster relief, as set forth in the AID *Foreign Disaster Assistance Handbook*, have evolved from the organizational groundwork of 1964-1965; at that time the first coordinated and directed system for responding to requests for disaster relief was developed. The initial effort to establish a coordinated U.S. disaster relief system was widespread; the development of the system involved many contacts with government officials (in the Departments of State, Defense, Commerce, and Health, Education, and Welfare; in the National Oceanic and Atmospheric Administration; in the U.S. Geological Survey; and in AID itself), representatives of voluntary agencies (particularly the American National Red Cross), and representatives of international organizations. During the time this system was being organized the staff was heavily engaged in foreign disaster response. The development of disaster assistance guidelines was therefore influenced by actual events and the accumulation of operational experience in responding to a wide variety of foreign disasters. Although high-ranking officials in the State Department and the AID were interested in and verbally supportive of these efforts, the additional personnel required to facilitate the proposed actions were not provided. The initial staff consisted of the coordinator, a temporary secretary, and the part-time assistance from AID personnel awaiting reassignment. As late as 1970 there were only five employees on the AID/OFDA staff—the coordinator, three operations officers, and a secretary.

Initially, the Disaster Relief Coordinator was given latitude to develop the emergency operations program and to carry out relief actions. Gradually authorization was given for the Coordinator to make expenditures up to $100,000. Although this $100,000 authority was recalled after the AID/OFDA was made a part of the Bureau of Population and Humanitarian Assistance (PHA), there was little difficulty for the AID/OFDA to obtain approval for expenditures up to this amount. When the AID/OFDA became independent in 1976, the authority to commit up to $2 million was delegated to that office. Amounts above that sum required and still require advance approval from the AID Bureau of Program and Policy Coordination (PPC) or from the Administrator.

From 1964 to 1971 actions were initiated via verbal requests, and approval and funding documents were issued later. The Coordinator in the Department of Defense (DOD), for example, initiated and directed DOD units to conduct

emergency relief operations based solely on telephoned requests from the AID Disaster Relief Coordinator, who provided funding numbers and amounts. The practice at that time was not to issue written procurement requests to the DOD. Cablegrams on anticipated actions and costs sent to the AID Missions in foreign countries were considered sufficient by the AID/PPC and Controller and by the DOD. Procurement of commercial tents, blankets, and other supplies was initiated by telephone, and appropriate purchase orders were prepared and sent through proper AID channels after the fact. Bills of lading were always issued for the use of commercial aircraft. The informality of these procedures was sometimes questioned, but speed of response was considered paramount; an accounting of the items procured and their costs was kept by the AID/OFDA and was included in disaster memos and case studies. Procurement and contracting procedures had become formalized by 1972; they are now specific items in the AID *Foreign Disaster Assistance Handbook.*

The development of AID Mission guidelines for disaster response merits some attention. In October 1964, the AID issued the first *Manual Orders* relating to foreign disaster relief. These *Orders* provided the AID Missions with specific policy directives and procedural instructions for administering foreign disaster relief operations. An important provision of the *Manual Orders* was the authority given to a U.S. Chief of Diplomatic Mission[3] to expend up to $25,000 for disaster relief. The discretionary use of this $25,000 enabled a Chief of Mission not only to express the U.S. sympathy and concern for the disaster victims but also to back it with a tangible gift of money or other resources. It should be noted, however, that the Foreign Service Act, until amended in 1966 and 1968, prohibited assistance to countries in the Sino-Soviet bloc as well as assistance to the economically developed nations. The *Manual Orders* were revised in 1968 to reflect the AID/OFDA authority to commit on its own larger sums for a disaster, to assign documentation and control of disaster funds to the AID/OFDA, and to provide more flexibility for activities in rehabilitation and disaster preparedness.

The AID Mission Directors[4] were at first reluctant to base disaster response actions on the *Manual Orders.* They also generally ignored the request that a Mission Disaster Officer be designated, because the assignment of disaster relief duties to staff members at the time of a disaster was believed to be sufficient. The idea that predisaster training for Mission personnel would be useful received little positive response. However, as the disaster response from Washington evolved and received commendation from the Department of State and the AID, this response improved somewhat. In 1965 the Disaster

[3]The term "U.S. Chief of Diplomatic Mission" refers to a U.S. Ambassador, Charge de Affairs, or Principal Officer in a foreign country.

[4]The term "AID Mission Director" refers to the head of AID within a U.S. Diplomatic Mission abroad.

Relief Coordinator took part in the direct training of Mission personnel by participating in the AID orientation program for new AID officers assigned to foreign posts. He also participated in the public safety and regional meetings to discuss disaster relief functions and the requirements for an effective response. The AID/OFDA staff had consultative meetings with AID Mission Directors and encouraged AID Mission personnel who were returning to Washington to visit the Office for a discussion of potential disaster problems in the host countries.

In 1973 the AID instructed all elements to rescind the *Manual Orders* and replace them with handbooks. This gave the AID/OFDA staff an opportunity to add to the handbooks sections covering recent policy and procedural changes and to expand the sections in the Mission guidelines covering disaster response operations, coordination, disaster preparedness, reporting, procurement, and surveys and assessments. The AID/OFDA first issued the *Foreign Disaster Assistance Handbook* in November 1974.

The AID/OFDA International Disaster Assistance Fund ($25 million per year) and special appropriations for specific disasters are the primary sources for financing U.S. disaster relief operations. This fund contains provisions for stockpiling of disaster-relevant goods, training foreign disaster relief personnel, and supporting disaster research.

Since its inception the primary emphasis of the AID/OFDA disaster assistance program has been directed to the problems of short-term emergency relief. Disaster prevention, preparedness, and prediction were historically considered to be functions that should be handled internally by each nation. However, the Office began to assume some responsibility for training disaster relief officials in foreign countries to prepare for and to reduce hazards in their own countries. The groundwork for such training was begun in 1967, when a disaster relief official from Jamaica came to the United States and spent 6 weeks training with the AID/OFDA and the American National Red Cross. This led to the development of the first International Disaster Preparedness Seminar for foreign participants held in 1969 in Washington, D.C. These 6-week seminars have been held each year since 1969, and over 125 foreign disaster officials from 35 nations have participated in them during that time. Since 1973 the seminars, together with in-country disaster technical assistance, have been administered by a separate unit of the AID/OFDA known as the Disaster Technical Assistance Branch.

In addition to disaster preparedness, the broader possibilities of utilizing science and technology to improve disaster relief were also recognized. Throughout the first 10 years the AID/OFDA attempted to accumulate scientific and technical knowledge on a variety of disaster relief subjects including hazard mitigation and preparedness, disaster prediction and warning, weather systems research, etc. However, until 1974 the Office was not sufficiently staffed to assign anyone to investigate the wide range of possibilities

for applying science and technology to disaster relief activities. The Office has defined several areas in which it hopes to make progress, such as the use of satellites and high-level aerial photography for hazard monitoring and damage assessment.[5]

Policy and Program Emphases

In the development of the program, certain emphases have emerged, sometimes as a result of specific policies and other times as a result of practice and experience. The AID/OFDA has responded to a wide range of disaster events, including civil strife. It has continued to work with and through nongovernmental agencies. Thus it has had to devote considerable attention to coordination with these nongovernmental agencies, as well as with other governmental units and with international agencies. Its primary emphasis has always been on assistance in the emergency period.

In general, foreign disaster relief has been seen as an expression of the humanitarian heritage of the people of the United States, although the enhancement of the U.S. image abroad has also been a motivating factor. Since 1964, when the Office was established, the AID/OFDA, the American Red Cross, other voluntary agencies, and the AID Office of Food for Peace have emphasized disaster assistance to victim populations. This motivation was usually evident in cases of natural disasters of the sudden-impact type (e.g., earthquakes, hurricanes, and floods). However, political considerations have played a major role in such man-made disasters as wartime conflicts and civil strife. Recent examples were civil strife problems in Cyprus in 1964-1965, the Dominican Republic in 1965, Nigeria in 1969, Jordan in 1970, and the Middle East during the Seven-Day War of 1967, to name a few.

A natural disaster usually stimulates the affected country and outside organizations to organize relief operations. Wars, civil strife, and "creeping" disasters (e.g., famines), on the other hand, often force people to take sides. This makes both the delivery and receipt of disaster assistance more difficult. Also the governments of the affected countries may refuse to admit that human suffering exists within their geographic boundaries. As a result, the United States, other nations, voluntary agencies, or even international organizations may not be permitted to assess relief requirements or to provide assistance to the victims.

During the period 1965-1975, 60 percent of the U.S. assistance for disaster relief went to countries suffering from civil disturbances, other internal political problems, and wars. Disaster assistance to Bangladesh alone has accounted for about 25 percent of all U.S. government disaster relief expenditures since 1970; this assistance began in 1970 in response to a devastating

[5]For example, high-level U-2 aerial photography was used for damage assessment purposes in the Guatemala earthquake of 1976.

cyclone that was followed by a protracted civil war with Pakistan.[6] The United States can do little to prevent civil strife and internal conflicts. However, sometimes it can influence relief operations. For example, in the Nigerian-Biafran civil war[7] the United States encouraged and supported the International Committee of the Red Cross as it brought pressure on the combatants to give attention to civilian victims. It also encouraged other nations to assist the victims through international organizations. The United Nations, the International Committee of the Red Cross (ICRC), the League of Red Cross Societies (LICROSS), and Joint Church Aid (JCA) have in the past been accepted organizations for reaching victims of these types of disasters.

The original AID *Manual Orders* contained a restriction against a cash grant to any international organization that regularly received annual contributions from the United States. Exceptions were made, however, and the precedent for cash grants to the Red Cross and other voluntary agencies to carry out relief operations was established in 1964-1965 with a $15,000 grant to ICRC for the victims of the internal conflict in Cyprus. The UN at that time did not have an established role in the disaster field. The AID *Foreign Disaster Assistance Handbook* now states specifically that cash grants may be made to international organizations that have the capability and willingness to undertake a comprehensive disaster assistance program. The program includes, but is not restricted to, responses to civil disturbances and wars.

It is difficult to assess the overall effects of the expanded U.S. government program on other donors of disaster relief. For example, during the past 20 years the proportion of total U.S. assistance provided by the government has increased from about 15 percent to 85 percent. This fact has been noted by AID on a number of occasions. Although a portion of U.S. government assistance is channeled through the voluntary agencies, particularly in politically sensitive situations, the U.S. government has clearly become a major bilateral donor in the world, providing government-to-government assistance and committing substantial internal funds to cover transportation and logistics costs. The U.S. military is particularly important in this regard because of its worldwide network of bases and disaster-relevant resources.

Although more than 400 voluntary organizations in the United States are doing foreign disaster assistance work, only a few have had the type of disaster relief capabilities (e.g., access to U.S. food surpluses, ongoing worldwide programs, organizational arrangements in other countries, and personnel with disaster relief expertise) that would justify a "contractual" relationship. The U.S. government tends to work with the group of voluntary agencies that

[6]U.S. government expenditures for the Pakistan cyclone of 1970 were more than $16 million; relief expenditures in the Bangladesh civil war (through September 1972) totalled $296 million.

[7]U.S. government relief expenditures in the Nigerian-Biafran civil war of 1968-1969 were just under $66 million.

have those capabilities and characteristics. One should not conclude, however, that there has been a diminution of nongovernmental disaster assistance. In general, the total volume of U.S. disaster assistance, both public and private, has expanded greatly. The growth of U.S. disaster assistance has also been accompanied by a similar expansion of aid rendered by voluntary agencies in other countries, other governments, and international organizations.

Regardless of the type of disaster or the level of societal development, matters of sovereignty, pride of country, and demonstrations of self-reliance and responsibility are very important considerations in disaster response. In many instances they stimulate positive consequences in dealing with the problems induced by disaster. In other instances, however, they manifest themselves in the form of sensitivity to and suspicion of the motives of other countries or agencies that are offering disaster assistance. Even when local resources or actions are inadequate, outside aid may be resented.

Although the U.S. government has on occasion provided its assistance for civil strife disasters only through international organizations, it has usually carried out its own disaster relief operation at the same time. Other countries have also taken this approach. Beyond the initial response to civil strife disasters, the AID/OFDA has had only an advisory role, and in this role the AID/OFDA has influenced the nature and extent of the U.S. government contribution. The critical decisions, however, have been determined by Department of State officials and sometimes by the Chief Executive, based both on long-range foreign policy goals and on the desire to help victims on both sides of the conflict. Once these decisions have been made, the AID/OFDA has coordinated the emergency relief operation. The international and domestic reactions to the U.S. provision of direct relief in civil strife disasters have not always been favorable.

The U.S. government has little control over the spontaneous outpouring of relief supplies from private U.S. citizens. Supplies are often collected throughout the United States without regard to what is needed, to the climate of the disaster-stricken country, or to the customs of the stricken populace. The U.S. government is then pressured to provide air transportation. If turned down, some of these groups manage to provide their own transportation of goods to the country, and the goods often accumulate in large quantities at the airport or otherwise clog local transportation systems in the stricken country. This kind of unstructured response hinders relief operations and causes intense logistical problems.

A U.S. government plan to coordinate this spontaneous outpouring of disaster relief was inaugurated during the Honduras hurricane of 1974. The plan was developed by the AID/OFDA staff in cooperation with the American National Red Cross, other voluntary agencies, the Defense Civil Preparedness Agency, and the offices of the state governors. The plan establishes an organizational mechanism for direct communication between the AID/OFDA

and the state official responsible for disaster preparedness and relief (usually the civil defense director for the state or the director of emergency services). When news of a foreign disaster reaches the AID/OFDA, a cable is sent to each of the state coordinators (with a backup message sent via the civil defense communications network), informing them of the occurrence of the disaster and the requirements for relief supplies in the disaster-stricken country. The coordinators, in turn, transmit this information to the news media in the state. In the absence of any firm request for material goods, the public is encouraged to make cash donations to the voluntary agencies operating in the disaster-stricken country. When material goods are requested the state coordinators meet with the voluntary agencies and supervise the process of collecting, sorting, and shipping the donated goods to a designated port of embarkation. Since the Honduras hurricane this organizational mechanism has been used in several major disasters, including the Honduras hurricane of 1974, the Guatemala and Italian earthquakes in 1976, and the Mexican hurricane of 1976. The AID/OFDA staff have credited it with easing the problems connected with the spontaneous and informal donations made by citizens and numerous voluntary groups.

Although the U.S. Chief of Mission in each country can provide up to $25,000 of disaster aid on his own authority, assistance above that amount requires the approval of the AID/OFDA. The AID/OFDA can make financial procurement and transportation arrangements for airlifting to stricken countries such commodities as medical supplies, emergency food, tents, blankets, mattresses, clothing, coats, cooking utensils, water purification tablets, vitamins, stoves, and, occasionally, air and land vehicles and other transportation equipment. The services of disaster relief officers, physicians, and epidemiologists can also be provided if conditions warrant.

In addition to rescue and relief during the emergency period, short-term rehabilitation assistance may also be provided for up to 90 days after the emergency period. The materials provided can include tools for restoring agriculture, seeds, hand-operated cement block-making machines, cement and roofing for rebuilding homes, and equipment and materials to rebuild damaged roads, bridges, embankments, irrigation systems, and wells. Such rehabilitation, however, has been designed only to restore conditions to a predisaster level.

The guiding principle of the AID/OFDA has been to give only those goods and services that are actually needed by disaster victims. However, adhering to this principle is not often easy: The assessment of disaster damage is highly subjective; the identification of needs is not precise; different groups, both domestic and international, often pressure the U.S. government to act immediately; and other groups pressure the government to provide specific goods and services that are often unrelated to the needs of the disaster victims.

Because of the emphasis on immediate assistance, the assessment of damage and the identification of disaster-induced needs pose continuing problems. The U.S. Missions and the disaster-stricken country frequently have not had the resources to make dependable assessments of damages and needs. The AID/OFDA was reluctant to use U.S. military personnel to assess damage because it was believed that they might not be accepted in a disaster-stricken country; still, the decision was made to try this technique. One of the first disasters in which a Military Disaster Assessment and Survey Team (DAST) was used was the El Salvador earthquake of 1965. That experience demonstrated the need for better training of the DAST teams and for closer ties with the AID/OFDA. It also demonstrated that these teams should be used primarily, if not exclusively, to assess damage and needs rather than becoming involved in the actual relief effort.

In a related development, the AID/OFDA conducted a feasibility study of stockpiling such commonly needed items as blankets, cots, tents, cooking utensils, and watercans at AID locations close to the countries likely to need disaster assistance. The AID/OFDA was able to establish a stockpile when an agreement was reached with the Department of Defense in 1967 to store limited quantities of the above supplies in Panama for use in Latin America. This initial pilot operation worked well; it has been continued. From 1973 to 1975 three additional stockpiles were established at Guam; Leghorn, Italy; and Singapore.

Efforts have also been made by the AID/OFDA to improve coordination among governmental agencies and between the U.S. government and voluntary agencies. In 1964 the Departments of State, Defense, and Health, Education, and Welfare were asked to appoint coordinators to work with the AID Foreign Disaster Relief Coordinator. By the latter part of 1964 each of these departments had designated specific people to serve as coordinators. The efforts to obtain needed goods and services then became less complicated. The Department of Defense became the primary source for the procurement and delivery of initial emergency supplies. As the rapport between the DOD and the AID coordinators developed, many beneficial precedents for expediting operations and improving relief efforts were set. Cooperation with the Department of Health, Education, and Welfare grew rather slowly, but it improved immeasurably in 1966, when the Department assigned a senior health official to work part time with the AID/OFDA on disaster-related health problems. Later the health officer was detailed to work with the AID/OFDA on a full-time basis. The Department of State coordinator facilitated the work of the AID/OFDA by providing necessary guidance in those disasters where political considerations affected the type of assistance offered and the way in which relief aid was administered. This arrangement continued until 1968, when this coordination was arranged more directly with the appropriate Department of State officials in regional bureaus.

Steps were simultaneously taken to improve coordination with voluntary agencies. In 1964 the AID/OFDA initiated direct contacts with the AID Advisory Committee on Voluntary Foreign Aid and with the registered agencies involved in foreign disaster relief. Meetings were held to exchange information and ideas and to discuss problems. Voluntary agencies were placed on the AID/OFDA mailing list to receive Disaster Memos and Alerts, as well as summary reports, and in return they sent copies of their reports to the AID/OFDA. At this time the American Council of Voluntary Agencies for Foreign Services, Inc., established a disaster committee. Sometime later mailing lists were expanded to include such international organizations as the International Committee of the Red Cross, the League of Red Cross Societies, various United Nations agencies, and the World Council of Churches. Occasional contacts were also made with representatives of other donor countries.

U.S. AID/OFDA and the Office of the United Nations Disaster Relief Coordinator (UNDRO)

These efforts at coordination by the AID/OFDA are only part of a very complex picture, since they focus primarily on U.S. governmental and nongovernmental groups. In most major disasters around the world, the United States is only one of many nations that respond. This shifts the coordination problem to a global level at which the United States is only one participant. Much of the effort at improving coordination must therefore take place at the international level.

A variety of recommendations have been offered to improve the coordination of international disaster relief. In the case of nations receiving disaster assistance, improved disaster relief planning and the development of more formalized coordination systems branching from the national level to local levels have been recommended. For international donors, the recommendations have included incremental efforts to improve exchanges of information; planning for *ad hoc* but flexible umbrella organizations based on common types of services and relief management systems; the creation of regional and international mutual aid agreements that are tied to international humanitarian law; and the establishment of a single, centralized international coordination agency that would organize knowledge and funding efforts and establish an international disaster relief distribution system. The latter recommendation pertains especially to the efforts of the United Nations to develop an international coordinative mechanism for disaster assistance and relief. This part of the chapter focuses on the United Nations program because of the similarity of many of its activities to those of the AID/OFDA and because the U.S. government has provided considerable financial support for the United Nations disaster assistance program. The coordination of U.S. and UN efforts is particularly important.

Following the outbreak of civil strife in East Pakistan (now Bangladesh), the United Nations passed a resolution that established the Office of the United Nations Disaster Relief Coordinator (UNDRO) in 1972. The general mandate of the UNDRO is: (1) to mobilize and to coordinate international disaster relief; and (2) to promote predisaster planning and preparedness. UNDRO is authorized to engage in a broad range of pre- and postdisaster activities of the following types:

1. Mobilize, direct, and coordinate the relief activities of the various United Nations agencies in response to requests for assistance.
2. Coordinate United Nations disaster assistance programs with those of other foreign assistance groups and organizations.
3. Accept contributions offered to the United Nations, the purpose for which is disaster relief.
4. Provide assistance to disaster-stricken countries in assessing damage and needs.
5. Evaluate priorities of disaster-induced needs, disseminate disaster-relevant information to international donors, and serve as an information clearinghouse for assistance extended or planned by all sources of external assistance.
6. Promote the scientific study, prevention, control, and prediction of natural disasters.
7. Provide technical assistance to governments on disaster mitigation, preparedness, and planning.

UNDRO's financial support came primarily from voluntary donations, but efforts have been made to transfer certain costs from voluntary funding to the regular budget of the United Nations. As in the case of the AID/OFDA, the UNDRO began its operations with a very small staff of professional and support personnel. However, in November 1974 the United Nations authorized an expansion of UNDRO's staff to 41 professionals, and since that time staff size has increased appreciably. UNDRO also draws on the staff of the United Nations Development Program (UNDP). In effect, UNDRO has made arrangements for the UNDP resident representatives to act as liaisons within developing countries for both preparedness and relief programs. The UNDP resident representatives are located in more than 100 developing nations.

By the spring of 1977 UNDRO had provided relief efforts for approximately 80 disasters, had directly allocated approximately $1 million in relief assistance, had dispensed about $27 million in cash from various international donors, and had reportedly saved donors $1.5 million in air freight costs by obtaining space available on commercial carriers and using government-owned-and-operated aircraft. It had also carried out technical advisory functions in 20 countries, had developed a "World Survey of Disaster Damages"

(the data are now being analyzed), and had disseminated numerous publications on disaster prevention, preparedness, and response. UNDRO inaugurated a permanent disaster coordination center on November 24, 1976, in Geneva. The center is to serve as a central information exchange during disasters. It is equipped with multiple telephones and telex facilities and has a computer terminal link to the United Nations International Computer Center at Geneva.[8]

The United States has publicly encouraged and financially supported the development and improvements of UNDRO. In addition to bilateral disaster relief, the U.S. government provided supplies, equipment, transport, and approximately $30 million through the United Nations during the civil strife in Bangladesh. The Department of State and the AID have, in turn, publicly supported the improvement of UNDRO[9] and provided funds specifically allocated to enhance UNDRO's capabilities.

In summary, the United States has long been involved in foreign disaster relief, and this involvement has usually included a mixture of governmental and nongovernmental activities. Much of the early foreign disaster relief provided by the United States was handled on an improvised basis by numerous voluntary religious and charitable organizations, but the U.S. government interest and participation has increased strongly in recent years. The pattern of cooperation between the government and voluntary agencies that was developed in handling relief aid to the victims of World War II has been continued and expanded.

A major effort to provide greater order and coherence to the U.S. program of foreign disaster relief was begun in 1964, when the AID Office of Foreign Disaster Assistance was established. In the intervening 13 years, the Office has coordinated the U.S. response to nearly 500 foreign disasters throughout the world. During this time the Office has sought to rationalize and improve the U.S. organizational mechanisms of response by instituting and refining various policies, programs, and procedures. It has formalized the disaster response procedures used by the U.S. Diplomatic Missions throughout the world. It has developed new domestic and international coordinative mechanisms with U.S. governmental and nongovernmental agencies, with other donor nations, and with international organizations. It has initiated disaster preparedness planning programs through its yearly International Disaster Preparedness Seminars and by giving direct technical assistance to other nations. It has established

[8]See United Nations Disaster Relief Organization, *UNDRO Newsletter*, 3 (May 1977), pp. 1-2.

[9]See Department of State and AID commentary in the following recent government reports: Reports to the Congress by the Comptroller General of the United States, *Need for an International Disaster Relief Agency* (Washington, D.C.: U.S. Government Printing Office, May 1976); and *Observations on the Guatemala Earthquake Relief Effort* (Washington, D.C.: U.S. Government Printing Office, August 1976).

stockpiles of disaster-relevant commodities and has undertaken other measures to speed the process of delivering commodities and services to disaster-stricken nations during the emergency and rehabilitation phases of disaster. It has undertaken efforts to apply science and technology to the problems of foreign disaster preparedness and relief problems. As will be noted in detail later, the Office has instituted various internal planning efforts to improve its operational capability, including a relatively comprehensive, computer-based management information system. And it has assisted the United Nations in the planning and establishment of the Office of the United Nations Disaster Relief Coordinator in Geneva.

Chapter 3

The Concept of Disaster: Implications for an Improved Policy on International Disaster Assistance

At a superficial level, providing assistance to a foreign country struck by disaster appears to be a simple problem that has a direct and easy technological solution. The typical scenario, often presented with great clarity by the mass media, is as follows: A disaster strikes and its effects are easily recognizable and measurable. The impact has destroyed life-sustaining resources that must be replaced immediately. Therefore, these resources—primarily food, shelter, medicine, and clothing—need to be provided as quickly as possible. The rapid transfer of these resources is most easily provided by industrialized societies because they have the excess resources and the complex technology to be of immediate assistance. The motivation for the transfer of needed resources is humanitarian.

The imagery in this scenario permeates thinking about disasters generally, but the reality of disasters is far more complex. Disaster agents are diverse and have diverse impacts, only some of which are easily observable. Actual impact depends in part on the nature of the hazards and on the vulnerability of human settlements. Some agents do not dramatically affect individual victims. Replacement resources often can be quickly reallocated within the affected society. Some assistance intended for developing societies may require technological support not locally available. The countries that provide disaster assistance in order to fulfill their own standards of "accountability" may organize distribution systems that are inconsistent with the patterns of culture and social organization in the disaster-impacted societies. The motivation for disaster assistance may be political rather than humanitarian, and this motivation may disappear after the political needs have been satisfied, even though the needs of the disaster victims have not been clearly identified or fulfilled.

In the light of the simplistic views of international disaster assistance, it is necessary to develop a perspective that more adequately reflects the complex realities of this subject. The perspective developed in this and the next chapter will be used to assess the present program of the AID/OFDA and to provide a context for understanding the Committee's recommendations. Prime concern in this chapter will be given to the various meanings that have

been given to the word "disaster" and to the problems of defining objectives for international disaster assistance.

It should be noted at the outset that the extent of systematic research on the social, economic, and political dimensions of foreign disasters is extremely limited.[1] As a result, little codified knowledge exists on the ways in which different societies and cultures deal with disaster problems. Moreover, existing knowledge of the performance of international donors is largely based on piecemeal evidence and donor organization reports characterized by insufficient detail and biased evaluations.

Definitions of Disaster

The term "disaster" has acquired different meanings. The differences in meaning and usage become particularly important in international disaster assistance, when agencies in a nation with one cultural tradition react to a disaster in another nation with a different cultural tradition.

Four different meanings have historically been assigned to the term disaster. The first refers to disaster *agents* that have the potential for creating unfavorable changes within the environment. Thus disaster refers to such agents as earthquakes, tornadoes, fires, etc. The second meaning refers to the *physical impact* of the agent—the resulting property damage and loss of life. Different types of agents have different impacts, and similar agents may have quite different impacts, depending on geographic location and other factors. The third meaning refers to the *social impact* created by the physical impact. The social organization of human settlements may be disrupted at different levels—family, community, region, or nation. The fourth meaning refers to the *evaluation* of the physical and social impact. Similar impacts will be defined differently by different segments of the community or by those outside the community, because they use different standards for evaluation. The problem is not solved by arbitrarily setting standards, but by understanding how the standards have been developed.

These four meanings of disaster are closely related but not identical. The disaster agent is not the same as the physical impact, and agents have different impact effects. Some agents have a minimal effect on human life, but they produce major physical and structural damage. Physical impact is not equivalent to social impact because some communities can suffer extensive physical damage without necessarily disrupting the society. Each of these four meanings of the term "disaster" is discussed further in the following sections.

[1] This point is well documented in the recently published monograph by D. S. Mileti, T. E. Drabek, and J. E. Haas, *Human Systems in Extreme Environments: A Sociological Perspective* (Boulder, Colorado: University of Colorado, Institute of Behavioral Science, 1975).

Disaster Agents

In order to deal with the concept of disaster, one accepts that an undesired effect on certain environments has been produced by something referred to as a disaster agent. No classification of these agents is without problems, but it is useful to distinguish four types of environment that may be impacted by disaster agents: (1) the geophysical environment, (2) the biophysical environment, (3) the sociotechnical environment, and (4) the social system itself. The first type encompasses the "natural" hazards (e.g., earthquakes, tornadoes, and floods), which can fundamentally change the physical character of inhabited areas. The second type refers to those agents that affect the human organism by creating ill health (e.g., disease) or by reducing physiological functioning (e.g., famine). The third type refers to those agents whose impacts vary with level of technology (e.g., oil spills, power blackouts, pollution, explosions), suggesting that various technologies can themselves become serious hazards. The fourth type refers primarily to acts of collective aggression that emerge within (e.g., civil strife) or between (e.g., war) nations.

Variable Characteristics of Disaster Agents The agents themselves differ in their frequency, predictability, controllability, cause, speed of onset, length of forewarning, duration, scope of impact, and disruptive potential.[2] Any attempt to classify such variable characteristics of disaster agents inevitably leads to the conclusion that every agent has both unique and common characteristics. Although the general task of systematically comparing and measuring these characteristics across a wide range of disaster agents remains to be completed, it is clear that there are some common characteristics shared by various types of disasters. For example, tornadoes, flash floods, and explosions share the common characteristics of relatively short forewarning periods, rapid onset, and short duration of impact. Hurricanes and earthquakes also share the characteristics of rapid onset and short duration of impact; but hurricanes are currently more predictable and the combination of initial quake and its aftershocks in an earthquake may create repetitive and cumulative impacts over a prolonged time period. These latter characteristics of earthquakes are also common to such disaster agents as fire, storms, civil strife, and war.

Until the systematic comparison and measurement of these characteristics improve, little more can be established about their interrelationships in different types of disasters and the different effects that these characteristics produce on disaster-struck communities. It can be argued that "natural" disasters should be distinguished from "man-made" disasters for purposes of isolating relationships among these characteristics. Currently the measurement poten-

[2]For a thorough discussion of these characteristics, see R. R. Dynes, *Organized Behavior in Disaster* (Columbus, Ohio: The Ohio State University, Disaster Research Center, 1975), pp. 50-82.

tial is perhaps greater for "natural" disasters (e.g., earthquakes, floods, tornadoes, droughts, hurricanes), but all forms of hazards pose problems in measuring the effects of disaster agents on human populations. These problems are discussed in greater detail in the remainder of the report.

Differential Vulnerability of Communities

The ultimate effect of any disaster agent depends not only on the characteristics of the agent, but also on the differential vulnerability of various human settlements threatened by it. A historical examination of human settlements reveals, unfortunately, that much habitation has been located in areas of relatively high risk. Human settlements frequently are established at points where there are breaks in the modes of transportation, and these breaks have frequently been at fords on rivers or at river mouths and harbors in coastal areas. The settlements located close to particular geophysical risks have usually persisted in spite of the risks. Such communities, once established, tended to attract more population and to become centers of technological development. These new and complex technological systems, in turn, produced a whole new series of sociotechnical risks. The development of technology offers the potential for mitigating the effects of certain disaster agents. But some of these mitigation measures reduce minor threats while increasing major ones. For example, flood control measures may eradicate or reduce the hazards of frequent minor flooding but may increase the damage from the more infrequent massive floods that occur every 50 or 100 years. This increased risk occurs because the lands previously uninhabited are now occupied and have become subject to the less frequent but more destructive floods.

Not all areas within established communities are equally subject to the risks of disaster. Some segments of the population—usually the wealthy or those with more resources—avoid high-risk areas, which then are populated by the poor or those with fewer resources. The subsequent risks from these hazardous areas then rest more heavily on those segments of the population least able to cope with them.

Physical Impact

Frequently, the term "disaster" is used to refer to the physical impact of various disaster agents. One could argue, however, that impact is usually considered in terms of its effect on human settlements rather than its effect on sparsely populated or unpopulated environments. There are tornadoes that touch the ground in sparsely settled rural areas and create much physical damage. These tend to be reported and then to be ignored as having minimum impact. Sometimes an agent may be very severe or intense, but its "impact" is

less if it does not cause injuries or deaths in a human community. For example, the 1906 San Francisco earthquake and the 1923 Kwanto earthquake in Japan are well known, since they occurred in major population centers, but the New Madrid, Missouri, earthquake of 1811, which was probably of higher magnitude and intensity, is almost unknown because the area that was primarily affected by that quake was very sparsely settled and, consequently, there were few human casualties.

The notion of impact seems to be relatively straightforward—i.e., that some disaster agent has an effect (an impact) and that the changes occasioned by this impact can be determined by a simple inventory, called "damage assessment." The term "impact" is appropriate for those geophysical hazards that have rapid onset and high destructive potential for physical structures; but it may not be the most appropriate designation for the consequences of a wide variety of disaster agents. It is least appropriate for biophysical agents, whose effects are slower, cumulative, and less spectacular.

One further problem with the notion of impact is that it implies that somehow the agent all at once creates a fixed set of problems. This is not accurate. Agents activate a series of changing demands upon the community; thus different groups and organizations have different problems at different times. Powell has identified a number of stages in a disaster: *predisaster conditions*, which largely determine the effects of the response to the disaster agent; *warning*, which triggers precautionary activity; *threat*, which prompts survival action; *impact*, the period in which the disaster strikes; *inventory*, which leads to a diagnosis of the situation, e.g., damage assessment and decisions on immediate action; *rescue*, which is spontaneous, local, and usually unorganized action; *remedy*, which consists of organized and professional relief, medical care, preventative, and security measures; and *recovery*, which involves individual rehabilitation and community restoration.[3]

The various stages described above suggest that, for different areas, for different organizations, for different families and individuals, the "same" impact may begin and end at different times. For example, a weather service may begin its involvement with the first weather cue picked up on its monitoring system but end its involvement after a warning message has been issued. In the "same" situation, a governmental agricultural agency may start six months after actual impact to insure that certain crops are planted and not end its involvement until two years later.

Even if the effect of certain disaster agents is dramatic and perhaps obvious, this does not mean that an "impact assessment" is easy to make. Assessment is predicated on the availability of adequate information concerning the preimpact status of the community as well as on the rapid collection of

[3]See J. W. Powell, *An Introduction to the Natural History of Disaster* (College Park, Maryland: University of Maryland, Disaster Research Project, 1954), pp. 13-21.

information concerning the changes that occur as a result of the disaster agent. Many difficulties develop as a result of: (1) the lack of preimpact data, (2) difficulties in collecting postimpact data, and (3) cultural and organizational biases in the assessment process.

1. *Lack of Preimpact Data* Adequate information relating to the preimpact status of communities is seldom available in usable form in industrial societies and is even less available in developing societies. For example, information concerning the status of various buildings in most American communities is likely to have been collected by different administrative units and will vary considerably in completeness. Existing records may not be appropriate for inventory purposes because they were developed for purposes other than for establishing baselines for damage assessment.

Other types of necessary information may be far from complete. Probably no society has an up-to-date evaluation of the current health status of the general population. However, current health records may exist for that segment of the population in institutions, such as school children, prisoners, and persons in hospitals. Modern societies possess many different sources of information relating to various segments of the society, but such data are usually collected for purposes other than for their use as a baseline to determine disaster change and impact.

2. *Difficulties in Collecting Postimpact Data* Difficulties in collecting postimpact data can derive from the inability to gain access to impacted areas in order to engage in reconnaissance, from the disruption of the usual means of communications, from the relocation of potential informants, from the destruction of prior records, and from other sources. There are also difficulties in ascertaining the proper reporting units, particularly with a disaster agent that creates a diffuse impact. Data are usually collected according to political subdivisions, but disaster agents seldom follow similar political lines. The difficulties in developing adequate impact data can be illustrated by comparing several different data sources on any major disaster. Unless the same sources are quoted, the variation is likely to be quite dramatic.

3. *Organizational and Cultural Biases in the Assessment Process* Accurate information concerning impact may have no relationship to the postdisaster behavior of many emergency organizations. One might expect that accurate damage assessment would be essential in determining the tasks that need to be done and the resources to accomplish them. In the extensive research on emergency operations by community organizations within American society, one rarely finds examples of organizations that initiate systematic attempts to assess damage and needs prior to engaging in concerted action. The more typical pattern is for the organization to commit its resources to the most visible task within its capabilities and then to modify its

operations when other tasks become obvious. Also a considerable length of time usually elapses before different emergency organizations meet to pool their respective information concerning damage assessment and begin to establish collective priorities.[4]

In addition to local emergency organizations within impacted communities, many external organizations may also provide disaster assistance. The role and image of these organizations is usually enhanced if they can show that they have very large, complex tasks to accomplish. This allows such organizations to increase their funding, either from public appeals or from other sources of support. Consequently, higher estimates of damage are often accepted without question, and lower estimates are increased—they are often doubled or tripled—to take into account "unknowns."

The problem of assessment is also complicated by differing cultural standards of value. As an example, individuals from developed societies may be impressed with disaster-induced losses to the industrial capacities of a foreign country, while individuals within that country might place a much greater value on providing food, energy, and fertilizer for agriculture. Unless one is familiar with a particular country's existing cultural tradition and standards of valuation, one tends to attribute universality to one's own standards.

Impact in Relation to Existing Resources

A major problem in damage assessment results from the fact that *lack* of damage is seldom reported. Disaster damage is virtually never total; some areas in and near the impact zone may be totally unaffected, and, thus, resources may exist nearby that may be utilized in disaster relief. Mass media reports about disasters tend to overlook this fact because they concentrate on damage and not on resources that are still available. In an industrial society, adequate food, medicine, clothing, and housing resources usually still exist within an "impacted" community after a disaster, so that no additional resources are immediately necessary to deal with emergency problems. Even though the level of stored resources within developing countries may not allow the same comfortable margin, the same situation would probably pertain in many disasters occurring in developing countries.[5]

[4] For a review of domestic disaster research, see Dynes, *op. cit.*, Chapters 3–7. See also A. A. Barton, *Communities in Disasters: A Sociological Analysis of Collective Stress Situations* (Garden City, New York: Anchor Books, 1970).

[5] For example, in one major earthquake in a developing country, six different medical units were dispatched to the impact scene by almost as many countries, although the earthquake had done no damage to the 16 hospitals within the community. These hospitals were able to deal with the disaster-related medical problems that emerged without the need for outside help. The medical units were dispatched because it was assumed that local facilities were damaged while, in fact, the people with injuries could be adequately handled by the available undamaged facilities. See U.S. Department of the Army, *After Action Report: Managua, Nicaragua, 1972* (Fort Clayton, Canal Zone: United States Southern Command, 1973).

Response-Generated Impact

A problem in assessing property damage and disaster-induced needs occurs because such assessments are usually confined to the specific demands or problems generated by the disaster agent; they usually ignore the more general demands or problems created by the act of responding to the specific demands. These more general demands include such problems as communication, continued assessment of the emergency situation, and coordination and control. To warn people requires communication and coordination. To restore essential services requires the mobilization and utilization of human and material resources. These sets of general demands or problems are less often seen as a part of the impact, and they do not often appear in disaster response plans, as contrasted with the almost certain listing of agent-generated problems.[6]

Disaster relief officials tend to overlook the more abstract processes of response demands. Everyone can understand, for example, that 400 bodies may have to be buried, but establishing priorities so resources can be mobilized is not as easily perceived. This problem is reflected in disaster response planning and in the actions of operational personnel. Disaster relief personnel often fail to agree on response-generated demands. They might agree that a water supply to an impacted area should be restored, but the need for coordination may not be understood. Coordination is likely to be seen by one official as involving centralized decision making and by another as keeping others informed, at one's own convenience, about the independent actions of one's own organization. Obviously, planning and operations are much easier to relate to anticipated agent-generated demands than they are to response-generated problems. However, the solution of these latter problems is likely to be of far greater importance in postdisaster situations. For example, inadequate rehousing efforts may create greater social and psychological damage than did the loss of housing after the disaster agent struck.

Social Impact

Another meaning of the word "disaster" refers to social impact. This meaning is captured in the often-quoted definition by C. E. Fritz that a "disaster is an event concentrated in time and space, in which a society, or a relatively self-sufficient subdivision of 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 society are prevented."[7] This definition is useful, as it shifts the meaning

[6]This point is discussed in R. R. Dynes, E. L. Quarantelli, and G. A. Kreps, *A Perspective on Disaster Planning* (Washington, D.C.: Defense Civil Preparedness Agency, 1972).

[7]See C. E. Fritz, "Disaster," *Contemporary Social Problems*, R. Merton and R. Nisbet (eds.) (New York: Harcourt, Brace, and World, 1961), pp. 651-694.

away from the purely physical aspects to an emphasis on the human community; but such a definition contains problems that do not simplify the determination of social impact. Some of these problems can be identified here. Some communities in high-risk areas develop so-called disaster subcultures, a set of cultural defenses to deal with recurrent dangers. These disaster subcultures include norms as to how threats are to be perceived and how warning cues are to be interpreted and a technology on how to respond. Thus, such communities on a routine basis are able to deal with agents that previously and in other communities would be considered "disastrous." There are disaster subcultures in the southern and southwestern coastal areas of the United States subject to hurricanes and in the midwestern areas subject to tornadoes. Such subcultures also characterize other parts of the world, which experience these and other types of recurrent disasters. This suggests, of course, that disaster agents of the same intensity would have different social impacts, depending on the characteristics of the communities affected. Thus the intensity of physical impact cannot be simply translated into the intensity of social impact.

Social disruption may take different forms. For example, the impact of a geophysical agent like an earthquake might be disruptive because it produces sudden anticipated losses of human and physical resources. The disruption from the impact of a biophysical agent (e.g., a famine) arises from the slow deterioration of human energy, which, in turn, may have a subtle but cumulative negative effect on the economic institutions. These effects could not be identified at a particular point in time, but would have to be determined by reference to earlier baseline data on the health and economic status of the community. In addition, the nature of disruption would vary, depending on whether the agent leads to civil strife and similar disturbances or to natural or man-made disasters. Civil wars, riots, and student disturbances tend to faction rather than to unite communities and societies. Natural disasters, as well as those produced by technological agents, tend to produce community agreement on the meaning of the situation, the appropriate norms and values, and the priorities that should be followed.

Social disruptions can occur on several different levels, such as the individual, group, and community. Existing research suggests that individuals, groups, and communities are much more resilient than is usually assumed.[8] The point of greatest impact is likely to be at the community level, particularly in situations created by diffuse disaster agents. Such agents tend to affect many different social groups within the community. Many of these groups are unlikely to have been engaged in predisaster planning, so that the adaptive changes that they are required to make are unplanned.

[8]See Fritz, *ibid.*

Evaluation

This meaning of disaster points to the processes whereby physical and social impacts become identified and defined as being "disasters." It should be obvious from the previous discussion that neither social nor physical impact is self-evident nor sufficient to produce a "disaster." Within any given society two events with similar impacts may be evaluated quite differently. In addition, similar events in two different societies are likely to be evaluated differently. The primary focus here will be on the evaluation process in foreign disasters.

The basic problem addressed is how unfavorable changes in the environment come to be defined as disasters. A disaster impact does not carry its own meaning; the meaning must be constructed and shared. Perhaps the best way to approach the problem is to indicate the various social, psychological, and political conditions that are likely to lead to defining an impact as a disaster. The conditions that are likely to be important include the following:

1. Those impacts that are sudden and focalized are more likely to be defined as disasters than those that have slow onset and diffuse impact. For example, an earthquake in an urban area is more visible than an epidemic in a rural region.

2. Those impacts that occur within clearly identifiable social and political units are more likely to be defined as disasters. If members of a social group are affected by disaster, other members feel a sense of responsibility for them and are likely to express concern. This same situation applies to political units. The fact that low-status groups, people on the periphery, and other groups outside the mainstream of political and social life may be ignored or neglected is manifested in the frequently documented neglect of refugees, peripheral groups, nomadic tribes, and other groups that exist on the fringes of political units.

Political units may, of course, try to underestimate the damage from a disaster agent so that the impact will not be defined as a "disaster." In some societies impacts that occur in parts of the nation that are regionally, tribally, and politically separate are likely to be ignored. In addition, impacts are sometimes treated as of little account for fear that other nations might interpret the occurrence of disaster as a sign of internal political failure. Disasters occurring in Communist countries have frequently been made light of because the countries do not wish the disaster to be interpreted as failure of the political system. Likewise, impacts in one region of the nation may be ignored because future negative economic consequences are feared. For example, in resort areas in the southern part of the United States, the travel industry tends to gloss over the risk of hurricanes because it fears that future tourist trade might be adversely affected by publicizing that risk. The social

and political units play an important part in the definitional process, having the potential both to minimize or to maximize a definition of disaster.

3. Those impacts that receive the attention of the mass media are more likely to be defined as disasters.[9] The communications media play a critical role in defining disaster—a role that transcends political and social boundaries. The importance of the media in the definitional process derives in part from their internal characteristics. Because of distance and inaccessibility, the larger national and international communities depend heavily on the mass media for information and for evaluations of the meanings of various events. The various types of media (e.g., newspapers, radio, and TV) compete with one another to get the news first; competition also occurs within media types (e.g., between radio stations and TV networks).

The news media usually concentrate attention on the unique and the dramatic. Pictures are always taken of damage but not of remaining community resources. Interviews usually focus on dramatic but atypical experiences.

The news media coverage often provides people outside the impacted area with the only available information of the effects of the disaster. Officials of agencies located outside the impacted area usually have to make some determination of the meaning of such events in order to handle their own organizational responsibilities. For many organizations, participation in disaster response provides an opportunity for service, while nonparticipation may lead to charges of nonresponsiveness and future withdrawal of organizational support. Involvement by one agency has a cumulative effect on others, and increasing organizational involvement enhances the definition by others of the seriousness of the event.

The whole process is also enhanced by the activities of organizations far removed from the impact scene. These organizations may initiate action solely on the basis of mass media reports. This rapid involvement may prompt action by local and regional officials, since it heightens their perception of the significance and seriousness of the event.

The result of these processes is usually to exaggerate the impact of those agents having sudden onsets. That exaggeration leads to increased organizational involvement, resulting in the convergence of outside aid, which, in turn, increases the overall social impact. On the other hand, the news media occasionally play an important role in identifying agents with slow onsets (e.g., droughts and famines) because their definition of impact evokes public sympathy, which, in turn, results in pressure to assist the victims.

4. Those impacts that occur in societies that have strong ethnic, religious, cultural, and political ties to potential donor countries are more likely to be

[9]This pattern is documented in a recent study of the Sahel drought. See J. W. Morentz, *The Making of an International Event: Communication and the Drought in West Africa* (Ph.D. Dissertation, University of Pennsylvania, 1976).

defined as disasters. The problem here is to determine what types of impacts in developing countries are likely to evoke the attention and aid of developed countries. In general, the stronger the cultural ties between the areas, the greater the attention that will be given. Several different kinds of ties can be identified and, for illustrative purposes, the following examples will focus on the United States as a donor country.

a. *Ethnic Ties* In the United States, immigration over the centuries provided ethnic populations from many parts of the world. Many of these populations still retain an interest and concern for their "homeland." These ties are maintained by visits and other forms of contact with relatives still in the "old country," by reading books and newspapers from these countries, and by membership in ethnic organizations, etc. Such ethnic groups have a sensitivity to the problems within the homeland and often wish to help in times of need.

b. *Religious Ties* Because Christianity has been a religion with strong missionary efforts, many Catholic and Protestant groups have had long and continuous ties to particular parts of the world. These ties also transcend political boundaries.

c. *Cultural Ties* Many of the ethnic and religious ties also take on a broader cultural connotation. American Jews often exhibit a concern for other Jews, whether they be in the Soviet Union, Iraq, India, or Israel. American Arabs express a concern for the Arab and Islamic worlds. American blacks often express a special concern for Africa. Ex-colonial countries tend to show special concern for former colonies, and Americans often demonstrate special sensitivity toward those countries (e.g., the Philippines and Panama) with which the United States has had long-standing relationships. Historically, the United States has shown a special concern for western European countries.

d. *Political Ties* Many of the concerns are channeled through long-standing political alliances and more contemporary ideological blocs. The United States, for example, has always shown a concern for the non-Communist world through such alliances as NATO and SEATO. As an extension of this, particular attention is given to nonallied nations, particularly if interest in these nations is expressed by other power blocs.

These various ties are activated in several different ways. Particularly in the United States, they provide the basis for forming various voluntary organizations to represent the interests of the members. These organizations furnish both personnel and monetary forms of assistance, and they also form lobbying groups to influence governmental action. In effect, they become surrogate members of the impacted society as they attempt to convince others within the donor nation of the merits of their causes.

In summary, it is obvious that no one definition is able to capture the full range of phenomena that have been traditionally included under the rubric of "disaster." The overall meaning involves the idea that some agent produces a change in the environment by creating possible physical and social impacts. That change has to be defined as unfavorable by the victims, other groups, or by political and administrative units. That definition depends, in turn, on the particular interests and values that characterize the group or organization.

Toward the Development of an Improved Rationale for International Disaster Assistance

From the previous discussion one can see that international disaster assistance involves a complex economic, social, and political process. This complexity, however, should not be used as justification for the failure to develop an overall rationale for U.S. government actions. The AID/OFDA presently does not have a clear statement of objectives that links assistance activities to precisely identified problems. The multiple objectives of international disaster assistance are seldom explicitly stated and compared, and the problems to which assistance is directed are chronically ill-defined. The historical pattern has been one of multiple and competing objectives, of discontinuity between vaguely defined problems and concerted activity, and of a disturbing lack of accountability for the actions taken by international donors.

In general, the Committee believes that the fundamental purpose of international disaster assistance should be to respond to the needs of disaster victims that cannot be fulfilled without outside help. This suggests that response should be conditioned not only by the intensity of impacts and the vulnerability of human settlements, but also by the capability of the affected community to respond to its disaster-generated needs. Both pre- and post-disaster assistance should complement the internal resources and disaster-related activities of the recipient country.

The needs of potential or actual disaster victim populations is only one possible frame of reference for evaluation. A variety of other frequently stated objectives may be of equal relevance to one constituency or another. For example, another objective of international disaster assistance is to further the foreign policy goals of bilateral donors. Another is to meet the administrative requirements of responding only under certain conditions to vaguely defined categories of problems and to particular time-phases of disasters. Another is to exhibit visible action in the face of domestic pressure to do something during well-publicized disasters. Thus the goal of meeting victim needs is inevitably tied to other concerns.

It is not the intent of the Committee to develop a specific listing of objectives for the AID/OFDA. The Office itself must meet that requirement.

The Committee can, however, identify certain questions whose answers would lead to a more consistent rationale. Therefore, the Committee suggests that the AID/OFDA consider the following issues in developing an explicit rationale for the U.S. government program:

1. What types of disasters should be included in a U.S. program of international disaster assistance? Should a 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 types of aid are 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., the replacement of road-building 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 that then solicits contributions from the international community? Do affected countries have the right to refuse assistance, particularly if donor countries still perceive unmet needs?

6. What is the proper mix of private and governmental assistance on the part of donor nations? At issue here are the relations between individual

donors, voluntary organizations, and the national government. Should the national government in the donor nations act as a collection agency and a provider of transportation for private donors? If so, does a donor government have the right to determine what is to be provided? Should donor governments restrict their aid to the fulfillment of societal needs, leaving private donors to provide for individual needs? Should donor governments only supplement the assistance rendered by private donors?

7. How should international disaster assistance be delivered? Is the responsibility of donor nations simply to collect and transport types of aid to the affected countries, letting the recipient nation distribute the aid? Do donor nations have a right to insure that the donated goods and services are distributed and used in conformity with their own standards and policies for administering disaster assistance programs?

8. How should international disaster assistance be coordinated? Is a donor country responsible only for coordinating the activities of its own donors? Should a donor nation allow the affected country or some international agency to act as the focus of coordination? Does coordination at the international level conflict with the national political motivations, which are often inherent in international assistance?

Chapter 4

Information Requirements for Pre- and Postdisaster Assistance

This chapter has two basic purposes: (1) to discuss the data requirements for pre- and postdisaster response; and (2) to examine current information collection and usage practices at the AID/OFDA. The stated objective of the AID/OFDA's international disaster assistance program is to respond to the needs of disaster victims. The following discussion details the serious problems of defining and measuring these needs and shows that the pursuit of this objective involves both pre- and postdisaster information requirements.

Data Requirements for Disaster Response

The Committee has identified four key types of information related to international disaster assistance: (1) hazard analysis, (2) vulnerability analysis, (3) disaster-relevant resource analysis, and (4) assessment of agent impact and victims' needs.[1] These information requirements have relevance to the entire range of pre- and postdisaster problems, and they should be of concern to all agencies prepared to respond to disaster-generated problems. Their interrelationship can be simply illustrated. Hazard and vulnerability analyses are directly related to problems of disaster mitigation and preparedness. However, data gleaned from these analyses are also of potential use in measuring disaster impacts, which, of course, dictate short-term response modes. Furthermore, the importance of measuring disaster impacts is not exclusively tied to the immediate emergency period. The effects of disaster have both long-term and short-term dimensions, and their measurement is a necessary component of both recovery activities and subsequent hazard and vulnerability analysis. Thus the conceptual framework for evaluating disaster response must be broad, and the effects of short-term emergency response must be viewed in relation to their long-term consequences.

The largest number of U.S. government disaster relief operations have been in response to natural disasters. The conceptual framework provided in this chapter has as its greatest relevance to this type of disaster, and, in that sense,

[1] Selected references relating to information requirements for pre- and postdisaster response are included in Bibliography B at the end of this report.

this chapter is directed to what have previously been the more frequent and continuing operational needs of the AID/OFDA. However, the greatest percentage of U.S. government disaster assistance expenditures during the period 1965-1975 has gone to disasters involving civil strife and civil war; the vast majority of these expenditures are tied to two events: the previously mentioned civil wars in Pakistan (Bangladesh) and Nigeria-Biafra. Our discussions of hazard analysis and vulnerability analysis have little applicability to civil strife or civil war disasters. Our discussions of the analysis of disaster-relevant resources and the assessment of agent impact and victims' needs, while still clearly relevant, exhibit little appreciation of the tremendous operational problems presented by events of these kinds.

1. *Hazard Analysis* For purposes of this discussion, a hazard is defined as a potentially harmful condition whose existence and magnitude of occurrence can be expressed in probabilistic terms. Hazards analysis involves the collection and assessment of data on past or potential hazards in terms of their nature, causes, frequency, distribution, and effects. Although this section draws selectively from existing scientific knowledge about natural disasters to illustrate points of discussion, the primary purpose here is not to summarize the current state of knowledge regarding the entire range of disasters that confront humanity. Instead, this section deals in a generic sense with the basic methods and resources of hazard analysis as they relate to a rational assessment of disaster events and to decisions about how to respond to these events. For example, the implementation of realistic disaster prevention or preparedness measures is directly dependent upon the ability to evaluate hazards and to anticipate the occurrence of potentially harmful events. Thus the goals of hazard analysis are to understand the patterns of occurrences and the effects of past events and to predict the same for future events.

The emphasis here will be on natural disaster agents of geophysical origin, because the predictive potential of hazard analysis is presently somewhat greater for events of these types.[2] However, one should also note that hazard analysis has been applied to a variety of human activities and technologies, most often in an attempt to isolate risk-benefit trade-offs.[3]

An extensive list of geophysical agents might include tropical cyclones; tornadoes and severe local storms; river and flash floods; earthquakes; tsunamis; lightning-induced large-scale fires; weather-induced droughts, frosts, and freezes; volcanoes; landslides; avalanches; and coastal erosion. All of these

[2]See G. F. White and J. E. Haas, *Assessment of Research on Natural Hazards* (Cambridge, Massachusetts: The MIT Press, 1975).

[3]For a review of this literature, see A. J. Van Horn and R. Wilson, *The Status of Risk-Benefit Analysis* (Cambridge, Massachusetts: Harvard University, Energy and Environmental Policy Center, 1976).

geophysical agents produce disasters of varying frequency and intensity. Each represents a complex series of events, and many are highly interrelated. Tropical cyclones, for example, may include the effects of direct damage from high wind, as well as secondary effects in terms of storm surge and flooding. Similarly, earthquakes may cause direct damage due to ground shaking and secondary effects through tsunamis and landslides. Geophysical events may also work in combination, as in the case of forest and grass fires involving the coincidence of intense fire, wind, and lightning.[4] The major natural disasters of recent experience have resulted primarily from droughts, tropical cyclones, floods, and earthquakes.[5] Analyses of these various hazards are based on recorded data on the effects of relevant hazard criteria such as those cited above. A specific product of hazard analyses could be a map indicating areas likely to be hit hard by expected natural events. In the case of earthquakes, such a map may indicate zones associated with the estimated peak intensity of ground motion over a particular period of time. Long-term estimates of this kind are uncertain to a significant degree and, thus, are generally expressed in probabilistic terms.

Hazard analysis and hazard forecasting require large amounts of analytic data. For example, climatological studies require a long record of comprehensive and reliable data—the longer the period, the more accurate the analyses and forecasts. More specifically, a tropical cyclone emergency requires meteorological monitoring and real-time forecasting. Monitoring is carried out by collecting data from networks of stations that observe surface and upper-air conditions, by interpreting cloud pictures transmitted by satellite, and by using special facilities such as weather radars and reconnaissance aircraft. The requirements for forecasting are concerned with the intensity of the tropical cyclone, its direction and speed of movement, the expected place and time of landfall, the strength of the wind, the amount and duration of rainfall, and the probability of storm surge.[6] Earthquake hazard analysis requires data

[4]For general overviews of the event patterns of natural hazards, see A. E. Scheidegger, *Physical Aspects of Natural Catastrophes* (Amsterdam, Netherlands: Elsevier Scientific Publishing Company, 1975); B. A. Bolt, *et al.*, *Geological Hazards* (New York: Springer-Verlag, 1975).

[5]This point is documented in the AID/OFDA historical data files as well as by a number of global overviews of disaster events. One should note again, however, that the validity of much historical disaster impact data is questionable. See, for example, J. Dworkin, *Global Trends in Natural Disasters, 1947-1973*, Natural Hazards Research Working Paper No. 26 (Boulder, Colorado: University of Colorado, Institute of Behavioral Science, 1974). See also, E. K. Kroeger, "Disaster Management in Tropical Countries," *Tropical Doctor*, Vol. 6 (1976), pp. 147-151; J. H. Latter, "Natural Disasters," *Advancement of Science*, Vol. 25 (1969), pp. 362-380.

[6]See A. V. White, *Global Summary of Human Response to Natural Hazards—Tropical Cyclones*, Calgary Report No. 19 (Calgary, Canada: 22nd International Geophysical Congress, 1972). See also, World Meteorological Organization, *Quantitative Evaluation of Disaster Risks—Tropical Cyclones* (Geneva, Switzerland: WMO, 1977).

provided by seismographic-monitoring programs that can be expressed on maps depicting seismicity, seismic risk, faults, and geologic hazards. These are based on probability estimates developed from frequency analyses of historical data. Considerable recent interest has also been directed to earthquake prediction, although there is currently much uncertainty about both the form that scientifically credible earthquake predictions will take and when these predictions will be forthcoming.[7] However, earthquake scientists agree that, in order to develop a reliable earthquake prediction capability, a network of highly sensitive instruments must be deployed; these instruments are used to monitor precursors such as microearthquakes and fault movements, as well as the day-to-day activity of major faults.

From the above examples one can see that hazard analysis depends on large amounts of data, a variety of methodological tools, and scientific judgment. In both the study of the mechanisms of natural phenomena and the estimation of future hazard patterns, advances are largely dependent on the acquisition and processing of relevant environmental data. Expansion of the volume and quality of data resources is essential to the improvement and application of the present predictive methodologies. For most geophysical hazards the instrument records and historic records cover only a minute portion of the time scale of geophysical events. Furthermore, detailed data collection has been limited largely to the developed world. Most of the developing countries currently suffer from limited data resources and inadequate systems for monitoring and data collection.[8]

The data collection methods are available, but the collection and utilization of technical data to mitigate disasters is lacking. For example, the reduction of a potential natural disaster risk requires the mapping of the risk at appropriate scale. Such mapping must be based on some understanding of the mechanisms of the phenomena, the locations and intensities of past occurrences, and the characteristics of its past impacts on human settlements. These maps might include, among other things, location of floodplains, areas of wind exposure, areas subject to coastal flooding and tsunami run-up, active volcanoes, indication of slope instability, zones of earthquake risk, and avalanche risk. Ideally, such mapping should be carried out at scales appropriate to the size of the planning unit—i.e., the larger the planning unit, the higher the scale. Although the preparation of such maps is of value for many planning applications, only a small proportion of the land area of the earth is covered adequately by current maps, even at a scale appropriate for planning

[7]See Panel on Earthquake Prediction of the Committee on Seismology, *Predicting Earthquakes: A Scientific and Technical Evaluation—With Implications for Society* (Washington, D.C.: National Academy of Sciences, 1976).

[8]This point is noted in a recent article on the drought in West Africa. See R. Baker, "The Sahel: An Information Crisis," *Disasters*, Vol. 1 (April 1977), pp. 1-23.

at a national level.[9] Because the costs of hazard mapping are great, developing societies generally tend to place low priority on this activity.

Present methods of environmental data acquisition include direct observations, instrument observations (which are more or less elaborate according to the dimension to be measured), and satellite observations utilizing the most advanced technology for remote sensing of the earth's surface and atmosphere. New systems for data acquisition generally supplement rather than displace traditional or conventional systems.[10] The organization of data collection involves local informants; networks of observing stations; telecommunications; and data processing at national, regional, and world centers. For example, with regard to meteorological data, the World Weather Watch program of the World Meteorological Organization (WMO) in the United Nations attempts to integrate the various observation techniques. The program includes three basic components: a Global Observing System, a Global Telecommunication System, and a Global Data-Processing System. The primary objective of the World Weather Watch is to make available to each member of the WMO the meteorological data and related environmental data required both for efficient meteorological services and for research. The three basic systems are being steadily implemented as national and international resources permit. Meteorological satellites are already providing a wide variety of data for both operational and research purposes. The advances to be expected in satellite technology and the further development of techniques for the interpretation of satellite imagery will enhance the capabilities for monitoring and mapping natural hazards.[11]

The measurements of the physical characteristics of natural phenomena have direct implications for issuing warnings. For example, a tropical cyclone can be detected at an early stage of its existence, and its subsequent history can be monitored in satisfactory detail. Cyclones can therefore be forecast with a useful degree of accuracy and reliability. In the case of phenomena such as cyclones, a warning system is of obvious value and is indeed indispensable for effective action to prevent and to mitigate disaster. A tropical cyclone warning system has the added advantage of providing an early warning of the possibility of a flood and storm surge that may be produced by the

[9] See V. A. Hood, *A Global Satellite Observation System for Earth Resources: Problems and Prospects*, report from the American Society of International Law to the National Science Foundation, Monograph NSF-RA-X-75-014 (Washington, D.C.: National Science Foundation, 1975).

[10] See Committee on Remote Sensing for Development, Board on Science and Technology for International Development, *Remote Sensing from Space: Prospects for Developing Countries* (Washington, D.C.: National Academy of Sciences, 1977).

[11] See D. S. Simonett, "Possible Uses of Space Satellites for Disaster Warning, Monitoring, and Damage Assessment," *The Role of Technology in International Disaster Assistance: Proceedings of the Committee on International Disaster Assistance Workshop, March 1977*, Committee on International Disaster Assistance of the Commission on Sociotechnical Systems (Washington, D.C.: National Academy of Sciences, 1978).

cyclone. In addition, any warning system must include not only environmental monitoring but also the preparation and dissemination of forecasts and warnings. Thus any warning system must necessarily be tied to local observations and to the local transmission of warnings. Information about local forecasts and warning alerts will, of course, be useful also for nonlocal disaster assistance programs.

The theme that runs throughout this discussion of hazard analysis is the need for accurate information–information needed to make rational judgments in anticipation of or in response to disaster situations. That same theme will characterize the discussion of the other three areas–vulnerability analysis, disaster-relevant resource analysis, and assessment of agent impact and victims' needs. It should not be inferred from comments here that the Committee believes the AID/OFDA must be a comprehensive storehouse of integrated hazard analysis data. The Committee does suggest that the above kinds of data are of considerable importance to all the AID/OFDA programs. For example, the relationship of hazard analysis to the AID/OFDA technical assistance and planning programs is direct. Currently available techniques of hazard forecasting and analysis would be most helpful to developing countries; the AID/OFDA provides one possible mechanism for promoting and instituting various forms of technology transfer. Specifically relevant to this report is the fact that hazard analysis provides important information for impact assessment and is therefore relevant to the AID/OFDA's disaster relief program as well. Moreover, the Office has a developing computer data bank, and it seeks to use the data bank for planning, operations, and technical assistance. The Committee believes that the Office must first consider the information requirements for disaster response in an analytical sense and then determine what it can reasonably accomplish with its own information system. The aim in this chapter is to contribute to both of those endeavors.

2. *Vulnerability Analysis* Vulnerability is generally referred to as the second component of disaster risk and is defined as the susceptibility to loss of a population at risk when a hazard of a given magnitude occurs. Population at risk specifies the number and distribution of persons and physical structures exposed to a hazard. Vulnerability analysis involves the collection and assessment of data on population and structures at risk, including data on the performance of buildings and lifeline systems during previous hazard events. Thus hazard and vulnerability analyses must be viewed in tandem. The vulnerability of an object or a community should not be thought of as a unique value. Rather we might speak of a "vulnerability function" representing various risks for a range of natural phenomena. Hazard analysis is largely concerned with the study of natural events over which man has little control. Vulnerability analysis is concerned with the human response systems to natural hazards that 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.

Natural disasters are precipitated by natural events, but the actions of humans significantly aggravate the effects of natural disaster. Practices that degrade the quality of the environment contribute directly to increased disaster risk. Destruction of vegetal cover by overgrazing, deforestation, and urbanization dramatically increase the risk of destructive flooding and soil erosion. The apparent impact of these practices is subtle, but their effects may take a dramatic toll in loss and suffering.

The vulnerability of human settlements may be expressed in terms of probable future losses from natural disaster. These losses include death, injury, and damage to property, as well as secondary losses: economic loss from reduced commercial activity and loss of public revenues, of employment, and of services. Also, in the aftermath of disaster, there may well be medium- and long-term health effects, especially in vulnerable developing countries. Although more research into these long-term health effects is needed, one can see that any natural event that adversely affects water supply or crops will eventually affect the health of some of the population. Floods and storm surges may contribute to the pollution of wells and to the spread of disease. Destruction of crops or grain reserves will eventually be reflected in the deterioration of nutritional status. All of these factors increase vulnerability to a range of secondary losses. These secondary losses, which often greatly overshadow immediate losses, usually go unreported, although they are no less real for the disaster-stricken community.[12]

Vulnerability may be reduced by both temporary and permanent measures. Temporary measures are typically undertaken in response to disaster warnings based on forecasts of impending events. Temporary measures are often limited to evacuation and to attempts to reduce immediate property loss. Permanent measures to reduce vulnerability are based on long-term hazard analysis and may include nonstructural solutions, such as public education, environmental management, land treatment, reforestation, erosion control, tree breaks, wetlands preservation, coastal zone management, and land-use regulation, as well as structural solutions. In both the temporary measures of disaster preparedness and the permanent measures of disaster prevention there are two approaches to vulnerability reduction: avoidance

[12] A well-documented case is malaria in Haiti, following Hurricane Flora in 1963. That hurricane caused extensive damage to housing in Haiti–about 68 percent of the houses in the affected area were destroyed and most of the roofs were blown away. The disaster occurred during the course of an extensive malaria eradication campaign and flushed away the residual insecticide that had been sprayed on the walls of dwellings. A severe malaria epidemic, involving about 75,000 victims, developed approximately two months after the hurricane. Haiti's subsequent problems with malaria may have been in some way related to the occurrence of this hurricane. See M. F. LeChat, "The Epidemiology of Disasters," *Proceedings of the Royal Society of Medicine*, Vol. 69 (June 1976), pp. 421-426.

and resistance. Evacuation in the face of emergency and the recognition of hazard zones in land-use planning are two ways of avoiding the impact of disaster-causing events. On the other hand, emergency efforts at flood fighting and at providing structural reinforcement for buildings are actions directed to resisting the force of the natural event.

Analyzing vulnerability is an information problem, and the measurement of the vulnerability of a community or society to several types of disasters at any given point in time is extremely difficult. At the minimum, the following kinds of data would be required 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). Once again, however, it is important to distinguish between vulnerability to specific disaster agents and general conditions of vulnerability and need in any given society. For example, the lower the basic economic condition of a society, the more vulnerable it is to a wide range of physical, economic, social, and political crises. If a society has high mortality and morbidity rates, basic nutritional inadequacies, poor sanitation systems, insufficient food supplies and distribution systems, and poor medical care systems, that society is obviously vulnerable to a host of problems. And if that society is undergoing urbanization with insufficient economic growth, its cities face severe difficulties. Compared to these conditions, vulnerability to geophysical hazards such as earthquakes and floods becomes insignificant. Thus the primary issue is not the vulnerability to "disaster," but vulnerability in terms of the general level of societal development. However, response at that level would require a long-term development strategy rather than a short-term disaster assistance program.

In view of the need for an understanding of broad societal conditions, this section will illustrate the vulnerability to specific natural disasters with a brief discussion of physical structures and lifeline systems. Buildings shelter and support most human activities. Thus the prevention of building collapse also prevents much human suffering, the reduction of building damage greatly reduces property loss, and the continuous functioning of buildings supports emergency activities and encourages the return of normal economic and social functions. Natural events affecting buildings may be measured in terms of the added loads they imply. Earthquakes and extreme winds, for example, produce closely related dynamic loads and mobilize similar resistance mechanisms. Many natural events are characterized by increased lateral loading, lifting, or extreme vertical loading. Generally speaking, simple structures are built primarily to resist gravity; when subjected to strong forces in other directions, they fail. Much disaster damage can be eliminated through rela-

tively simple measures that tie the elements of buildings together: tie roofs to walls; tie walls to foundations; and tie together frames to resist lateral and lifting forces of earthquakes, winds, and floods. Concern for structural performance under the extreme loading conditions of natural events is not only limited to conventional buildings, but also relates to the improvement of disaster resistance in lifeline systems such as water, power supply, transportation, and communication systems. Although measurement is less well developed here, concern for the resistance of lifelines is acute, because, as extended network systems, they are more likely to be exposed to damaging natural events and because their failure is of potentially greater consequence than the failure of isolated structures.[13]

While the results of the scientific study of natural events may be applied universally, studies of vulnerability and social response to natural disasters are to a much greater extent confined to specific locations. Consider the case of building codes. In the developed countries, extensive engineering research has been carried out on the performance of buildings and facilities under natural hazard loadings. Sophisticated means of analysis and design have been developed. This work is to a large extend reflected in most recent design standards. However, it is generally restricted to sophisticated and expensive building types.[14]

The building types covered by existing building codes from the developed countries are of limited relevance to the developing world, where, during natural disasters, the great bulk of building-related fatalities have occurred in simple nonengineered structures, typically of adobe or other local construction. Social and economic factors affecting construction in developing countries include shortage of funds and materials; heavy migration of rural population to urban centers; rapid population growth; insufficiently developed communications, transportation, and distribution systems; shortage of skilled labor; and often low standards of workmanship.[15]

[13]For discussion of these topics, see W. F. Reps and E. Simiu (eds.), *Design, Siting, and Construction of Low Cost Housing and Community Buildings to Better Withstand Earthquakes and Windstorms*, prepared for the U.S. Agency for International Development by the National Bureau of Standards, Report No. NBS, BSS-48 (Washington, D.C.: U.S. Department of Commerce, National Bureau of Standards, 1974). See also N. J. Raufaste and R. D. Marshall, *Progress Report on Design Criteria and Methodology for Construction of Low-Rise Buildings to Resist Typhoons and Hurricanes*, prepared for the U.S. Agency for International Development by the National Bureau of Standards, Report No. NBS, SIR-74-567 (Washington, D.C.: U.S. Department of Commerce, National Bureau of Standards, 1974); R. V. Whitman, *et al.*, "Analysis of Earthquake Risk for Lifeline Systems," *Proceedings of the U.S. National Conference on Earthquakes Engineering* (Oakland, California: Earthquake Engineering Research Institute, 1975), pp. 377-386.

[14]See, for example, R. V. Whitman, *et al.*, *Methodology and Pilot Application*, Seismic Design and Decision Analysis Report No. 10 (Cambridge, Massachusetts: MIT, Department of Civil Engineering Report R74-15, 1974).

[15]One should note that considerable improvement of the hazard resistance of structures

Information gaps concerning vulnerability are particularly pronounced in developing countries. Many local materials or construction systems have not been studied scientifically. Their technical design parameters are therefore not known. Records of natural-event occurrences are not available in many regions. Even if the required data were available, the application of building standards to low-cost or low-income housing for disaster prevention purposes is a matter that requires considerable flexibility. The administrative costs are high. The development and implementation of building standards are costly; the greater the resistance of a structure to physical damage, the more costly the structure becomes.[16] Low-income groups in most developing countries can ill-afford the additional costs required for substantially increased structural strength to prevent houses from collapsing in the face of wind, water, or seismic shock.

The conclusion to this section is similar to the final comments about hazard analysis; namely, the Committee does not believe that the AID/OFDA should necessarily become a comprehensive storehouse of data on vulnerability. However, the above kinds of information are of direct relevance to all of the AID/OFDA disaster assistance programs. Given the potentially vast amount of information that can be generated, both the location of stored data and the distribution systems for its use become increasingly important issues—issues particularly timely because both the AID/OFDA and the UNDRO are attempting to develop centralized data-retrieval systems. For example, information on vulnerability that may be used in developing disaster mitigation and preparedness programs is to a large extent tied to specific countries or geographic areas. These uses suggest that the location of vulnerability data should be decentralized. However, both vulnerability and hazard analysis data are important for agent impact assessment and subsequent disaster response. Effective use of vulnerability and hazard analysis data in this context therefore implies ready accessibility to a centralized information system by groups within the affected country and also by international disaster response agencies.

3. *Disaster-Relevant Resource Analysis* Disaster response requires a broad range of human and material resources. Human resources are personal

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widely used in developing countries may be achieved by relatively simple measures. These include the horizontal bracing of certain types of roofs over adobe masonry houses, rational distribution of openings in shear walls, provision of adequate walls or frames to withstand concentrated seismic load action, reinforcement of critical areas susceptible to being overstressed, and strengthening of connections at critical joints. See Ranfaste and Marshall, *op. cit.*

[16]See, for example, R. D. Larrabee and R. V. Whitman, *Costs of Reinforcing Existing Buildings and Constructing New Buildings to Meet Earthquake Codes*, Seismic Design and Decision Analysis Report No. 28 (Cambridge, Massachusetts: MIT, Department of Civil Engineering Report R76-25, 1976).

skills and knowledge that can be utilized in organized responses to disaster-generated demands. Material resources may take the form of specific disaster-relevant items such as debris-clearance equipment or particular kinds of facilities, such as hospitals. Thus these resources are logically those that relate to either agent- or response-generated demands. Agent-generated demands include task areas, such as warning, preimpact preparation, search and rescue, care for the injured, restoration of essential individual and community services, protection against continuing threat, and maintenance of community order. Response-generated demands include problems, such as communication, continuing assessment of the emergency situation, the mobilization of human and material resources, coordination, and control.

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 the AID/OFDA have documented information on the capability of developing countries to respond to various disaster-generated demands. Two general information requirements in this regard have emerged: the first relates to the *level of disaster preparedness* in the disaster-stricken society, and the second relates to what might be referred to as the *general resource profile* of that society.

a. *Level of Disaster Preparedness* Level of disaster preparedness is not something that can be readily measured either quantitatively or qualitatively, and disaster research has yet to document precisely the utility of preparedness activity. For example, the existence of a disaster plan does not necessarily mean that the operational capabilities to carry out the plan also exist. Furthermore, there is no necessary relationship between the level of detail in a disaster plan and its usefulness. To the contrary, a cumbersome and out-of-date plan may do more harm than good. The more general point is that disaster planning must be seen as a continuous process rather than a completed product. Although level of preparedness is difficult to document, there are a number of relevant items of information that can be monitored.

First, citing the existence of national, regional, or local disaster plans is of little use, but specific descriptions of their contents gives some insight into the problems being considered. Second, the levels of hazard analysis and vulnerability analysis that have been completed in a society suggest an impetus to preparedness and should be documented as should any mitigation measures that have been taken. Third, standby emergency facilities and equipment (e.g., emergency operations centers and specialized communications equipment) should be recorded wherever they exist. All of the above represent specific dimensions of societal preparedness that outside responding agencies should be aware of in organizing their own responses. However, since preparedness is a constantly changing process and must be reasonably continuous to be effective, it logically follows that the monitoring of that process

should also be sustained. In the case of the AID/OFDA, this suggests the necessity for regular contact between its technical assistance staff and officials in developing countries, so that information about preparedness can be updated. This information should form the basis of a detailed and integrated written assessment of societal preparedness that becomes a part of the basic preparedness profile of the country.

A fourth preparedness information item relates to disaster experience. Although communities experiencing repetitive emergencies have not been systematically studied, there appears to be some consensus in the literature that disaster experience involves a learning effect that may contribute to preparedness.[17] Disaster experience would include such indicators as the frequency of disasters and disaster threats and aggregate measurements of previous agent impacts. The logic is that certain events may represent a disaster for one community, but not for another because of the second community's considerable experience with repetitive emergencies. The disaster impacts may be similar and the societal and community characteristics may be similar, but the ability to cope may still vary substantially. However, one should note that the interpretation of this learning effect is generally couched as a societal and cultural adjustment to an event whose magnitude is anticipated. Experience can also provide a false reference for future preparedness requirements, because predicting the occurrence and magnitude of future events on the basis of past experience involves uncertain probabilistic judgments.[18]

A fifth preparedness information item suggests that time has a diminishing effect on the level of disaster preparedness when there has been no intervening disaster event. For example, the occurrence of disaster often leads to a flurry of planning activity, but these efforts noticeably weaken with time when no new threats or impacts from disaster actually occur. This same planning is also tied to a particular experience and may be only partly generalizable to other events. Thus the historical timing and patterning of events are important sources of preparedness data as well.

In all of the above, the Committee does not argue that any information system can maintain a definitive accounting of the level of societal preparedness for disaster. At present, there is some documented knowledge of *selected* aspects of preparedness at the national level of *some* societies. Far less is known about preparedness at the regional levels of these societies and very little about what is going on at local levels. But there is an even more basic technical problem. Although the Committee believes that most researchers and practitioners in disaster work are convinced that disaster preparedness

[17] See R. R. Dynes, E. L. Quarantelli, and G. A. Kreps, *A Perspective on Disaster Planning* (Washington, D.C.: Defense Civil Preparedness Agency, 1972).

[18] See I. Burton, R. W. Kates, and G. F. White, *The Human Ecology of Extreme Geophysical Events*, Natural Hazards Research Working Paper No. 1 (Toronto, Canada: University of Toronto, Department of Geography, 1968).

helps, everyone concerned knows far too little about the actual relationships between disaster preparedness and effective disaster response. However, the Committee is quite willing to argue on logical grounds that preparedness is an important social as well as technical dimension. As noted earlier, there are many information cues about preparedness that should be monitored and stored.

b. *General Resource Profile* Communities and societies vary greatly in their basic economic, social, and political conditions, and these variations relate to their abilities to cope with disasters. For example, disaster preparedness is not generally well developed in some areas of the United States, but the U.S. domestic disaster response capability is clearly enhanced by the tremendous amount of resources that can be mobilized to cope with the effects of disaster.

Any community or society has everyday needs that must be fulfilled. People require food, shelter, clothing, medical care, education, and other basic services, and these translate into demands for production, distribution, and consumption activities. Since these activities require some degree of order in their performance, various social control mechanisms are developed to insure conformity to laws and other norms. The allocation of resources to needs takes place in the context of an organized division of labor. The larger the social unit, the greater the demand for goods and services; and the greater the capability to generate resources, the more complex will the division of labor become. The implication is that the everyday resources of the community or society are in many ways quite important for disaster response. In some cases the importance of the resource does not manifest itself until after impact, e.g., the fortuitous proximity of bulldozers to roads that must be cleared. In other cases, the relevance of the resource is obvious before disaster strikes, e.g., the distribution of medical facilities. Disasters create broad demands for supplies, facilities, human skills, and organizational resources. These resource needs can never be completely anticipated, and, even if they could, there would still be problems in mobilizing them. Developing societies are generally deficient in the types of resources discussed here. At the same time, however, human communities are tremendously adaptive in responding to disaster events. In any event, the primary information problem is to isolate resources that are likely to be disaster relevant.

A discussion of health services points out resources that are likely to be disaster relevant and should therefore be measured. The health facilities in a country will be of substantial importance to relief officials in many disasters, but knowledge of their location relative to disaster sites will be crucial. Thus, at the minimum, the location of principal hospitals should be an important part of resource analysis. If microzoning is impossible, hospitals should at least be grouped by districts or provinces. Making geographic (rural versus urban) and administrative (public versus private) distinctions wherever pos-

sible would be useful, because both of these dimensions affect hospital availability during disasters. Furthermore, wherever possible, the personnel and facilities should be cross-linked; for example, estimates should be made of the types and numbers of trained personnel available in particular hospitals.

The basic organizational structure of health services is another important disaster-relevant resource. Thus the mechanisms and extent of national, regional, and local integration of health services should be documented. For example, if there are national or regional health directorates, there may be formal organization charts, aggregate personnel listings by specialties, and descriptive outlines of available specialized medical services. Such services as specialized laboratory facilities for epidemiological surveillance and storage and transportation facilities for vaccines, drugs, and other biological commodities should be documented. From a preparedness standpoint, there may also be formalized procedures for mobilizing these human and material resources during emergencies. In addition, the availability, extent, and reliability of health information systems should be documented so that full use can be made of existing systems. If there is, in fact, an epidemiological surveillance system, particulars concerning its methodology and coverage should be identified.

From the standpoint of disaster operations, the above kinds of health and medical data have clear relevance to both domestic and international disaster response agencies. The information is useful for predisaster preparedness and planning, for emergency relief, and for the organization of prolonged assistance, as well as for longer-term health programs. Many of these data are far more difficult to retrieve than simple aggregate measurements, such as the number of hospitals, beds, or doctors per capita. On the other hand, these easily gathered measurements are of little practical use.

The health and medical areas represent only one subset of likely disaster-relevant resources. The gathering of these types of data will require research within each developing country, as well as the use of international data archives. There are practical constraints on the collection of much of this information, and decisions need to be made about where it should be stored. At present it is necessary to determine the kinds of data that are relevant. The health facilities illustration suggests the need to gather data on disaster-relevant organizations. These include organizations whose tasks within the emergency period will be quite similar to those undertaken during routine or predisaster times. They also include those organizations that can be expected to be involved in postdisaster operations, regardless of their predisaster activities. The former would include organizations such as public safety (e.g., law enforcement, fire fighting) agencies, health and medical organizations, and departments of public works. The organizations included in postdisaster operations would include various agencies of government, voluntary relief agencies, civil defense organizations, and military forces. In all cases, inventories

of staff composition, of geographic and administrative distributions, and of material resources would provide considerable insight into the disaster-relevant organizational profile of the society. It is also important to maintain general logistics data on existing communications systems (power sources, audio and video modes), transportation systems (land, air, water, and rail), and administrative requirements for intergovernmental transfer of funds, goods, and services.

Finally, there are other more general measures of economic development that logically suggest increased capability to cope with disaster. These development measures have two possible functions. First, although all the human and material resources that might be required to respond to disasters cannot be predicted, it could be argued that the more highly developed the society, the greater the availability of disaster-relevant resources. Thus one function of development data is to document the aggregate level of economic development at given points in time. Useful general measurements might include levels of industrial and agricultural productivity, rate of economic growth, gross national product, per capita income, literacy rate, median education, a variety of health measurements, and other standardized development data of this type. The second, and more important, function of data that reflect societal well-being is to provide the necessary baseline for estimating the long-term effects of disaster on societal development. These data must, of course, be monitored on a continuing basis to be useful for that purpose.

4. *Assessment of Agent Impact and Victims' Needs* . The preceding three types of data requirements provide a multifunctional, predisaster baseline profile. As stated earlier, these data relate to a variety of preimpact activities such as prevention, mitigation, preparedness, planning, and warning. However, they are also relevant for postimpact decisions concerning appropriate mechanisms for external response. It should be explicitly noted that hazard, vulnerability, and resource profile data cannot be used as a substitute for specific postdisaster impact information; nor, obviously, can a computer system mechanistically make decisions for the AID/OFDA in responding to disaster. But, combined with a systematic postimpact assessment, the decision-making process can be enhanced to a considerable degree. This section will therefore divide the discussion of assessment of agent impact and victims' needs into two parts (1) the modeling of agent impacts; and (2) postimpact assessment.

a. *The Modeling of Agent Impacts* If one has sufficient data, it is now technically possible to combine the results of hazard analysis and vulnerability analysis in simulating natural disasters. This is done by assuming that a given type of natural disaster of particular intensity strikes a target zone having particular vulnerabilities. For example, in the case of earthquakes, it

has been possible to establish probabilistic relationships between the level of shaking, the type of construction, and the level of damage to be expected. Such information can be presented in damage probability matrices for given building types.[19] This information, combined with the seismic risk for a given settlement, can provide an estimate of expected future disaster damage. Such an estimate can be expressed in terms of the total expected loss over a given future period, the average annual loss, or the probability of exceeding a catastrophic loss threshold during the period.[20]

The predisaster estimate of expected future disaster loss is a potent tool, because it brings together the two components of disaster risk (hazard and conditional damage probability) in a statement of expected impact. Thus it has been possible to establish probabilistically a series of conditional relationships that link expected damage to total property loss and incident losses such as fatalities, injuries, economic impact, and recovery time.[21]

This methodology for estimating disaster losses also allows an evaluation of the effectiveness of alternative mitigation actions in reducing losses. Actions affecting hazards, such as event modification or selective siting, can be incorporated into the hazard input, and actions reflecting the resistance of structures or lifeline systems can be incorporated into the damage probability component. With such an analytical methodology, it is possible to evaluate the estimated effectiveness of particular hazard adjustments and to assess the expected function of various disaster mitigation actions.[22]

Computer programs have been developed for the simulation of selected natural hazards such as earthquakes, hurricanes, and floods. In the analysis, loss potential is derived from the interaction of four factors: (1) a natural-event generator that determines the frequency and severity of natural events; (2) critical local conditions, elevation, soil conditions, slope; (3) population at risk; and (4) vulnerability. The model generates a geographic severity pattern associated with a given geophysical event, such as in earthquakes. Severity

[19]See R. V. Whitman, *Damage Probability Matrices for Prototype Buildings*, Seismic Design and Decision Analysis Report No. 8 (Cambridge, Massachusetts: MIT, Department of Civil Engineering Report R73-57, 1973).

[20]See B. Schumacher and R. V. Whitman, *Models of Threshold Exceedence and Loss Computations of Non-Homogeneous Spatially Distributed Facilities*, Seismic Design and Decision Analysis Report No. 30 (Cambridge, Massachusetts: MIT, Department of Civil Engineering Report R77-9, 1977).

[21]See D. J. Friedman, *Computer Simulation in Natural Hazard Assessment*, Monograph No. NSF-RA-E-75-002 (Boulder, Colorado: University of Colorado, Institute of Behavioral Science, 1975).

[22]See J. H. Wiggins, *et al.*, *Budgeting Justification for Earthquake Engineering Research*, Technical Report No. 74-1201-1 (Washington, D.C.: National Science Foundation, 1974). Also see California Division of Mines and Geology, *Urban Geology Master Plan for California: Nature, Magnitude, and Costs of Geologic Hazards in California and Recommendations for Their Mitigation*, Bulletin 198 (Sacramento, California: California Division of Mines and Geology, 1973).

patterns are adjusted to reflect local conditions. Population at risk specifies the number and geographic distribution of persons and buildings subject to the earthquake's impact, and vulnerability defines the susceptibility to loss on the part of the population at risk when an earthquake of given severity occurs. The overlapping and resulting interaction of a geophysical event severity pattern with the geographic array of population at risk determines the magnitude of the loss potential associated with the occurrence of a natural event.[23]

Modeling may be employed as a predisaster tool for purposes of mitigation and preparedness, but it also has potential use for postimpact assessment. For example, if one assumes the existence of data on local geological conditions; on the vulnerability of structures; on the population size, density, and distribution of the impact area; and on magnitude of the earthquake (now available almost immediately), it is now possible quickly to estimate the effects of impact with considerable precision. This, combined with data on capability and resources within the country concerned, allows one to delimit both the needs generated by a disaster and the potential roles of organizations prepared to render outside assistance. Similar possibilities exist for tropical cyclones and hurricanes, which, in contrast to earthquakes, can be tracked; the approximate area of impact for each can also be predicted.

A major problem associated with the use of natural-event simulation is, of course, the lack of information on the various populations at risk and their vulnerability to disaster-agent effects. It goes without saying that if these techniques are to be useful, the accumulation of this information must be given high priority. Gathering these data will require both sophisticated remote-sensing techniques and labor-intensive ground-surveying techniques, particularly in areas known to be subject to disasters. Simulation will be further improved with more complete understanding of the physical relationships of hazard mechanisms. However, the Committee does not imply that more adequate data will automatically result in a clearer relationship between disaster-generated needs and local as well as nonlocal responses. Although the situation would be markedly improved, this technique can only serve as a supplement to postdisaster assessment. Moreover, the Committee has noted earlier that assessment of disaster-induced needs is a subjective process and that the motives to seek and provide outside assistance are often only marginally related to objective measures of needs. The next section deals with postdisaster assessment.

b. *Postdisaster Assessment* Adequate postimpact assessment necessitates the objective measurement of the overall effects of disasters, specific victim needs, domestic (or internal) resources, and the organization of response within the impacted country. And there must be a reasonable con-

[23] See Friedman, *op cit.*

tinuous assessment of the emergency situation, i.e., there must be sustained information feedback about changes in postimpact needs and response modes. The modeling capacity discussed above has serious limitations for assessment purposes. Whenever and wherever possible, postimpact assessment remains the best source of information upon which to determine actions.

Although the need for factual information is commonly acknowledged, reasonably objective data are difficult to retrieve during the immediate emergency period. Expertise to conduct local surveys is often scarce. In general, the methodologies for rapid ground-survey assessment of needs are relatively crude. There are numerous constraints on the quick use of aerial reconnaissance and remote-sensing techniques. There are political problems involved in the use of external assessment teams. Local and international politics and emotional considerations are involved in the assessment of needs. The private and public communications media generate a large amount of misinformation and distorted information. In sum, postimpact assessment of needs is a chronic problem that defies a purely technical solution.

Problems in documenting health and medical needs are excellent cases in point.[24] Disaster relief generally overemphasizes medical and health needs. Considerable resources can be drained for inappropriate relief on the basis of myths or unverified reports. Typically a disaster of sizeable magnitude triggers the mobilization and convergence of the following: unsorted drugs in large amounts that are improperly packaged, medical volunteers lacking proper training or briefing, field hospitals, and an abundance of food items. Multivitamins, which do not meet actual deficiencies, are examples of expensive but largely useless items that are often shipped in large quantities to disaster-stricken populations. The mass vaccination of populations against typhoid is another case in point. Although massive typhoid inoculation is being increasingly defined as a useless and counterproductive procedure, little notice is taken of this admonition.[25]

Experience in recent disasters has shown that overreaction has many negative effects beyond being useless. It may divert energy, tax the energies of local officials, and jam the logistics networks to such an extent that effective intervention is delayed or made altogether impossible. The externally supplied temporary resources may also be far above local quality standards and therefore may create new levels of expectation, which cannot be fulfilled in the future.

[24] For an interesting general discussion of this problem, see C. de Ville de Goyet and M. F. LeChat, "Health Aspects in Natural Disasters," *Tropical Doctor*, Vol. 6 (1976), pp. 152-157.

[25] To illustrate, in the Guatemala earthquake of 1976, voluntary relief teams inoculated more than 85,000 persons. However, since no provision was made for a second required shot, the entire effort was rendered meaningless. See C. de Ville de Goyet, *et al.*, "Earthquake in Guatemala: Epidemiologic Evaluation of the Relief Effort," *Bulletin of the Pan American Health Organization*, Vol. 10 (1976), pp. 95-105.

Postdisaster assessment is of pivotal importance in linking assistance with genuine need. At the moment, the process of external assistance appears to be generally captured by the following scenario. Initially there are undocumented local requests for assistance. The validity of these requests is often questionable and they may not relate to any genuine need. They generally result from inadequate assessment of the characteristics of the situation by local officials, combined with political pressures on them to appeal for assistance. In response to these pressures, there is a tendency to rely on the usual stereotypes about the needs of victims (food, shelter, vaccines, medical equipment, blood, doctors, etc.).

Once requests for assistance are received, donors (foreign sources are the referent here because validation becomes more difficult as distance from the disaster site increases) may or may not check the validity of these requests. Logically, the need for validating them and determining priorities increases as the number of appeals for assistance multiplies and the number of donor agencies contemplating a response proliferates. In certain cases donors may wish to act even before requests for assistance are received, and they seek information on what needs are likely to exist. Hazard, vulnerability, and resource profile data along the lines outlined earlier would provide useful information for these types of unspecific responses. However, the present level of development of these systems is very low. Existing profile data have very limited usefulness. Reasonably useful logistics data (roads, airports, holidays, customs regulations, storage facilities, names of local officials) can be provided; but data on hazards, vulnerability, and short-term disaster-generated needs are likely to be inadequate, trivial, or nonexistent.

Donors also have a tendency to make the unwarranted assumption that certain commodities and services will certainly be needed. In part, at least, these unwarranted assumptions derive from the unreliability of local requests, from the fact that donor organizations are generally unable to program a specific type of assistance on the basis of preexistent data, and because the donor organizations are themselves under considerable pressure to respond. This situation is exacerbated by the large number of governments and uncoordinated relief agencies acting independently.

Hopefully this scenario is sufficiently detailed to indicate the omnipresent need for postdisaster information. To reiterate, projecting disaster-induced needs from profile data requires the kinds of inputs that were discussed earlier. But even with those kinds of data that can potentially provide standardized estimates of the scope and intensity of damages, it is still necessary to have postdisaster assessments on the precise geographic scope of damage, the number of deaths and injuries, the types of injuries, the communicable disease potential, the extent of damage to public facilities and local food stocks, and the degree to which the host country has mobilized its own disaster-relevant resources. Postdisaster assessment must therefore be viewed as a well-defined

information system in its own right—with its own methodological rules, techniques, and an organized body of knowledge. Those in charge of gathering this information (local authorities, international teams, foreign experts, etc.) should be well trained in the types of data that are needed and in how these data can be collected and analyzed most efficiently.

The objectives of postdisaster assessment are to determine both the actual needs resulting from impact (e.g., the number of people injured by collapsed structures) and the possible needs that could arise (e.g., the occurrence of epidemics following interruption of water supply). One could perhaps arbitrarily identify two ways of generating postdisaster information: one involves a direct ground-survey approach, and the other involves indirect aerial assessment (both low-level and high-level) and information derived from space satellites. Space satellite imagery can depict both global and specific patterns of impact under certain conditions, but at present researchers must lean heavily on ground surveys and low-level aerial reconnaissance as the principal tools to assess victims' needs. The measurement of disaster-associated health and medical problems, in particular, is for the most part dependent on ground surveys.

In carrying out these surveys, the gathering of information should be geared to opportunities for action. For example, the number of deaths is an important measurement of impact, but it is irrelevant to assessing medical needs. The number of injured admitted to hospitals suggests a need being served rather than an estimated demand for medical services. The number of injuries is not particularly useful if there are no distinctions made between major and minor traumatisms, the types of injuries, and the types of health countermeasures required.

The survey techniques should be designed in such a way that a minimal amount of data can clarify boundaries of victims' needs, with provision being made for the gradual upgrading of information as time passes. In the health area, for example, this implies procedures that are valid but do not require elaborate sampling procedures. This also implies knowledge of where to look, how many people to examine, how to make sure they are not a biased sample of the victim population, and how to examine people with simple techniques.[26] The development of valid methods for rapid assessment of needs under highly adverse conditions in disaster-stricken societies will require considerable research and additional resources. The objective should be to de-

[26] An illustration of the latter is the great progress that has been made in measuring the nutritional status of famine-stricken populations. The nutritional status of a whole population can be estimated by simple methods that can be used by local people with adequate training. See, for example, L. E. Davis, "Epidemiology of Famine in the Nigerian Crisis: Rapid Evaluation of Malnutrition by Height and Arm Circumference in Large Populations," *American Journal of Clinical Nutrition*, Vol. 24 (1971), pp. 358-364.

velop standardized procedures for collecting data that can then be linked to operational decisions.

In summary, it is clear that disaster response would not be automatically improved simply by collecting more information. Large amounts of information on disasters are currently generated by governments, international agencies, voluntary relief agencies, and other groups. Much of this information is of questionable validity, and much of it is improperly collected, analyzed, and used. The Committee believes that valid and reliable hazard, vulnerability, and disaster-relevant resource analyses, combined with systematic assessment of agent-impact and victims' needs, represent a multipurpose information system whose development and use will contribute much to the objectives and underlying values of disaster assistance discussed earlier. The basic framework outlined here is depicted in Figure 1. Note that hazard, vulnerability, and disaster-relevant resource analyses as a group comprise a Predisaster Baseline Profile for any country included in the information system. As stated earlier, that baseline profile not only contributes to a variety of *predisaster* activities, it also allows for the modeling of disaster impacts (hence the arrow pointing to Assessment of Agent Impact and Victims' Needs). In so doing, the baseline profile provides a framework for delimiting the needs generated by specific disaster events. Assessment of Agent Impact and Victims' Needs similarly contributes to a variety of *postdisaster* activities. There is a distinction between specific and unspecific response modes to convey the fluid character of disaster environments and to convey the fact that external response will often involve a judgmental rather than a mechanistic decision-making process. For example, a request for assistance may be based on a need that is expected to develop as response unfolds but is clearly not yet documented. It is also clear that postimpact assessment is a continuing process that contributes to the development of longer-term recovery activities. Finally, the collection of systematic data on specific disasters obviously becomes a part of the baseline country profile (hence the arrow pointing to Predisaster Baseline Country Profile).

A few other issues merit brief comment. First, the Committee has outlined a perspective for a rational disaster response. The Committee has intentionally defined this framework as one in which the *information requirements are far in excess of present levels.* Much of the information considered to be relevant has not been sought, there are political constraints on its collection, and even where collected it may not be used in the administration of disaster response. The costs of collecting these data are substantial, and there are a variety of constraints on decision making that have no relationship to adequate information. However, the Committee believes that an analytical approach to disaster-related information problems is essential for assessing the reality of any disaster-response program and for offering positive recommendations to improve performance.

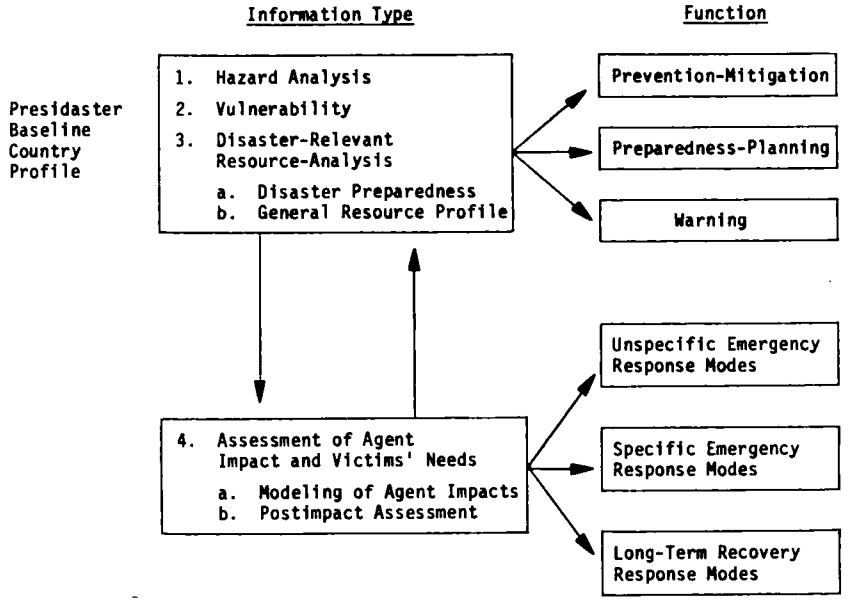

FIGURE 1 Types of disaster-relevant information and their functions.

Second, the Committee reiterates that the existence of adequate data does not imply highly programmed decisions. Disaster situations are far too complex for mechanistic response. Moreover, when one considers the multiplicity of participants involved in international disaster response, the organizational and coordinative problems involved are enormous. In taking the AID/OFDA as the decision-making referent, the Committee believes that this Office should relate its efforts to a broader system of responding units. It is therefore not a simple problem of the AID/OFDA gathering its own data. Rather the problem is to determine who should collect which types of data, where various types of data should be stored, and then to develop appropriate international distribution systems. These issues will not be simply solved, and they will demand continuing attention.

Finally, the evaluation of short- and long-term disaster responses would yield another type of information that has not been discussed. Postdisaster evaluation allows responding units to learn from their mistakes. However, there are no agreed-upon measures of effectiveness in this area, there is no agreed-upon methodology to evaluate performance, and there is consequently no organized collective memory that prevails from one disaster to the next. Improvements in all these areas must await the more systematic definition and measurement of disaster-generated needs. Once that problem is solved, researchers will then have some yardsticks to evaluate the assistance that is provided by external sources. Attention has therefore been directed to what is the logically primary conceptual problem.

Current Collection and Use of Information by the AID/OFDA

Having set forth certain information requirements for pre- and postdisaster assistance, we conclude this chapter by summarizing the AID/OFDA data management system.

When the U.S. disaster relief program became formally organized in 1964, no system existed for recording, storing, and disseminating data about foreign disasters; there was no explicit rationale for why such a system was needed; and no methodological ground rules existed for data collection and use. However, when the program began, it was obvious that the AID/OFDA required an organized body of information in order to function. During an actual disaster response the Office required information on the flow and disposition of requests for assistance so that it could keep track of what it was doing. With a mandate both to coordinate the U.S. government response and to relate that response to the actions of other governments, private groups, and organizations, the AID/OFDA definitely needed to inform others about its actions. And the Office had the bureaucratic requirement of documenting and justifying its actions. What needs were being served? What were the types of requests for assistance? How did the U.S. government respond, and what were the effects of its assistance? Finally, the staff hoped that, by maintaining a historical record, it could improve its own performance and perhaps provide guidance to other groups and organizations.

Disaster Reporting

From the beginning, high priority was placed on the development of a reporting system designed to keep the AID/OFDA, other offices in the AID, the Department of State, the Department of Defense, other federal agencies, voluntary agencies, international agencies, other governments, and other interested offices and individuals informed of current and past actions. In 1964 the staff developed a reporting system that consisted of Disaster Alerts, Disaster Memos, Mission Interim Situation Reports and Final Summaries, Disaster Case Studies, and Annual Disaster Reports.

Disaster Alerts notified recipients that a disaster had occurred and, if known, what the first U.S. government response would be. Disaster Memos reported changing situations in the disaster area; actions taken by the host government, the U.S. voluntary agencies, and international organizations; and financial data. These memos were also designed to report on problems encountered in carrying out relief actions and on what was being done to solve them. Disaster Alerts and Disaster Memos were subsequently replaced by what are now called Situation Reports, but the aim is to retrieve similar kinds

of information. During any large-scale disaster, Situation Reports are distributed once a day to various U.S. government offices and to a large number of voluntary agencies. They are based on cables received daily from the U.S. Mission in the country affected by the disaster. The transmission and receipt of field cables takes only minutes; their distribution involves several hours.

Through the *Manual Orders*, Missions were instructed to send Interim Situation Reports and a Final Summary of each disaster. Guidelines of what to include in these reports were also provided in the *Manual Orders*, and these guidelines have been further elaborated in the more recent AID *Foreign Disaster Assistance Handbook.* Since the very beginning, it has been difficult to get the Missions to respond to requests for written summaries, and, as a later section will point out, the quality of these reports varies greatly.

After disaster operations have been completed, the AID/OFDA staff reviews all available material–Situation Reports; Mission disaster summary reports; cables; field reports; scientific and technical data from outside agencies; reports sent in by international agencies, by the American Red Cross, and by other voluntary agencies–and prepares a case report on the disaster. These reports were assembled first into semiannual foreign disaster reports (1964-1968), then into annual reports (1969-1971).

The decision to discontinue the annual report format was made in 1971. Disaster case reports are now issued on an individual basis, but their content is the same as those summaries contained in previous annual reports. It should be pointed out, however, that there has been a considerable time lag in the publication of case reports since 1974. The purpose of the latter annual reports was to provide a fiscal year statistical summary and a brief discussion of major developments and highlights in international disaster assistance. Utilizing this format, the AID/OFDA issued a combined report for fiscal years 1972-1973 in late 1973. No other annual reports have been issued since that time.

The above background suggests that the Washington-based case report is the cornerstone of the disaster-reporting system. All data sources are channeled into the preparation of synthesized case reports, and the annual reports that have been published thus far have either collated individual case reports or have briefly highlighted what is in them. It is difficult to judge the relative importance of the various data inputs to the preparation of case reports. It should be clearly indicated, however, that the framework for writing case reports directly follows the guidelines provided to the Missions by the AID/OFDA for writing Mission disaster summaries. This similarity suggests several conclusions: that the Mission summary report is potentially the most comprehensive data base available, that the AID/OFDA assumes that Missions have the resources necessary to gather these data and should therefore be accountable for them, and that the quality and thoroughness of Mission reporting is directly related to efficiency of the entire reporting system.

The AID/OFDA Computer-Based Information System

The potential use of automatic data processing to simplify reporting functions was initially considered in 1967. Exploratory discussions with technical experts were begun, but there was no great enthusiasm for computerization among the AID officials who were responsible for approving the project. The functions of such a system were not clearly stated. The AID/OFDA staff did not have the necessary skills to operate such a system, and no additional personnel could be made available from other areas of the AID. It was acknowledged that the amount of information being generated was becoming massive, but it was decided that the projected benefits of a computer data bank did not then justify its implementation and maintenance costs.

The climate for computerization became more favorable in the mid-1970's, and the impetus for applying automatic data processing came from the AID Administrator's office. A team of specialists was sent to the AID/OFDA in March 1974 to explore feasibility, outline a program, and make recommendations. The final decision to "automate disaster relief" was made by the AID Administrator and the Director of the AID/OFDA. There are four primary components to the recently initiated system. These include a disaster history file, country profiles, a procurement and logistics file, and an operations or crisis management file.

The disaster history file maintains a record of all foreign disasters to which the AID/OFDA responded from FY 1965 to FY 1975, plus selected major disasters dating back to 1900. The file includes agent-impact assessment data and a compendium of the types and monetary value of both internal and international disaster relief efforts. The primary data resources for the historical file are the various disaster-reporting mechanisms discussed earlier. The stated purpose of this file is to provide a quantitative base for projecting and predicting disasters and response requirements. All data entries have been completed and some analysis has been undertaken by both the AID/OFDA planning staff and by members of the CIDA. However, the AID/OFDA has made no systematic effort to determine if the functions for which this system was developed can be performed.

The country profiles contain information on the characteristics of disaster-prone countries. The profiles include a variety of demographic, economic, cultural, epidemiological, logistic, and disaster preparedness data that have been gathered from numerous cited and uncited sources. Approximately 30 profiles have been completed, and a total of 35 will eventually be produced. The processes of data collection and storage are being handled via outside professional contracts. Thus far the AID/OFDA staff has not undertaken an analysis of the country profiles, but members of the CIDA Panel on Review and Assessment of Available Information have examined those that have thus far been completed. The purposes of the country profiles have not been made explicit by the AID/OFDA, but the Committee assumes that the primary

projected uses of these profiles are to gauge the internal capability of a country to respond to disasters and to provide logistical data helpful to the delivery of external assistance.

A procurement-planning subsystem has been programmed for the procurement and logistics file. This subsystem provides for the storage and retrieval of data on the commodities that can be furnished by various suppliers, together with data on availability, cost, and packaging considerations. Very few data have thus far been entered into this file because of limited time and money resources. The logistics subsystem was not developed under the aegis of the AID/OFDA, but was adapted from a Department of Defense transportation logistics model designed for broader AID use in 1974. This subsystem was used for an analysis of the Sahel region at the request of the Drought Office of the African Bureau. The model was not completed until after the Sahel disaster had waned, and there has been little subsequent interest in its refinement. In any event, the stated purpose of the procurement and logistics file is to identify the most timely and cost-effective means of procuring and transporting necessary relief supplies and services.

The operations, or crisis management, file is the last component of the system. The original purpose for this component was to program a large number of possible types of transactions so that they could be manipulated to meet the reporting requirements of the AID/OFDA. More specifically, this system was designed to monitor continuously any disaster in terms of requests or offers of assistance and their disposition. Although there was some testing of this system during the Guatemala earthquake of 1976, its operational utility has not been documented. Development of the system has been temporarily halted in favor of implementing manual recording procedures.

Although programming capability is available for all four elements of this system, it is clear that the historical file and the country profiles have been further developed in terms of data collection, storage, and potential use. The Committee's subsequent assessment will therefore focus primarily on these two components.[27] Any assessment of this system must be couched largely in terms of its future potential rather than its present uses. The system is new, and the AID/OFDA staff has necessarily concentrated its efforts on programming and data collection. There has been some discussion of the potential use of this system for disaster modeling and some appreciation of the data problems involved, but it appears that the AID/OFDA has completed only a limited amount of conceptual or empirical groundwork in developing this system.

[27] A detailed assessment of the AID/OFDA information management system, together with a series of recommendations for improvement of this system, are contained in the Appendix of this report. Recommendations 8 and 9, in Chapter 5, summarize this detailed assessment.

Chapter 5

Findings and Recommendations

Chapter 1 briefly introduced the scope and problems of international disaster assistance. Chapter 2 provided a historical description of the AID/OFDA. Chapter 3 detailed the complexities of defining disaster situations; it also detailed the associated problems of determining an appropriate rationale for international disaster assistance. Chapter 4 discussed analytically the information requirements for pre- and postdisaster assistance and described current information management practices at the AID/OFDA. The purpose of this final chapter is to summarize the key recommendations and findings that derive from the Committee's studies during the past year.[1] The recommendations and findings are grouped under the following three general categories: (1) program emphases in the U.S. government international disaster assistance program; (2) management of U.S. government international disaster assistance operations; and (3) broader research needs related to international disaster assistance. In general, the Committee believes that donors must take a far more analytical approach to foreign disaster assistance and that they should pay particular attention to information problems related to pre- and post-disaster response. The perspective developed in this report and the findings and recommendations included in this chapter are directed to that need.

Program Emphases in the U.S. Government Foreign Disaster Assistance Program

1. *Greater consideration should be given to operational and planning needs related to disasters that involve conflict or slow onset.*

As stated earlier, historically, the *largest number* of U.S. government disaster relief efforts have been in response to disaster agents that have rapid onset (e.g., earthquakes, tropical cyclones, hurricanes, and river floods). One should note, however, that the *largest amount of money* spent on disaster assistance by the U.S. government has been for conflict disasters (e.g., civil strife or civil wars) and for the so-called creeping disasters (e.g., droughts and

[1] Note that a large number of augmenting and/or derivative findings and recommendations are included in the Appendix at the conclusion of this report. This Appendix summarizes the Committee's detailed assessment of the AID/OFDA's information management system and serves to specify further Recommendations 8 and 9 in this chapter.

famines). For example, in the Bangladesh civil war of 1972, the U.S. government expenditures totaled about $296 million, and in the Sahel drought the U.S. government expenditures between 1972-1975 totaled approximately $228 million. Those two disasters alone account for 34 percent of all U.S. government expenditures for foreign disaster assistance from fiscal year 1965 through December 1976 and 42 percent of U.S. government expenditures for foreign disaster assistance from fiscal year 1970 through December 1976. Differences among these types of disasters were highlighted in Chapter 3. And, as was noted in Chapter 4, the techniques of hazard analysis and vulnerability analysis as historically developed have had marginal relevance to these types of events.

Studies of past slow-onset and conflict events document the need to be flexible in thinking about and responding to disasters. The following issues are illustrative. First, the problems that confront disaster monitoring, warning, and damage assessment are in many ways magnified by specific types of disasters. Key needs in the drought area, for example, include early identification of premonitory signs, continuous assessment over a lengthy period, and sustained measurement of the effects of international response efforts and efforts within the impacted country to lessen the drought's impact. As was documented in the Sahel drought, major deficiencies existed in all of these areas, and the causes were political as well as technical.[2] In conflict disasters, such as the Nigerian-Biafran civil war, the political dynamics become preeminent in both the pre- and postdisaster contexts.[3]

Second, the AID has historically maintained administrative distinctions between postdisaster relief, rehabilitation, and reconstruction and has tied arbitrary time constraints to the performance of these functions. Thus relief and short-term rehabilitation have been the purview of the AID/OFDA, while reconstruction is a broader AID function; the period of 60 days after impact alloted to emergency relief plus the additional 90 days alloted to short-term rehabilitation have set important time boundaries for its activities. As noted in the discussion of Recommendation 2, *general* distinctions can be made among these functions, but they overlap in various ways, depending on the type of disaster and the characteristics of the affected community. Therefore, the AID must maintain flexibility in thinking about and structuring various programs pertaining to relief, rehabilitation, and reconstruction. The time constraints on relief and rehabilitation, for example, have little relevance for disasters such as droughts, which have a slow onset and relatively long duration of impact.

Finally, in civil war disasters one can expect that unique problems will

[2]See, for example, M. H. Glantz (ed.), *The Politics of Natural Disaster: The Case of the Sahel Drought* (New York: Praeger Publishers, 1976).

[3]See, for example, M. Davis, "Audits of International Relief in the Nigerian Civil War: Some Political Perspectives," *International Organization*, Vol. 29 (Spring 1975), pp. 501-512.

confront donors and those attempting to coordinate international disaster assistance. Although natural disasters pose uncertainties about what needs to be done, civil wars tend to create considerable controversy about what should be done and for whom. Urgent requirements to assist civil war victims still exist—in many instances to a much greater extent than in natural disaster—but bilateral governmental assistance becomes more complicated and is inevitably tied to foreign policy interests. The need for multiple coordinating agencies to dispense aid to both parties in the conflict is specific to conflict disasters. And, of course, the hazards to the donors who are providing external assistance become much more pronounced.[4]

The above kinds of problems uniquely characterize conflict and creeping disasters, and they merit considerable attention in the predisaster planning of donor organizations such as the AID/OFDA. Beyond the unique operational problems involved, however, these issues pose questions of basic policy that need to be addressed. What are the rights and responsibilities involved in undertaking the surveillance necessary to detect disasters of slow onset? Should disaster assistance be provided in arbitrarily defined relief and rehabilitation periods with no regard for the long-term effects of short-term relief actions? Should foreign policy interests dictate the amount of assistance offered or accepted? These are difficult questions for which there are no easy answers or prescriptions. In formulating future U.S. policies and plans, however, these issues merit Congressional discussion and debate.

2. *The development of stronger linkages between the AID/OFDA's disaster assistance program and the broader development programs at AID should be given careful consideration.*

The relationship between AID's disaster assistance programs and its general development programs currently is conceptually confused. This is evidenced by attempts to make distinctions between (1) preparedness and prevention programs prior to disaster and (2) short-term relief and long-term recovery programs after the occurrence of disaster. Historically, the AID policy has been that developmental assistance should be long-range and societally directed, whereas disaster assistance should be short-term and largely directed to the individual needs of victim populations. Since preparedness is geared to improve emergency response, it has been an assigned function of the AID/OFDA. Conversely, disaster prevention or mitigation has been seen as a development problem, suggesting that this is the responsibility of other elements of AID.[5] Policy has also directed that relief and rehabilitation pro-

[4]Considerable documentation of these and other problems are found in M. Davis (ed.), *Civil Wars and the Politics of International Relief* (New York: Praeger Publishers, 1975).

[5]An excellent case in point is the present AID program to prevent or to mitigate drought problems in the Sahel.

grams sponsored exclusively by the AID/OFDA should not involve major capital projects of a developmental character.[6]

The Committee believes that strengthening the organizational linkages between AID's disaster assistance programs and its general development programs should produce a clearer conceptualization of the interrelationships between disasters and the development process that will be beneficial to both types of programs. The precise nature and magnitude of the relationship between disaster and societal development are currently not known, but the theoretical possibilities merit careful study. For example, to the extent that safer physical structures and improved growth management are by-products of economic development, a society reduces its vulnerability to certain types of disasters. More broadly, perhaps the ultimate goal of development is improved economic and social well-being. The realization of that goal should be accompanied by a correlative improvement in a society's ability to cope with various forms of hazards and emergencies. Moreover, with effective disaster-response planning and preparedness measures a society can better respond to the impact of disaster as it develops economically. In many cases the impact of disaster may also serve as an important stimulant to economic and social development.

As stated previously, the AID/OFDA technical assistance program in disaster preparedness has disaster mitigation potential, although its present focus is narrow, its scale is quite small, and it is not currently linked to development assistance planning at the AID. The primary emphasis of the AID/OFDA activities is short-term emergency relief. We believe that this form of disaster assistance also has potential development consequences. On the negative side, unneeded and unwanted external assistance can divert attention away from development problems and within-country programs geared to reducing those problems. On the positive side, emergency assistance may have usefulness beyond the emergency period. For example, recent research indicates that externally provided temporary housing materials have frequently been used locally for permanent housing.[7] This suggests that, with proper planning, emergency assistance and development programs can sometimes be directly linked. These potential linkages between disaster assistance and development assistance programs during both the pre- and postdisaster periods should be further explored.

3. *Greater budgetary support should be given to the disaster planning and preparedness activities of the AID/OFDA technical assistance program.*

[6]However, some monies from the AID/OFDA's FY 1977 International Disaster Assistance Fund are being spent for a building construction program in Romania in the aftermath of the March 1977 earthquake. This is a clear exception to the historical policy.

[7]See I. R. Davis, "Emergency Shelter," *Disasters*, 1 (April 1977), pp. 23-39.

The Committee believes that the U.S. disaster assistance program is constrained by the generally low level of disaster preparedness in the receiving nations. At present the AID/OFDA technical assistance program addresses this problem in the International Disaster Preparedness Seminars held each year in Washington, D.C., and also in its provision of direct technical assistance to those countries requesting such assistance. However, the present budget for these programs is quite small. The Committee suggests that the International Disaster Preparedness Seminars be maintained and that the direct technical assistance to other countries be offered on a much wider scale. The purposes of the latter would be to reinforce the positive benefits of the seminars, to assess the continuing planning and preparedness needs of countries subject to disasters in order to improve the U.S. technical assistance role, and to update the country preparedness profiles of societies subject to disasters as a basic planning tool for postdisaster assistance. The effectiveness of internal disaster preparedness and of external disaster relief are closely interrelated. Without a preparedness program within a recipient country, the application of external aid becomes more complicated, and its effectiveness is reduced. Support of preparedness programs in receiver countries is therefore pivotal to the successes of the U.S. program and the programs of other donor countries.

The Committee believes that the budgetary expansion of the AID/OFDA technical assistance program should be gradual rather than precipitous and that the program should be combined with a systematic assessment of its effects. Thus far there has been no formal assessment of the effects of the technical assistance program. Observations based on the experience of the Technical Assistance Branch staff suggest that rapid progress in disaster preparedness (e.g., the development of disaster plans and/or legislation) has occurred in some countries that have received AID/OFDA assistance either in the U.S.-based seminars or in consultations in the recipient country. The AID/OFDA staff members have suggested that perhaps 12 out of the 35 countries that have received technical assistance between 1969 and 1976 have shown improvements in their preparedness programs. However, the precise impact of the AID/OFDA technical assistance efforts is unknown and in need of systematic study.

The positive effects of disaster preparedness must necessarily be advocated on logical grounds and piecemeal evidence. Disaster research (both domestic and international) has yet to document the precise relationships between indicators of disaster preparedness and postdisaster response. Yet experience suggests that both individual and organizational preparedness yield genuine benefits when emergencies occur. Experience also suggests that there are major difficulties involved in establishing and maintaining formal preparedness programs at other than national government levels.

Management of U.S. Government Foreign Disaster Assistance Operations

4. *The U.S. government should adopt a multiphased disaster assistance program which ties the commitment of funds to a more systematic evaluation of need. The assessment of needs should be accomplished under international auspices.*

Although the Committee believes that the AID/OFDA emphasis on disaster relief is justified, we see a definite need to reexamine the role of external aid during the emergency period. Both the timeliness and the importance of external assistance in the period immediately following disasters are often misconceived by disaster relief personnel. People and organizations in and near the disaster site must assess the immediate needs and cope as best they can with these needs. Under the best conditions, international disaster assistance will be delayed for perhaps days or weeks.[8] The primary response early in the emergency period must necessarily rely on local resources and capabilities. Disaster research has repeatedly shown that human communities have tremendous adaptability and resourcefulness in coping with problems during this phase.[9] We should recognize this pattern as a basic strength of human communities and should limit external assistance to those goods and services that are needed to complement local efforts in the later phases of the emergency period. Thus particular attention should be directed to preventing the delivery of unneeded and unrequested goods. Goods should be packaged for unit distribution, and provisions should be made to ensure that the people in the stricken area are capable of handling and using these commodities.

The assumption that the local population will be helpless after a disaster is without foundation. The assumption that foreign assistance should be given quickly in most disasters should also be seriously questioned. Usually there is little need to buy time with a costly, undifferentiated, and uncoordinated international disaster assistance effort. In general, a slower, studied response to disaster-induced needs will allow outside governments and voluntary relief agencies to improve the quality and usefulness of their assistance.

Systematic evaluation of disaster-generated needs that cannot be met locally is perhaps the most chronic problem facing international disaster assis-

[8]In the case of emergency shelter, this point is documented in I. R. Davis, "Emergency Shelter," *The Role of Technology in International Disaster Assistance: Proceedings of the Committee on International Disaster Assistance Workshop, March 1977*, Committee on International Disaster Assistance of the Commission on Sociotechnical Systems (Washington, D.C.: National Academy of Sciences, 1978).

[9]See C. E. Fritz, "Disaster," *Contemporary Social Problems*, R. Merton and R. Nisbet (eds.) (New York: Harcourt, Brace, and World, 1961).

tance efforts. The Committee has no illusions that highly accurate evaluations of victim needs during the emergency period are likely to be made in the near future, but it does believe that more adequate assessments are possible. There is currently insufficient motivation to undertake a more careful evaluation of needs. One possible step in improving the U.S. response is to provide incentives for more careful assessment. The Committee therefore recommends that the United States develop a three-phased disaster assistance policy, formalized at the State Department level. Phase 1 would involve the present $25,000 discretionary authority of the Chief of Mission, with perhaps a periodic rise in this total sum to adjust to inflation and international monetary exchange rates. Phase 2 would involve a decision to release either additional funds or commodities (e.g., from the stockpiles) up to a value of perhaps $100,000-$125,000. Material commodities should be carefully labeled, packaged, and designed for unit distribution, and the cultural acceptability of material commodities to societies impacted by disaster should be a continuing concern. The decision at this level would, of course, necessitate the action of the AID/OFDA. In the past the majority of U.S. disaster responses have fallen below this $100,000-$125,000 limit, so no evaluation of need beyond present arrangements should be required for a relatively large number of disasters. This assistance would represent a "no-strings," humanitarian gesture on the part of the U.S. government. Phase 3 would involve any commitment of funds beyond the $150,000 expended in Phases 1 and 2 and would require a more systematic evaluation of need. This requirement for needs assessment would, in effect, become an explicit element of U.S. policy on foreign disaster assistance. Needs assessment will necessarily involve an evaluation of disaster impacts and of the resources and capabilities of the receiving nation to respond to victim needs. The Committee has already noted the inappropriateness of applying U.S. standards of disaster response to the developing countries and has pointed to the generally subjective nature of needs evaluation. The basic objective is a more reasonable accounting of needs, not some optimum measurement that is unattainable. In general, however, the explicit government policy of the United States should be to tie its humanitarian efforts to a more adequate assessment of needs than presently exists. This recommendation does not reflect a crass disregard for victim needs; rather it is predicated on the assumption that better impact assessments will provide more effective response to victim needs.

As earlier chapters have pointed out, the number of countries and agencies involved in international disaster response has expanded greatly in recent history, and the U.S. government involvement in foreign disasters has contributed to this expansion. Short-term disaster assistance provides a convenient mechanism for many different individuals, groups, organizations, and governments to express their concern for disaster victims. This often results in duplication of effort and the provision of inappropriate goods and services.

The net effect is to create additional problems not generated by the disaster event, but by the response itself. Solutions to this problem obviously require better information on the linkage between victim needs that cannot be met locally and the goods and services that can be furnished by external donors. Present mechanisms are insufficient for determining and communicating both victim needs and the receipt of relief items.

Victim needs are tied to the disaster site, but their definition can become distorted at various levels (local, within-country, international, and within donor countries). As the number of participants involved in international response has increased, the distortions have become greater. Even given the purest of motives by all parties involved, there are likely to be information and communication deficiencies from the field to disaster headquarters, from disaster headquarters to the national capital, and from the national capital to the many external agencies and groups that wish to provide assistance.

The emphasis on short-term emergency relief is likely to be a continuing fact of life. However, if bilateral donors begin exercising the self-imposed constraints suggested earlier, this problem would be partially ameliorated. The potential donor nations need to make explicit the kinds of commodities that they are prepared to offer and how these commodities could be delivered. Disaster-struck societies would then have a better idea of where to seek needed commodities. Regardless of such improvements in the management of bilateral disaster assistance programs, however, there is still a need for an international organization to verify needs and to collect information on the amounts and locations of standard relief items that can be furnished by various donor nations. The principal functions of this international organization would be to verify needs, to channel goods and services, and to reduce or to redirect the flow of unneeded and unusable goods and services. Such an organization must be trusted both by recipients and donors if it is to be effective, because the recipient nation's definition of needs must be objectively verified by an outside organization without interfering in the recipient nation's sovereignty. Any international coordination organization must likewise have considerable credibility with the potential donor nations, because the impetus for direct bilateral governmental assistance will be difficult to overcome.

The Office of the United Nations Disaster Relief Coordinator (UNDRO), located in Geneva, Switzerland, has recently been created to perform such a role, but it has had only limited success thus far, partly because it is relatively new and has not fully established its credibility.[10] The problem is also compli-

[10]This point is documented in a recent U.S. Government Auditing Office report. See Comptroller General of the United States, *Observations on the Guatemala Earthquake Relief Effort*, report to Congress (Washington, D.C.: U.S. Government Printing Office, 1976).

cated by the strong political pressures to continue direct bilateral assistance. In addition to these basic constraints, UNDRO needs to demonstrate working relationships with local officials and United Nations Personnel in countries subject to disaster. The suggested need for improving the AID/OFDA ties with the U.S. embassies and AID Missions is paralleled by a similar need for UNDRO to strengthen its ties with the United Nations Development Program (UNDP). The UNDP and AID Missions are similar in that they both have current information on the social and political climate of recipient countries that could affect the administration of international disaster assistance programs in each country. That type of information is no more amenable to programming in the Geneva computer than it is in the AID/OFDA computer file. The knowledge of UNDP personnel must be used to evaluate both pre- and post-disaster conditions and constraints that pertain to the countries subject to disasters. The parallel to the AID/OFDA Mission relationship is therefore striking. In summary, it appears that the UNDRO has the potential for performing a necessary international coordination role in handling external disaster assistance. In order to realize that potential, UNDRO must win the trust of both donors and recipients. A necessary first step in the development of that trust is to demonstrate evidence of its orderly and established relationships within the United Nations.

5. *Site visits under the auspices of the AID/OFDA should be budgeted for any U.S. government disaster response involving expenditures that are likely to exceed a minimum of $150,000.*

In the Committee's discussion of the previous recommendation, we suggested that any commitment of funds beyond $150,000 should require some verification of needs through international auspices. Thus the purpose of AID/OFDA site visits is *not* needs assessment. We do not believe that needs assessment can or should be done on a bilateral basis. Rather, there are two purposes for these site visits: (1) to facilitate the delivery of verified requests for U.S. assistance and (2) to provide a reasonable accounting of the use of the services provided, and to observe and document any logistical problems in their delivery.

In order to facilitate the delivery of needed U.S. assistance, it is necessary to have smooth working relationships with the appropriate AID Mission and U.S. embassy personnel and also with indigenous governmental officials who are knowledgeable about local conditions. Site-visit team personnel must be thoroughly informed about the standard items the United States has available. They must also be informed about U.S. government relationships with voluntary agencies and the United Nations.

The goal of postdisaster assessments is to develop a more adequate system for evaluating the effectiveness of large-scale U.S. disaster assistance efforts.

They should not be used to study the many small disasters to which the United States responds or give the impression that the United States is attaching unnecessarily stringent bureaucratic controls. The minimum of $150,000 is suggested in order to permit a rapid and substantial "no-strings" humanitarian commitment on the part of the United States, but the $150,000 is low enough so that a postdisaster assessment becomes a useful tool for learning how to respond more effectively to future major disasters. In the past the AID/OFDA has not conducted its own postdisaster assessments. For example, although the AID/OFDA has delivered tents in over 70 disasters, it has not systematically evaluated how they have been used or the user reactions to them.

In suggesting the use of site visits under the auspices of the AID/OFDA, we do not preclude independent evaluations of U.S. disaster assistance efforts by persons and groups outside the AID. On the contrary, independent assessments of international disaster assistance—i.e., ones not conducted by the agencies with operational responsibility—are critically needed to correct current deficiencies in our knowledge of how to improve existing and future programs.

The political sensitivities of a disaster-stricken nation must, of course, be fully recognized in conducting these postdisaster assessments. The AID/OFDA must continually reinforce the point that the purpose of assessment is to improve its own performance in meeting victim needs, not to interfere in the political sovereignty of the recipient country. The process of implementing this policy change should be carried out in slow, deliberate stages, but the initial efforts to improve the assessment process should be started as soon as possible.

The costs of AID/OFDA site visits are certainly not prohibitive in relation to total assistance expenditures. The more basic issue is the timing of these site visits. As recommended earlier, the major provision of commodities and services should be delayed until needs assessment is well under way and until verified requests for U.S. assistance are made. Facilitating the delivery of U.S. assistance would then require relatively rapid arrangements within the recipient country if such delivery arrangements had not been established prior to the disaster. On the other hand, monitoring the use of the goods and services provided would necessitate delaying the site visits until after delivery had been completed. This suggests the need for two types of site visits: (1) to facilitate delivery arrangements, and document problems related to them, and (2) to evaluate the use of goods and services provided. The more precise timing of these trips would necessarily vary by type of disaster. For example, earthquakes and floods have relatively short emergency periods, while droughts and famines tend to be of longer duration. Finally, the Committee believes that postdisaster assessments of civil strife disasters will necessarily have to be conducted under international auspices.

6. *The AID/OFDA should provide foreign disaster relief officials and U.S. embassy and AID Mission personnel with clear, current information on (1) the kinds of goods and services available from the United States and (2) the organization of the U.S. government disaster assistance program.*

It is crucial for both disaster relief officials in recipient countries and U.S. embassy and AID Mission personnel to have a much clearer understanding of the U.S. disaster relief role. This refers to a number of information requirements that could be addressed prior to the occurrence of disasters. First, a standard vocabulary of relief commodities is needed. To the extent possible, disaster relief officials need to know the standard relief items that the United States has available and their design and performance characteristics. Second, a relatively clear accounting of the standard policies and procedures that direct the U.S. program is needed. Third, a mutual awareness of how the United States works with voluntary organizations, both within recipient countries and externally should be developed. Fourth, given the political sensitivities that pervade international disaster relief, the manner in which U.S.-United Nations relationships are evolving should be made as clear as possible. Fifth, the distinction between the AID/OFDA disaster assistance role and the broader AID recovery and development role should be outlined. To the extent that these programs are related in the future, all relevant parties in the recipient countries should be kept informed. Sixth, the practical realities of implementing assistance programs in recipient countries is a knowledge requirement of the AID/OFDA staff. The U.S. embassy and AID Mission personnel should be relied on as one basic information resource for this purpose.

The above issues inevitably arise in the *postdisaster* context. Even though the AID *Foreign Disaster Assistance Handbook* deals with some of them as they relate to the AID Mission, there is a lack of clarity about them when disasters strike. The alleviation of these problems implies the need for *predisaster* contact with appropriate U.S. and foreign officials. Implementing this recommendation will require greater internal AID/OFDA planning efforts and expanded contacts within recipient countries by the AID/OFDA staff.

7. *The entire disaster-reporting system of the AID/OFDA should be thoroughly evaluated.*[11]

We believe that effective disaster reporting requires well-defined purposes, a logically stated rationale, focused data requirements and the resources to meet those requirements, methodological guidelines for data collection, and a

[11] This recommendation is based on the Committee's detailed evaluation of the AID/OFDA disaster-reporting system presented in the Appendix.

well-developed dissemination and feedback system. The Committee's initial assessment of the present U.S.-based disaster-reporting system suggests that it is deficient in all these areas.

First, and perhaps most important, disaster reporting appears to serve several purposes, but these are not explicitly stated, nor has there been any discussion of possible contradictions in data collection requirements in meeting these purposes. For example, data on disaster impacts and responses (types and amounts) are entered into the AID/OFDA historical file, but their usefulness as planning and evaluation tools requires greater efforts in validating them. (This is particularly true for disaster-impact data.) On the other hand, final case reports appear to be used increasingly by AID for public relations reasons. This is evidenced by the post-1972 backlog of U.S. disaster responses for which no case reports have been published. The present practice seems to be to use case reports selectively to publicize only major U.S. disaster assistance programs. Data collected primarily for use in public relations need not be either continuous or rigorous.

Second, in addition to measurements of disaster impacts and data regarding types and amounts of various assistance programs, the report form that the AID/OFDA provides the AID Missions requires the following information: descriptions of the history of the disaster event, of U.S. government relief programs, and of the activities of U.S. voluntary agencies; and a multifaceted appraisal of the assistance provided by the United States, other bilateral donors, and international organizations. The Committee's analysis of the Mission disaster summary reports suggests that the AID Missions only have the resources to collect data on disaster impacts and on the types and amounts of within-country and external assistance programs. Third, the Missions are provided with few guidelines for collecting the data. The philosophy appears to have been one that requested all the data considered to be of potential interest and that hoped the Mission staff had the time, resources, and motivation to collect at least some of it. Fourth, the AID/OFDA has a dissemination list of over 400 entries for its various report categories. However, the Office has little knowledge of how the reports are used externally. It does not know what impressions about the disaster are created by the reports or if the individuals, groups, and organizations that receive these materials are aware of the incompleteness and unreliability of much of the data presented in them.

We believe the above situation can and should be improved and that the AID/OFDA should itself undertake a thorough evaluation of its reporting system. We offer the following guidelines for this effort. First, we believe that top priority should be given to two interrelated *internal* functions of disaster reporting: (1) to provide statistical documentation of disaster events and (2) to provide a basis for improving disaster response. The former requires collecting valid and reliable data on disaster impacts and on the types and

amounts of within-country and external assistance programs. The historical file in the AID/OFDA's computer system is programmed to store just such data. To provide data necessary for improving disaster response, on the other hand, requires documenting response-related problems, so that practitioners can collectively learn from past experience. The descriptive data necessary to perform this function is not regularly collected in sufficient detail to be of much use, and there is presently no system to organize such data.

Second, as indicated previously, our analysis suggests that the U.S. AID Missions provide *one* resource to document disaster events. In fact, the data required by the first internal function are the only ones the Missions are capable of regularly collecting for purposes of disaster reporting. We therefore suggest a simplified reporting form that relates directly to the data requirements of internal function 1 (the AID/OFDA computerized historical file). Since the AID Missions will then have more focused data requirements, we further suggest that they be strongly encouraged to cross-check various estimates of disaster impacts and to monitor changes in these estimates during the emergency period. We assume that the measurement of the types and amounts of within-country and external assistance programs presently suffers more from incompleteness than invalidity. This may require delaying the submission of a final report until government and donor accounting have been completed.

Third, the function of providing a basis for improving disaster response (internal function 2) is basic to Recommendation 5 discussed earlier. It will be recalled that Recommendation 5 states that site visits under the auspices of the AID/OFDA should be budgeted for any U.S. government response above a certain minimum. The twin purposes of the site visits are: (1) to facilitate the delivery of verified requests for U.S. assistance and (2) to provide a reasonable accounting of the use of the services provided, describing any logistical problems in their delivery. If a descriptively more detailed accounting of response problems is desired, the AID/OFDA will have to undertake the effort on its own resources. Assuming Recommendation 5 is implemented, a system for storing and using these data needs to be developed. We envision detailed after-action reports that precisely document response problems relating to U.S. government activities. These reports would become an information resource for the operations and planning divisions of the AID/OFDA.

Finally, the public relations and other external uses of the AID/OFDA disaster-reporting system should be viewed as secondary or as spin-off benefits rather than primary functions. However, in restructuring its disaster-reporting system, the Office should inform the over 400 persons and agencies currently on the distribution list of the kinds of data to be collected, the manner in which they will be collected, and the internal uses to which they will be put.

8. *The computerized data bank at the AID/OFDA cannot perform all of the multiple functions for which it was originally developed. The system should therefore be critically reevaluated in terms of its capability to perform the following information management functions: (a) modeling disaster impacts using integrated hazard and vulnerability analysis, (b) documenting disaster events for management purposes, (c) providing adequate baseline country profiles, and (d) improving operational performance.*

The general function of the AID/OFDA computerized data system is to meet the information requirements of the Office's disaster relief and preparedness programs. The four functions itemized in this recommendation are specific subdivisions of this more general function. The Committee's conceptual framework provides a useful mechanism to evaluate the potential of this system to meet these functions. We offer the following suggestions, based on our initial assessment of the data bank.[12]

a. *Modeling Disaster Impacts Using Integrated Hazard and Vulnerability Analysis* The present contents of the historical file are not configured to fulfill this function. The file is inadequate for hazard analysis, because it only records those events that have actually coincided with vulnerable settlement patterns. Moreover, for events of long recurrence cycles, such as earthquakes and volcanoes, the file has insufficient historical coverage on which to anticipate future patterns of occurrence. Nor does the system have much potential for assessing the vulnerability of particular human settlements to particular disaster agents. This requires systematic collection of impact data from previous disasters. For the vast majority of the 900 events in the historical file, there is no record of the precise location of the impact area, no record of the level of intensity, and no record of the total population and physical structures exposed. Thus there are insufficient data even for very crude estimates of vulnerability. Although the file is programmed to store more detailed descriptions of impact, this is only a very preliminary step for disaster modeling, and it remains to be seen whether the data will actually be collected. Moreover, the country profiles do not contain basic research data on vulnerability of structures because such research has thus far been carried out predominantly on modern and sophisticated building structures in developed societies. There has been little effort to support vulnerability analysis in developing countries. Although disaster modeling has some potential for certain disaster agents, the data requirements are large and costly. The present system is insufficient for this purpose, and the Committee believes that the long-range costs needed to obtain the pertinent data and perform the neces-

[12]The comments here are based on the Committee's more detailed evaluation of this system presented in the Appendix.

sary rigorous analyses exceed the benefits the AID/OFDA will derive from the effort.[13]

b. *Documenting Disaster Events for Management Purposes* The historical file has genuine value for management purposes. It is a reasonably accurate expression of the work performed under the aegis of the United States and other international disaster assistance programs, particularly since 1965. Much more can be done in a descriptive fashion to analyze recent expenditure patterns. With improvements in the data on assessments of agent impact and victim needs, the AID/OFDA will have a better basis for isolating relationships between disaster-induced needs and disaster response. Combined with readily available measurements of development, improved estimates of the long-term developmental effects of disasters will become possible. These are worthy and manageable objectives for the historical file, which should, in the long run, prove to be cost-effective. We therefore believe that the costs of maintaining and updating the historical file are justified.

c. *Providing Adequate Baseline Country Profiles* As outlined in Chapter 4, a predisaster baseline profile logically includes information on hazard analysis, vulnerability analysis, and disaster-relevant resource analysis. We have already suggested that the potential for using this system to conduct integrated hazard analysis and vulnerability analysis is very limited. However, the system does have potential usefulness for conducting disaster-relevant resource analyses in terms of level of disaster preparedness and the general resource profile of countries subject to disasters. The present country profiles provide several types of information: descriptive data on the social and political structure, data on transportation and communications logistics, information on health conditions and the structure of health services, and limited data on disaster planning and preparedness. Thus it is clear that most of the currently available data relates to what we have referred to as the general resource profile of these societies rather than disaster preparedness. We offer several comments on the country profiles and their possible uses.

First, we believe that information on disaster preparedness and planning within a country is useful and should be regularly updated, because that information identifies existing societal preparedness measures that outside donors should be aware of in organizing their own responses. It should also be

[13]The data requirements and research costs of disaster modeling should never be understated. Disaster modeling techniques have little potential usefulness without adequate data, many of the necessary historical data are not available, and the costs of collecting current data are prohibitively expensive. There is a temptation by practitioners to use these techniques simply because they exist, and there are crude data available. The Committee rejects such unreflective uses for purposes of decision making. The techniques themselves, their ultimate uses, and the costs attached to these uses should be subjected to continuing scientific and public scrutiny and debate.

noted that disaster experience and its historical timing also potentially relate to preparedness. Since those data are available from the historical file, they should be integrated with any continuing assessment of societal preparedness.

Second, information related to the country's languages, ethnic groups, political organizations, and political relations represents useful supplemental briefing material for people making site visits. However, these data need not have been computerized to serve this purpose. We also believe that the more important practical information involves close and continuing contact with relevant organizations and officials of the disaster-stricken societies and an assessment of the current political, social, economic, and cultural realities of dealing with the government and its citizens. That kind of detailed, informal knowledge is, in large measure, possessed by the AID Mission personnel, and it cannot adequately be computerized.

Third, information related to the general level of societal development has little direct operational use, and the AID/OFDA is not well equipped to utilize the data for purposes of examining the effects of disaster on societal development. We recommend that the data on development variables not be updated and that information on disaster impacts and responses (from the historical file) be made available to development research experts who, in turn, can undertake the required analyses.

Fourth, those portions of the country profiles pertaining to topography, climatology, transportation systems, communications systems, and power sources are important for anticipating logistical problems of disaster response. These data should be maintained as a basic planning and management tool.

Fifth, information pertaining to basic health conditions and the structure of health services should be maintained and updated. The former provides useful data for both general and specific epidemiological surveillance purposes. However, one should recognize that the validity and reliability of epidemiological data vary from country to country. The latter illustrates quite well the point made in Chapter 4 about the need to gather data on disaster-relevant organizations. However, such data as the number of hospitals, number of beds, and number of health personnel as a proportion of total population is of insufficient specificity for direct operational use. Instead, much more detailed knowledge is needed on their *location* and *distribution* in relation to the disaster site.

d. *Improving Operational Performance* The two remaining AID/OFDA subsystems—i.e., the procurement file and the crisis management file—highlight the operational and planning potential of this system most explicitly. The Office has given little attention to these systems thus far, and the files are virtually devoid of data.

The purpose of the procurement file is to provide data on the commodities that can be furnished by various suppliers, together with data on avail-

ability, cost, and packaging. We believe that the very effort to make explicit the kinds of services the United States is capable of providing will lead to a far more organized U.S. response. Disaster-stricken societies need to know what is available. A procurement file can potentially provide that kind of information quickly. We therefore recommend a feasibility study of the procurement file—one that selectively examines commodities that have previously been donated in large amounts.

The basic data inputs to the crisis management file are to be obtained from the continuous monitoring of any disaster in terms of requests or offers of assistance and their disposition. On the basis of these inputs, the Office would then be able to program a continuous process of transactions. Thus the system would presumably expedite the development of a rational line between available resources and disaster-generated needs. The idea is conceptually elegant, but the Committee believes that it is practically untenable as an operational guide. The postdisaster context is far too complex to be simply programmed. However, the crisis management concept provides an additional postdisaster reporting methodology and a basic planning tool to improve future responses. Both of these functions require a reasonably accurate accounting of what happened during the emergency period.

Broader Research Needs Related to International Disaster Assistance

9. *High priority should be given to research that will develop more valid and reliable measurements of disaster impacts and of societal and international responses to these impacts.*

The AID/OFDA and the Committee have conducted some preliminary statistical analyses of the AID/OFDA's historical file to assess possible relationships between measures of disaster impact and the response of the United States. There are essentially two types of data amenable to analysis in this file: several measurements that reflect disaster impacts and other measurements that reflect the aggregate level of international disaster assistance from various sources. Since the data are in quantitative form, much could be done in the way of "number crunching." However, we question both the wisdom and the utility of more complex multivariate statistical analyses of the full data deck, because most of the data inputs are of dubious reliability and validity. The bulk of the more than 900 entries provide at best the date of disaster, name of country impacted, disaster agent, and crude estimates of number killed, number of victims (which is never defined), and dollar damage. The file appears to be reasonably complete for the period 1965-1975 and also includes fairly detailed data on the contributions of the U.S. government

and other international donors. The period of the 1950's to early 1960's appears far less complete, and the period 1900-1950 has both very serious gaps and some highly questionable numbers. The early years of the historical file are dependent on information collected from general sources, the accuracy of which cannot be known. That same problem characterizes, perhaps to a considerably less degree, the formal reporting mechanisms established since 1965. Specifically, the data file on disaster impacts is far more complete but not necessarily more valid for the period 1965-1975. We assume that information concerning U.S. government expenditures during this latter period is fairly accurate.

The data may only have meaning in the aggregate and, even in that form, one should be cautious in interpreting it. Restricting ourselves to data that document the activities of the AID/OFDA (1965-1975), we have looked at the following types of statistical aggregations: (1) aggregate measurements of disaster impact and response (e.g., total world damage and average annual loss, total deaths and average annual death rates, total victims and average annual victim rates, and total and average U.S. expenditure by type of disaster); (2) ranking of disaster agents in terms of their fatality rates, victim rates, and reported damage; (3) ranking of countries suffering disasters in terms of average annual fatalities, victims, property damage per capita, and property damage as a proportion of the gross national product; and (4) year-by-year comparisons of aggregate level of U.S. expenditures in terms of disaster types. We have chosen not to summarize these analyses in tabular form because that would give the appearance of more precision in the number of findings than they generally deserve. At this point, we feel it appropriate only to offer some general observations.

Even without examining the data, one could surmise that a simple relationship does not exist between the magnitude of need generated by disasters and the quantity and quality of extralocal response. Some readily identifiable reasons would account, in part, for this discrepancy: the disaster-relevant resources and capabilities within a particular country vary, as does the desire both to give and receive assistance; the quality of information about victim needs is often poorest when the outside response is being generated; and the resources of donors vary over time. Without a reasonable understanding of these dynamics, one would have difficulty interpreting a statistical relationship between a crude measurement of disaster impacts and a measurement reflecting the extent of external assistance.

This historical data file unfortunately does not allow for a reasonable test of the relationship between disaster-generated needs that cannot be met at the local level and the amount of U.S. or broader international disaster relief. Additional data would be required, and the data presently on file concerning disaster impacts are of questionable accuracy. For example, the term "disaster victim" is not defined. The numbers killed, injured, homeless, evacu-

ated, or cared for by mass feeding all reflect the idea of a victimized population, but these types of measurements are not necessarily comparable for different natural and man-made disasters. At the broadest level, it appears that the number of people affected is the measurement that the AID/OFDA finds most useful, but there is no standardized meaning given the term. In an earthquake, that measurement may reflect a gross estimate of the homeless; in a flood it may refer to the population of a geographic area; and so on. Furthermore, the short- and long-term economic costs of disasters are extremely difficult to measure. Property damage is only one of several possible measurements and, as measured, has severe validity problems. Even if there were agreed-upon and valid measurements of impact that could be assumed to imply disaster-generated needs, we would still require a far better understanding of conditions and actions within the recipient country before residual needs could be determined.

In light of the complex problems of defining and measuring the needs of victim populations, one is far more likely to find little statistical relationship between measurements of impact and measurements of external aid. Not surprisingly, the level of U.S. expenditures for the U.S. disaster assistance program from 1965 to 1975 is not simply related to either weighted or unweighted measurements of impact. The data also reinforce the ideas that, in this context, it is unreasonable to talk about disasters in the generic sense and that comparisons across types of disasters are most difficult. At this stage in our level of knowledge, it is more fruitful to look for patterns within, rather than between, disaster types.

In any event, there is a need for systematic research that will lead to (1) valid and reliable measures of impact and (2) precise documentation of response activities at several levels. With regard to the former, for example, efforts should be made to develop new ground-survey data-collection methods for rapid damage and needs assessment. The techniques should be designed in such a way that a minimum amount of data can clarify need boundaries. Provision should also be made for the gradual upgrading of information as time passes. More broadly, research should be directed to determining the appropriate mixes of ground-survey, aerial-assessment, and satellite-monitoring technologies for damage and needs assessment in various types of disasters. Finally, the methodologies for analyzing the economic, social, and environmental impacts of natural disasters should be thoroughly reviewed and critiqued. With regard to the latter, for example, efforts should be made to identify the research requirements for sustained monitoring of the flow and use of commodities and services provided by international donors. Research should also be directed to a thorough analytical treatment and empirical documentation of the types of social networks that exist among international donors in various types of disasters. Finally, research should be directed to the identification of the forms of disaster assistance that have important

developmental consequences, e.g., housing and other forms of reconstruction, land-use planning, food production and distribution, and public health measures.

10. *The establishment of organizational mechanisms for the exchange of policy-related research information on disaster prevention, mitigation, and response should be given careful consideration at the international level.*

A number of attempts are now being made to organize knowledge in such areas as hazard vulnerability and impact, monitoring and warning systems, individual and organizational response patterns, technologically feasible emergency housing designs, food delivery systems, basic nutritional data relating to food priorities for mass hunger conditions, causal relations between nutritional deficiencies and communicable diseases, and many other scientific and technical areas. In the fields of administration and management, there are also some efforts to achieve a better organization of the collective memory of the experiences of disaster practitioners so that future international disaster assistance operations can be made more effective and efficient.

The above kinds of efforts are discontinuous, and perhaps unavoidably so. One underlying issue to consider concerns the relationships between priorities for research and priorities for providing available types of services. The gap between the two must be bridged if specific successful efforts to apply scientific and technical knowledge are to be made. One possible solution may be first to identify the high-priority problems from a service delivery standpoint, then to direct research attention to scientific and technical capabilities that can be immediately applied to these problems. For example, if one can assume that pre- and postdisaster problems have been throughly documented in terms of the research suggested in Recommendation 9, one might envision disaster-relevant technology profiles directed to those problems. These profiles would include information on design criteria, performance evaluation, and adaptability to various contexts. In any event, an effort must be made to achieve a balance between short-term needs based on immediate administrative operational problems and long-term research and application needs.

Perhaps the most basic problem in this area concerns the appropriate auspices through which scientific and technical knowledge should be organized and disseminated. Such knowledge might be better integrated through the use of existing national and international scientific organizations. Information on the effective means of administering or managing international disaster assistance operations is currently scattered and unorganized. A methodology and organizational framework to collate, systematize, and disseminate the lessons learned from previous experience is needed.

The difficult problem of effectively linking the relevant bodies of scientific and administrative-operational knowledge needs to be given considerable

attention. Some form of international clearinghouse for information exchange appears to be essential. Such a clearinghouse could serve both operational and research functions. It would seek to translate existing scientific and technical knowledge into operationally useful information for many different user groups in the international community of hazard reduction and disaster preparedness personnel. It would also serve to alert and inform disaster research specialists of new or additional problems that require further research efforts.[14] The establishment and operation of this type of international clearinghouse on disaster-related information falls within the general coordination mandate of the UNDRO, whose capabilities to handle this function effectively should be the subject of further study. In particular, attention should be directed to the question of whether this clearinghouse function should be centralized exclusively within UNDRO, or whether UNDRO should be the focal point for referring users of disaster-related information to other national and international sources of scientific, technical, and operational knowledge.

[14] For further information on the functions and organizations of such a clearinghouse, see C. E. Fritz, *Some Guidelines for Developing an Office of Emergency Preparedness Clearinghouse for Emergency-Related Research* (Arlington, Virginia: Institute for Defense Analyses, Paper P-824, 1971). This report may be obtained from the National Technical Information Service, Springfield, Virginia 22151, as document No. PB 206278.

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Information Requirements for Pre- and Postdisaster Assistance: An Evaluation of the Information Management System at the AID/OFDA

Appendix

Disaster Reporting at the AID/OFDA

As stated in Chapter 4, when a particular disaster assistance operation is completed, the AID/OFDA staff reviews all available documentary material on that operation. This includes Mission disaster summary reports, cables, field reports, scientific and technical data from outside agencies, and reports received from international organizations and voluntary agencies. It then prepares a case report on the disaster. These reports were compiled first as semiannual reports (1964-1968), then as annual reports (1969-1971), and then as individual reports (1971-present). The Committee has not had sufficient time to assess all the data inputs for disaster reporting since 1965. But since the framework for writing case reports directly follows the guidelines provided to the AID Missions for their preparation of Mission disaster summary reports, they are the most standardized and potentially the most comprehensive data base available. We therefore decided to direct our initial assessment of the reporting process to Mission disaster summary reports. We further restricted ourselves to reports issued after 1971. This was done principally because earlier reports were unavailable and because the Committee assumed that as the Missions acquired greater experience in the use of the Mission guidelines, the quality of these later reports would be improved.

A total of 26 Mission disaster summary reports for the period 1971-1975 were located. The following table provides a yearly listing of the number of U.S. disaster responses, the number of case reports produced, and the number of Mission summaries that could be found in the AID/OFDA files.

Year	No. of Disaster Responses	No. of Case Reports	No. of Mission Disaster Summary Reports
1971	51	9	2
1972	30	21	8
1973	25	20	6
1974	27	23	8
1975	34	4	2

A few qualifications about this table merit attention. First, the number of case reports for 1971 does not represent the number completed for that year;

rather it is the total number published as individual reports. Second, we suspect that an unknown number of Mission summary reports for 1971 have already been stored or discarded; thus the total number listed may not be correct. Third, it is also possible that an unknown number of Mission disaster summaries for the years 1972-1975 have been selectively stored or discarded, although we know of no reasons for taking such actions. In any event, the Committee had no way of determining the total number of Mission summaries for the period 1971-1975. The Committee has been informed by several AID/OFDA staff members that at least a few of these Mission summaries under review represent the best that have been submitted over the years. The sample of 26 therefore provides a sufficient number to give a general description of their content and to undertake an initial assessment of their adequacy. The following recommendations are based on this assessment.

1. *The primary emphases of the AID Mission disaster reporting should be to collect data on (1) disaster impacts, (2) disaster assistance programs within countries (types and amounts), and (3) external assistance programs (types and amounts). The Mission disaster summary report form should be simplified to reflect this narrowed focus.*

The present mission disaster-reporting form is a formidable document. These forms appear to have been written with large-scale disasters in mind, but the majority of disasters to which AID/OFDA responds are of small or moderate scale. The present form requests detailed information in the following areas: (1) a large number of quantitative measurements reflecting agent impacts; (2) detailed descriptions of the history of the disaster event, operations by the impacted country, U.S. government relief programs, and the activities of U.S. voluntary agencies; and (3) a multifaceted appraisal of the assistance provided by other countries and international organizations.

The organization and quality of Mission reports vary a great deal: a few provide reasonably detailed comments as well as quantified data and many are notably inadequate, but most fall between these extremes and are difficult to label. It should also be added that an unknown but probably large number of Mission disaster summaries are never initiated or completed. There appears to be a slight positive relationship between the magnitude of the disaster and the quality of the Mission summary, but that conclusion only applies to the extremes of the distribution, i.e., to the very large versus the very small disasters.

The most complete data provided are measurements of U.S.-based contributions and those of other international donors. Beyond these, there are several measurements of disaster (e.g., number killed, injured, property damage, etc.) generally given, but their validity and reliability are uncertain. They present little or no systematic information on the problems of identifying and verifying victim needs. One can learn little about the problems relating to the

delivery of goods and services. There is practically no analysis on the use of these goods and services. There is seldom an accounting of activities or capabilities of the impacted country.

We assume that the principal purposes of disaster reporting are to document disaster events and to provide a basis for evaluating performance. There is some evidence to suggest that the Mission reports provide *one* resource to document disaster events. However, these reports clearly do not provide an adequate basis to evaluate performance at any level of response. At best they provide some descriptive insight into the actions taken by the U.S. government since 1965.

Our analysis suggests that the types of information listed in the recommendation are the only ones that the Missions are capable of collecting for purposes of disaster reporting. The majority of Mission reports are either never completed or, if completed, are very inadequate. We do not imply that the information requested by the report form is not important. However, the effort required to get it appears to exceed Mission staff time or motivation. Moreover, the Missions appear to have no real incentive to be thorough. We therefore recommend a simplified reporting form that relates directly to the data requirements of the Office's computerized historical file. This suggests that if a descriptively detailed accounting of within-country or external disaster response is desired, the AID/OFDA will have to undertake the effort on its own resources.

2. *The final case reports for 1965-1975 should be evaluated by the AID/OFDA staff.*

There are a total of 72 final disaster case reports for the period 1971-1975, and, as noted, we have been able to locate 26 Mission disaster summaries for the same period. The *relative* importance of Mission summaries for preparing the final case reports is not known. We do know that Mission summaries have historically been potentially the most comprehensive information resource. There are published case reports for all 26 Mission summaries that we have analyzed. This overlap permitted us to compare the two types of reports to determine the degree to which the Mission summaries contributed to the preparation of the final case reports.

The Mission summaries appeared to be the primary information resource in 69 percent of the cases. Of those remaining, Red Cross reports appeared to be used for writing both Mission summaries and case reports in two instances, the itemized categorizations of assistance provided by the summaries were used in two other final case reports, and narrative descriptions of disaster impacts or local responses were used in three other final case reports. Finally, there was only one instance in which the Mission summary was not used at all.

The above pattern does *not* suggest that Mission reports are major contributors to the quality of case reports. That issue should be the subject of

additional research, which makes explicit the AID/OFDA objectives for writing case reports, identifies user needs, and then evaluates the reports in terms of these kinds of criteria. What this pattern does suggest, however, is that the Mission summaries that are submitted are utilized to a substantial degree in the preparation of case reports by the AID/OFDA. The fact that gaps in Mission reporting have historically been a problem implies that the result is reduced effectiveness in the entire reporting system.

The implication of this recommendation is that the entire disaster-reporting system of the AID/OFDA should be thoroughly re-evaluated. Effective disaster reporting requires well-defined purposes, a logically stated rationale, focused data requirements and the resources to meet those requirements, methodological guidelines for data collection, and a well-developed dissemination and feedback system. The present U.S.-based disaster-reporting system is deficient in all these areas. Chapter 4 makes explicit the kinds of data that are relevant to international disaster assistance. That chapter should be given careful attention, because it dictates possible AID/OFDA reporting requirements for both pre- and postdisaster contexts. However, we presently know little about how other groups and organizations involved in international disaster assistance use disaster information for purposes other than public relations. For example, the AID/OFDA has a dissemination list of over 400 entries for its various report categories. For what purposes are the reports used? What impressions about the disaster context are created? Are these individuals, groups, and organizations aware of the unreliability of the numbers presented in the reports? One should note that disaster information has external as well as internal uses and misuses. Not only must the AID/OFDA make its own objectives and uses of information explicit, it needs to give some attention to the external effects of its reporting system.

Use of the Computerized Data Bank

The general purpose of the AID/OFDA computerized data system is to meet the information requirements of its disaster relief and preparedness assistance programs. When completed, the projected system will contain a data bank composed of historical data, country profiles, and a variety of procurement, logistics, and other operational data. The findings and recommendations discussed below summarize the Committee's response to three specific questions:

1. Can this system be used for purposes of modeling disaster impacts using integrated hazard analysis and vulnerability analysis?
2. Does this system provide for adequate baseline country profiles?
3. Can this system lead to improved operational performance of the AID/OFDA?

1. *It is not realistic for the AID/OFDA to undertake on its own a major disaster modeling effort. Planning for this kind of effort should be discontinued.*

The historical file is to contain data on specific disasters—their natures, locations, effects, and response requirements—in order to provide a basis for understanding the destructive forces that cause disasters so that their effects can be predicted. In effect, it is hoped that the historical file will provide the foundation for predictive models of disaster effects—i.e., it would contain data on the occurrence of potentially dangerous phenomena combined with data on the vulnerability of particular human settlements to those phenomena.

The present contents of the historical file are not configured to fulfill this goal. The file is inadequate for determining the frequency and occurrence of potentially damaging natural phenomena because it only records those events that have actually coincided with vulnerable settlement patterns. More broadly, for events of long recurrence cycles, such as earthquakes and volcanoes, the file has insufficient historical coverage on which to anticipate future patterns of occurrence. In general, hazard analysis involves very complex and expensive data gathering and analysis, which can be more appropriately undertaken by such organizations as the U.S. Geological Survey or the National Oceanic and Atmospheric Administration.

The system also does not have much potential for assessing the vulnerability of particular human settlements to particular disaster agents. As stated earlier, according to current methodology, the probability of loss is the product of the probability of occurrence of an event of given magnitude and the conditional probability of damage experienced by various structural types and materials at that level of magnitude. Thus the probability of damage at a given level of intensity for a given type of construction may be expressed in the form of a Damage Probability Matrix (DPM). Damage can also be translated in terms of the probability of injuries, fatalities, and property loss costs. With vulnerability expressed in a DPM, it becomes possible, using an estimate of an event probability, to estimate potential loss. In addition, in the immediate postdisaster period, it becomes possible, with prior knowledge of the distribution of populations and structures and the event intensity, to estimate rapidly the probable level of damage. DPM's are developed on the basis of observed damage that occurred in previous disasters. As stated earlier, such damage analyses have thus far been carried out only on modern and sophisticated building structures. There has been little effort to apply DPM's in assessing damage in the developing countries.

As now constituted, the historical file in no way provides the data on damage needed for developing damage probability matrices. The categories of impact are generally ill-defined and apparently have been subjected to differing interpretations from case to case. The data available include the follow-

ing: country, disaster agent, date, number killed, number of victims, and dollar damage. There is no record of the precise location of the impact areas, no record of the level of intensity, and no record of the total population exposed. This means that there are insufficient data for even the crudest estimates of vulnerability. To repeat: with no indication of the total exposed population (people, buildings, etc.), the simple recording of deaths or property loss does not provide the basis for vulnerability assessment.

The new disaster-history computer-program file provides for a far more detailed description of impacts, including quantifiable measurements of location and intensity. It is important to note that concern is limited to geophysical phenomena, fire, and health disasters. Civil strife and accident-caused disasters are not included, because they are not subject to the same predictive methodology. But, as pointed out earlier, the major expenditure of funds in the past 11 years has been for civil strife disasters. It is also interesting to note that the AID/OFDA has indicated its future intent to collect data that is designed to verify model predictions. Specifically, the data to be collected will compare the verified number of people killed, the number of victims, and the monetary value of damage with original estimates.

Another improvement in the AID/OFDA computerized data file is to distinguish between damaged and destroyed housing and to compare the proportion of damaged structures to the total number of structures. This is an appropriate but preliminary step toward developing vulnerability estimates. The new format would compare the percentage of damaged structures to total transportation, communications, and other public facilities. All of these dimensions represent major improvements. However, it remains to be seen whether there are valid data that will permit that kind of detailed analysis. And, in the case of damage to buildings, it will be necessary to acquire more detailed information if useful DPM's are to be developed. In this analysis, it will be necessary to distinguish between the major types of structures and materials and to subdivide damage statistics accordingly.

In sum, the data requirements and measurement problems related to disaster modeling are immense and extremely costly. The more detailed format for data collection is only a preliminary step in the right direction for vulnerability analysis, and it should be noted that most of the detailed information needed for this modeling is missing for the 900 historical events on file. Moreover, the modeling capacity is presently confined to a very narrow range of disaster agents—a range that does not cover the major proportion of the past assistance expenditures of the U.S. government. For these and other reasons, the Committee suggests that it is unrealistic for the AID/OFDA to undertake a major disaster-modeling effort as a part of its own information management system. Although this kind of research is clearly important, the present data file is insufficient for these purposes, and the costs to the AID/

OFDA to obtain the necessary data and perform the necessary analyses exceed the benefits the Office will derive from the effort.

One should not conclude that the historical file has no value. That file is a reasonably accurate expression of the work performed under the aegis of U.S. and other international disaster assistance programs, particularly since 1965. Much more can be done in a descriptive fashion to analyze recent expenditure patterns. With modest improvements in assessments of agent impact and victim needs, the AID/OFDA will have a better basis for isolating relationships between disaster-induced needs and disaster response. Combined with readily available measures of development, it will also be possible to make better estimates of the long-term developmental effects of disasters. These are worthy and manageable objectives for this historical file that should, in the long run, prove to be cost effective. We therefore believe that the historical file should be maintained and updated and that the costs of developing that portion of the computerized data file are justified.

Recommendations 2-6 relate to the potential of this system for providing predisaster baseline country profiles. As outlined in Chapter 4, a predisaster baseline profile logically includes information on hazard analysis, vulnerability analysis, and disaster-relevant resource analysis. We have already suggested that the potential of this system for integrated hazard and vulnerability analyses is very limited and that the necessary research should be pursued by specialist organizations better equipped to do that work. It is still essential to assess the potential of this system for disaster-relevant resource analysis in terms of the level of disaster preparedness and the general resource profile of countries subject to disasters. The present country profiles provide several types of information: descriptive data on the social and political structure, data on transportation and communications logistics, data on health conditions and the structure of health services, and limited data on disaster planning and preparedness. Thus it is clear that most of the currently available AID/OFDA data relates to what we have referred to as the general resource profile of these societies rather than disaster preparedness. Approximately 30 profiles have been completed out of a projected total of 35. The Committee's overall impression of these profiles is that considerable time and money have been expended in their development and that they provide a variety of potentially useful data. Although our impression of the profile data is generally favorable, we are particularly concerned with the question of how various elements of these profiles can be used most effectively. That question, so far as we can determine, has never been seriously raised by the AID/OFDA. We raise it now and hope that our response will provide direction for subsequent action.

2. *That portion of the country profiles related to disaster preparedness and planning should be regularly updated, and the task of keeping these profiles current should be assigned to the Technical Assistance Branch.*

As stated in Chapter 4, the level of disaster planning and preparedness in other countries is not something that can be readily documented. It was previously noted that there is no necessary relationship between the existence of disaster plans and the utility of the planning process. We suggested that profiles should contain descriptions of planning contents and the basic organization of disaster response in order to provide insights into the problems being considered, that preparedness and mitigation measures should be documented where they exist, and that any standby emergency facilities and equipment and their locations should be recorded. Our present reading of these profiles suggests that, at least for the national level, the AID/OFDA is collecting and storing information on these various dimensions.

This is useful, because all of these dimensions refer to the level of societal preparedness that outside agencies should be aware of in organizing their own response. However, we also noted that preparedness is a constantly changing process that must be continuous to be effective. The monitoring of that process must also be continuous. The implication is that the AID/OFDA must be committed to making the necessary effort to keep this preparedness profile up to date. This function could be routinely assigned to the Technical Assistance Branch, because it will require frequent contact with the appropriate officials in recipient countries. It should also be noted that disaster experience and its historical timing also potentially relate to preparedness. Since those data are readily available from the historical file, they should be integrated with any continuing assessment of societal preparedness.

3. *That portion of the profiles related to the county's languages, ethnic groups, political organizations, and political relations represents useful supplemental briefing material for the AID/OFDA staff making site visits. However, these data need not have been computerized to serve this purpose. No further efforts should be expended to update this portion of the country profiles.*

We believe that the more important practical information involves close and continuing contact with relevant organizations and officials of the disaster-stricken society and an assessment of the current political, social, and cultural realities of dealing with the government and its citizens. That kind of detailed, informal knowledge is possessed by the AID Mission personnel, and it cannot adequately be computerized. This implies that heavy reliance should be placed on the knowledge and interpersonal skills contained in the staff of the AID Mission. It also suggests that direct field contact between the AID/OFDA and the AID Mission staff should be a normal requirement for all major U.S. disaster response efforts.

4. *That portion of the country profiles related to general level of societal development has little direct operational use, and the AID/OFDA is not well equipped to utilize the data for purposes of examining the effects of disaster on societal development. We therefore recommend that the data on development variables not be updated and that information on disaster impacts and*

responses (from the historical file) be made available to development research experts who, in turn, can undertake the rigorous statistical analyses required.

Standardized data on the level of societal development have at least two potential functions in the disaster area. First, for *operational* purposes, it is reasonable to assume that the more highly developed a society the greater its capacity to meet its own disaster-generated needs. Second, for *research* purposes, developmental data provide the necessary baseline for estimating the long-term effects of disaster on societal development. In both cases, if the data are to be of value they must be longitudinal rather than cross-sectional. Particularly in the latter case, it is not enough merely to update the information; periodic iterations of the measurements must be regularly stored so that time-series comparisons can be made.

The present country profiles contain many development measurements and therefore represent a start toward serving both operational and research purposes. If there is a problem, it results from the fact that the selection of variables was not guided by the existing corpus of development theory. Before undertaking any further updating of this file, developmental specialists should be consulted about identifying key developmental variables. However, we have a far more basic concern here. Although both operational and research functions are arguably important, it does not appear to us to be either appropriate or practical for the AID/OFDA to pursue them. The operational function is of minimal utility, because it is difficult, if not impossible, to make decisions on the basis of very fine statistical distinctions among societies that are all generally underdeveloped. Finally, the AID/OFDA is simply not well equipped to perform the research function. It would be more appropriate, practical, and valuable for the Office to furnish the available impact and response data to development research experts who, in turn, can undertake the rigorous statistical analyses that will be needed. It should be added that the link between disasters and general development is an issue with which the entire agency should be concerned. The initiative and leadership in developing contacts with the research community on this linkage should come from the top echelons of AID.

5. *Those portions of the country profiles pertaining to topography, climatology, transportation systems, communications systems, and power sources are important for anticipating the logistical problems of disaster response. These data should be maintained as a basic planning and management tool.*

We believe that the above data are of substantial importance for anticipating a whole series of logistical problems in disaster response. They should be used by the AID/OFDA as a basic planning tool and as a management frame of reference for postdisaster response. The data are well organized and usefully presented. We believe that the costs involved in generating this part of the profile were justified.

6. *Those portions of the country profiles pertaining to basic health conditions and the structure of health services should be maintained and updated.*

We believe that information on *basic health conditions* is of sufficient importance for disaster preparedness and response to justify the costs needed to collect, store, and update this information. For example, measurements of mortality and morbidity have relevance for both predisaster planning of general medical needs and for general epidemiological surveillance purposes. More specifically, disease prevalence has implications for emergency medical-supply needs. Communicable disease patterns have relevance for postimpact outbreaks, long-term rehabilitation problems, and for possible protection of expatriate personnel. Regional patterns of disease have potential import for the logistics of relief. Nutritional habits and nutritional status are important inputs for both short- and long-term food and general health requirements. However, it should be recognized that the validity and reliability of epidemiological data vary from country to country. This should be borne in mind when making intercountry comparisons. In any event, general health information, wherever possible, should be standardized for comparative purposes.

The storage of data on the *structure of health services* illustrates quite well the point made in Chapter 4 about the need to gather data on disaster-relevant organizations, i.e., organizations whose tasks and involvement in disasters can be anticipated before the fact. The Committee agrees that collection of this type of information is appropriate. However, data on the number of hospitals, number of beds, and number of health personnel as a proportion of total population is of insufficient specificity for direct operational use. Rather, much more detailed knowledge is needed on their location and distribution in relation to the disaster site. Thus, as suggested in Chapter 4, hospitals should be grouped at least by districts or provinces, and preferably by cities. Geographic (rural versus urban) and administrative (public versus private) distinctions should also be made on a regional basis. Perhaps even more importantly, personnel and facilities should be cross-linked so that the types and numbers of medical personnel available in various hospitals can be determined. In addition, details should be given, wherever possible, on specific equipment available in medical facilities. It should also be noted that health organizations are not the only disaster-relevant organizations that can furnish knowledge useful in planning external responses. Unfortunately, data on disaster-relevant organizations in developing nations cannot generally be retrieved at modest cost.

Recommendations 7 and 8 represent the Committee's assessment of the operational potential of the remaining two elements of the computer system: namely, the procurement file[1] and the crisis management (operations) file.

[1]The procurement file contains a logistics element that will not be discussed here because it has only tangential relevance to the activities of the AID/OFDA. The logistics

The AID/OFDA has given the above systems very little attention thus far, and they are virtually devoid of data.

7. *The costs of developing and updating a procurement file are likely to be high. In light of the diffuse nature of needs assessment, we think that a major development effort at this time is inappropriate. We therefore recommend a small-scale feasibility study—one that selectively examines commodities that have previously been donated in large amounts.*

The purpose of the *procurement file* is to provide data on the commodities that can be furnished by various suppliers, together with data on availability, cost, and packaging considerations. On the face of it, one would be very hard pressed to think of more useful information that could be retrieved quickly during the emergency period. Of course, until needs assessment becomes a more refined art, a commodity repository must necessarily be underdeveloped. In spite of this basic problem, we believe that the very effort to make explicit the kinds of services the United States is capable of providing will lead to a far more organized U.S. response. Not only is assessment of victim needs a problem, but disaster-stricken societies have the basic requirement of knowing what is available. It would do little good to send an AID/OFDA staff member to a major disaster site with very imprecise knowledge about what the United States has to offer. A procurement file can potentially provide that kind of specific information quickly.

The costs of developing and updating a procurement file may be substantial. And, in light of the diffuse nature of needs assessment, the Committee believes that a major development effort is inappropriate at this time. A relatively small-scale feasibility study—one that examines selected commodities that in the past have been donated in large amounts—may be more useful.

8. *The crisis management file has little potential to "automate" disaster response. However, the crisis management concept is potentially both a useful postdisaster reporting methodology and a basic learning tool for future responses. We recommend a feasibility study to assess the crisis management concept for these functions.*

The basic data inputs for the *crisis management file* are to be obtained from a continuous monitoring of any disaster in terms of requests or offers of assistance and their disposition. On the basis of these inputs the Office would then be able to program a continuous process of transactions. Thus the

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element was not developed under the aegis of this Office, but was adapted from a Department of Defense transportation logistics model designed for broader use at AID. The model appears to have its greatest potential for long-term food distribution and recovery programs in regions affected by famine. The Committee believes that impetus and support for the model's further refinement should come from the regional assistance bureaus at AID.

system would supposedly expedite a rational link between available resources and disaster-generated needs. The idea is conceptually elegant, but we think practically untenable as an operational guide. It should be clear that the disaster context is far too complex and fluid to be simply programmed. In view of the large number of participants involved, the multiplicity of interests, and the diffuse nature of needs assessment, it is naive to think that international disaster assistance can be "automated." However, the crisis management concept provides a potentially useful postdisaster reporting methodology and a basic learning tool to improve future responses. Both of these functions require a reasonably accurate accounting of what happened during the emergency period.[2]

Although we have not evaluated the present AID/OFDA system of recording requests for and offers of disaster aid during emergency operations, we think that the present system of manually recording these requests and offers should be maintained. The follow-up requirement is to develop a coding system for the data so that they can be stored in the computer. Once that programming requirement is accomplished, efforts can then be undertaken to identify transaction patterns and processes in various types of disasters. The key to this entire effort is, once again, adequate data collection. We therefore suggest the need for a feasibility study to assess the potential of the crisis management system.

[2] As stated earlier, the AID/OFDA has four regional stockpiles. Implementation of the procurement and crisis management files should also shed considerable light on the relative costs/benefits of alternative stockpiling arrangements.

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