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STRATEGIC PLANNING EVALUATION STUDY
OFDA
NON-RELIEF ACTIVITIES
VOL. I
MAIN TEXT

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Submitted to:

Mr. Barry Heyman, OFDA

MANAGEMENT SYSTEMS INTERNATIONAL

600 Water Street S.W., NBU 7-7
Washington, D.C. 20024

telephone: (202) 484-7170
telex: 4990821MANSY fax: (202) 488-0754

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EXECUTIVE SUMMARY

After more than a decade of funding non-relief activities -- over 470 separate activities dealing with disaster preparedness and mitigation -- A.I.D.'s Office of Foreign Disaster Assistance (OFDA) commissioned an appraisal of this aspect of its program. The review of experience from 10 years of work was also to be used to plan for the 1990s. This Strategic Planning Evaluation Study is the result.

Management Systems International (MSI) carried out the study which had three major components: an evaluation of selected OFDA activities; the identification of key lessens learned; and development of the framework of a strategy for continuing operations.

The basic methodology included archival research, interviews, site visits and case studies. In addition, in order to shape its work, MSI:

- Used the Logical Framework;
- Identified key factors to the success of OFDA activities and incorporated them into a Case Study Data Sheet for use in cross case analyses;
- Developed an experimental means to measure cost-effectiveness of activities; and
- Developed hypotheses to be tested in the retrospective research as well as concerning the future of the OFDA program.

OFDA's principal reputation is as an action-oriented office responding in a rapid and effective manner to disasters. The office's important, decade-long support of disaster preparedness/mitigation is much less well known.

MSI studied OFDA's non-relief portfolio and sampled in detail several dozen of its activities. It became clear to us that virtually all of the activities have been of vital concern to A.I.D., the wider community of donors, national governments and, most importantly, the people whose lives and resources are most at risk from disasters -- the poor.

In the last two decades, the UN reports, 3 million people have been killed in natural disasters alone, another 800 million affected, and physical damage has been in excess of $23 billion. Between 1979 and 1987, the U.S. Government (USG) reported expenditures of $2 billion on disaster responses outside the U.S. Because of population growth and environmental degradation, there has been a trend toward increasing frequency and severity of disasters. Long-term development investments made to improve lives are continually eroded as a result of natural and man-made disasters. The interrelatedness of disaster, development and the environment -- with adverse cross-effects -- is becoming ever more clear. Only through investments in preparedness and mitigation and, whenever possible, the integration of such measures in regular development objectives can these dangerous trends be slowed down or reversed.

The MSI study shows that OFDA played a leadership role in developing more refined approaches to natural and man-made disasters. The mid-1970's, emphases on the stockpiling of supplies and the development of operational plans gave way to more sophisticated efforts to develop forecasting and early warning systems, to train search and rescue teams and to launch public awareness programs. Such "preparedness" activities further evolved to include disaster mitigation, a broader and (to some people) an all encompassing approach to the problem, taking into account not only loss of life and destruction of property but also the devastating socio-economic impact of disasters. Examples of mitigation activities include:

- Regulation of land use, such as zoning laws, covering floodplains, seismic areas, or landslide areas;
- Improving building codes and construction practices to increase structural resistance to earthquakes, high winds, or flooding; and
- Planting of crops that are resistant to seasonal events, such as cereals that can be harvested before the flood season, or bananas that can withstand high winds.

OFDA has been at the forefront in taking preparedness and mitigation concepts and making them operational realities. Largely on a pilot or target-of-opportunity basis, OFDA built a portfolio which included a wide range of key activities, produced a rich lore of lessens learned, experience upon which OFDA, other donors and national governments can build during the U.N.-sponsored International Decade of Natural Disaster Reduction (IDNDR).

We found that OFDA might have done many things differently and, in some cases, better over the past ten years. For example, many activities could have been more adeptly designed and the overall portfolio better focussed. Specific shortcomings were found in insuring the financial and institutional sustainability of many OFDA supported activities and in training. Often, these were caused by insufficient attention to formulating an overall strategy and inconsistently applied processes for the design, monitoring and evaluation of activities.

Other circumstances also adversely affected OFDA's performance. For example, as OFDA became more deeply involved in the new field of preparedness/mitigation, it could not depend on knowledgeable USAID field missions for consistent help. Often OFDA's small staff of dedicated professionals were seized by the latest crises, and were therefore unable to spend uninterrupted time strategizing or giving full professional attention to the design, monitoring or evaluation of non-relief activities. The program also suffered an unusually high turnover in leadership -- seven Directors in the ten years. Each Director was new to A.I.D. and brought varied levels of knowledge, interest and commitment to the field of preparedness/mitigation.

MSI's study of the strengths and weaknesses of a range of OFDA's major preparedness and mitigation activities from the past ten years suggests the need for important technical, tactical, managerial and planning changes. Indeed OFDA staff both in Washington and the field, under new leadership, has already began to work to make just such changes. But as the team looked back and thought ahead, it was obvious that OFDA has already performed an extremely valuable service. Its wide ranging portfolio of preparedness and mitigation activities has demonstrated the value of the approach and increased the world's understanding of the broad variety of preparedness activities. The MSI team hopes that the past shortcomings of OFDA's program cited here are in no way used to obscure the importance of the subject itself. The time for consideration of disaster preparedness and mitigation has arrived. OFDA has led the way, and should continue to do so.

As OFDA begins the new decade, MSI believes that the findings of its study, summarized below, will greatly strengthen OFDA's preparedness and mitigation program.

In summary, the study:

- SUGGESTS CHANGES IN HOW OFDA MANAGES ITS NON-RELIEF ACTIVITIES. These include:
  - Upgrading existing management systems dealing with all aspects of design, monitoring and evaluation appropriate to OFDA's specialized needs rather than simply adopting AID's regular procedures
  - Changing the way small activities are managed
  - Ensuring that relief and non-relief activities are treated as co-equals within the office
  - Establishing a comprehensive and operationally useful training data base designed to promote consistent evaluation and follow-up
  - Establishing clearer working relationships with contractors placed in field management positions
  - Consider the use of contractual methods designed to ensure greater ease of access to needed consultant assistance

- DEMONSTRATES THE UTILITY OF SEVERAL METHODOLOGIES WHICH COULD BE INCORPORATED INTO FUTURE EFFORTS IN DESIGN, MONITORING, EVALUATION AND STRATEGIC PLANNING. They are:
  - The Logical Framework
  - Identification of 12 factors (and five clusters) important to project performance
  - Attempts at measuring cost-effectiveness, most notably a nine-cell matrix which permits comparison of ranges of activity costs to either: performance; potential to prevent deaths and injuries or potential to avoid property damage and negative socio-economic development

- SUGGESTS CHANGES IN HOW OFDA CONCEPTUALIZES ITS NON-RELIEF PORTFOLIO. These include:

  - Preparing a Strategy Statement for the Decade

  - Adopting three to five program-oriented Purpose statements for the entire portfolio

  - Funding only those activities which would produce Outputs directly contributing to the Purposes

- HIGHLIGHTS THE NEED FOR A RE-DEFINITION OF DISASTER PREPAREDNESS/MITIGATION EMBRACING THE OBJECTIVES OF LONG TERM, SUSTAINABLE AND ENVIRONMENTALLY SENSIBLE ECONOMIC DEVELOPMENT

- IDENTIFIES THEMES AROUND WHICH A COMPREHENSIVE STRATEGIC PLAN CAN BE DEVELOPED. They include;

  - Increasing the priority given to Africa

  - Increasing support for the growth of local capacity, especially through national and regional institutional building and first responder training

  - Making the re-definition of disaster preparedness/mitigation an operational reality

  - Continuing the downward trend in the percentage of budget allocated to technology transfer activities and ensuring that objectives involving technology transfer are fully integrated with all other aspects of an activity's performance

  - Preparing for an increase in the frequency and severity of man-made, technologically-induced disasters

  - Developing activities which recognize the differential effects of disasters on the poor and women

- SUGGESTS WAYS IN WHICH OFDA'S RELATIONSHIPS WITH OTHER COMPONENTS OF AID AND THE DONOR COMMUNITY MIGHT CHANGE. They include:

  - Reaffirming the USG's commitment to provide leadership in this field during the next decade

  - Creating an interagency coordinating mechanism, such as a Sector Council, chaired by OFDA

  - Improving systems to increase regional bureau and USAID participation and to identify regional activities which should have a disaster mitigation objective

  - Participating fully in the International Decade for Natural Disaster Reduction

- Continuing to explore possible collaboration with the United Nations Disaster Relief Organization

I. BACKGROUND

DEFINITIONS

Some basic definitions will be helpful not only to the discussion in this chapter but also as points of reference throughout the study.

Three types of planning activities are involved as part of efforts to reduce the negative effects of a disaster before it occurs: disaster prevention, disaster preparedness, and disaster mitigation.

Disaster prevention focuses on the hazard that causes the disaster and tries to eliminate its effects, for example, by building embankments to control flooding.

Disaster preparedness is planning intended to cope with disaster situations or similar emergencies that cannot be avoided. It seeks to minimize loss of life and damage and to organize and facilitate timely and effective search and rescue, relief, sheltering and rehabilitation. Preparedness must be supported by the necessary legislation, regulations, and operating procedures. Examples of preparedness concerns are:

- Forecasting and warning
- Education and training of the population
- Organization for and management of disasters
- Operational plans
- Training relief and search and rescue groups
- Stockpiling supplies
- Development of evacuation plans

Disaster mitigation measures are those that minimize the destructive effects of disasters. It aims at reducing the devastating economic impact associated with disasters. Examples of disaster mitigation are:

- Regulation of land use, such as zoning laws, covering floodplains, seismic areas, or landslide areas

- Improving buildings to increase structural resistance to earthquakes, high winds, or flooding;

- Planting of crops that are resistant to seasonal events, such as cereals that can be harvested before the flood season, or bananas that can withstand high winds.

Well-planned mitigation measures can be integrated at little cost with regular development activities. Because of the broader and all-encompassing implications of the term disaster mitigation, there has been a gradual trend toward its increased use in substitution for disaster preparedness. Often within the international donor community, mitigation has tended to emphasize both planning and action and the linkages among disasters, relief operations, and development.

SCOPE OF WORK/METHODOLOGY

Problem

In 1988, after more than a decade of funding non-relief activities the Office of Foreign Disaster Assistance (OFDA) of the Agency for International Development (A.I.D.) began the process of reaching a consensus on goals and objectives for the 1990s. The first step was a review of experience, drawing lessons and ideas from the experience, and applying the lessons to plans for the future. Therefore, it was decided to undertake a Strategic Planning Evaluation Study which took as its point of reference OFDA's experience during the decade 1979-1989.

Scope of Work

The study was divided into two phases. For the first, preparatory, phase, OFDA issued a Work Order to Booz*Allen Hamilton (B*AH) to help prepare for an evaluation of a decade of OFDA non-relief activities. The effort yielded three products: a compendium of profiles of 478 non-relief activities; 42 detailed project chronologies of the most important activities; and a Scope of Work to be used as a guide in carrying out the strategic planning evaluation study. This work was completed in late 1988.

Management Systems International (MSI) was selected to complete the second phase of the study through its Indefinite Quantity Contract (IQC) No. PDC-5317-I-00-8122 and Delivery Order #14 was signed on June 26, 1989.

The Scope of Work is divided into three major sectors:

- Evaluation of Activities
- Lessons Learned
- Strategic Design

Annex 1 contains the full text of the Scope of Work, while Annexes 2 and 3 contain a List of Acronyms and a List of Interviews.

Method

Throughout the study, the MSI team frequently used the Logical Framework methodology. The methodology and a Schematic Logical Framework for OFDA's non-relief activities appears in Annex 4. Early in MSI's work, a retrospective and prospective Conceptual Analysis Framework was also prepared (see Annex 5). These two documents provided a general framework from which to proceed. The team then developed a set of hypotheses to shape the research. The hypotheses expressed what seemed to be the conventional wisdom about OFDA held by a variety of individuals.

An important step in the evaluation was the selection of activities in the OFDA portfolio to be the subject of case studies (see Annex 6). Several criteria were used to narrow the field from the compendium of 478 activities. For example, activities selected had to have: (a) cost more than $50,000;

and (b) been in operation for at least several years. However, since approximately two-thirds of OFDA's activities cost less than $50,000, the study also included a number of activities in this category as well. These were considered in case studies of larger projects to which the under $50,000 activity was directly related.

Application of the selection criteria resulted in selection for study of 25 country-specific, region-specific and worldwide activities. In addition, two special studies were undertaken.

- An overview of training activities, drawing heavily on information collected during field visits;

- A review of management issues relating to field office operations.

The selection of case studies was made by MSI with the review and concurrence of OFDA.

Volume II of the study contains the specific case studies.

The Scope of Work gives six sets of questions to guide the evaluation of activities within the overall conceptual framework. MSI refined these questions into 13 factors, which were incorporated into a multi-purpose written instrument called the Case Study Data Sheet (See Annex 7). The Data Sheet served as a guide for field investigators, a collection instrument for objective data and a score sheet. Its development was important to insure key data were gathered, and that each of nine team members was gathering similar information. Tabulation of the data sheets was a basis for the evaluation results that are summarized in the section entitled Cross-Case Analysis/Synthesis.

A Case Study Outline (see Annex 8) was developed simultaneously with the Data Sheet. The outline structured the objectives of the field research and supplied guidelines for writing individual reports. Utilizing the outline of the case study, team members collected data on the project context, the planning process of the activity and analyzed the project performance of the activity.

Each Case Study Report and the accompanying Case Study Data Sheet was reviewed by at least one other member of the team to provide peer group review and promote uniformity. Since the Case Study Reports expanded and supplemented the information on the Data Sheets, they were used freely to interpret and clarify the cross-case analysis.

The descriptive and analytical work associated with the case studies provided the major evidence for findings regarding the hypotheses. However, final judgments also relied upon: (a) team members' prior experiences with non-relief activities in general and OFDA in particular, (b) archival research, (c) interviews, and (d) field visits to activity sites.

The key team members of the MSI team who worked on this study were:

- David Read Barker
- Nan Borton
- David Callihan
- Edward Glaeser
- Lawrence Heilman
- Robin Mason
- Louis Mitchell
- Anthony Schwarzwalder (Team Leader)
- Roberta Warren

In the course of conducting the study, the team visited ten countries -- Bangladesh, Costa Rica, Dominican Republic, Fiji, Indonesia, Jamaica, Peru, Philippines, Switzerland and Thailand -- and met with more than 200 individuals at 81 institutions.

Cost-Benefit and Cost-Effectiveness

The Scope of Work for the evaluation specifies that the conceptual analysis framework for the study "... will be based on cost-effectiveness analysis, cost-benefit analysis, strategic planning, and other appropriate methods and will take into account humanitarian, political, economic and social factors."

The matter of cost-effectiveness and cost-benefit deserve special mention since measuring cost-effectiveness of OFDA-financed activities was one of the central issues in this evaluation. Although the method chosen did not yield credible results, the effort should not be simply ignored.

Cost-Benefit Analysis is an analytic measurement of the alternative benefits of a unit of money spent. It begins by assigning a monetary value to the likely benefits and costs of a project over time. Normally expressed as a fraction, the cost-benefit ratio sets as the numerator the aggregate stream of costs over time and the denominator as the aggregate stream of benefits over time. Both costs and benefits can be discounted to reflect the time value of money. Projects with the highest ratio of benefits to costs are most preferred.

The requirement that benefits be monetized is a serious limitation when benefits cannot be accurately quantified. This is often the case regarding disaster preparedness and mitigation activities. The practical difficulties of attempting a cost-benefit analysis appeared to be so formidable that the MSI team dropped the effort early in the study.

Cost-Effectiveness is an analytic measurement which is commonly expressed as a fraction:

$$\text{Cost-effectiveness} = \frac{\text{(Additional)(purpose level) result}}{\text{(Additional) money input}}$$

Cost-effectiveness analysis can be used in two ways: (a) to compare the costs of alternative methods of achieving a particular desired result or; (b) more rarely, to compare alternative results from a fixed money input. Good management chooses the alternative with the highest Cost-Effectiveness, i.e., either the greatest result for a given amount of money or the least amount of money for a given result. Unlike cost-benefit analysis, which requires that benefits be quantified in money terms, cost-effectiveness analysis is useful when results cannot be monetized. It is more frequently used to analyze projects supported by A.I.D. and, to some extent, by other donors as well.

In both formal and informal efforts to identify evidence regarding the cost-benefit or cost-effectiveness of the OFDA-supported activities selected for case study, the MSI team reviewed the professional literature on disasters and interviewed several of the leading professionals. The results were surprising. We found that there does not appear to have been any serious research that has attempted to determine the cost-effectiveness of disaster preparedness and mitigation activities.

OFDA has not previously sought an evaluative judgment on the cost-benefit or cost-effectiveness of its non-relief activities. Within the United Nations system, the agencies most concerned with disasters and disaster preparedness/mitigation are the United Nations Development Programme (UNDP) and the UN Disaster Relief Office (UNDRO). Neither of these agencies have successfully obtained quantified data on cost effectiveness of any of their disaster preparedness undertakings.

The Federal Emergency Management Agency (FEMA) has commissioned several evaluations which did not find, or have not yet found, cost-effectiveness in specific FEMA-supported or federally mandated programs. A study now underway, on school construction in the Pacific Northwest, may yield some quantified data. A major study, on the results of floodplain zoning throughout the U.S., is under discussion but perhaps several years from starting.

Cost-effectiveness analysis was attempted on all projects for which Case Study Data Sheets were completed. The method was to construct a fraction. The numerator was the average score of the first 12 of the 13 coded factors, which we considered to be a consistent measure of overall performance. The denominator was a cost comparison factor based on the relationship between the cost of an individual project and the average cost of similar OFDA-funded projects targeted at the same threat. Arithmetic results greater than one were taken to reflect relative degrees of cost-effectiveness; results less than one were taken to reflect cost-ineffectiveness. Unfortunately, the method used produced incomplete results. (See Cross-Case Analysis/Synthesis.) This was consistent with the methodological problems other investigators had faced and the problems we foresaw.

THE CASE FOR DISASTER PREPAREDNESS AND MITIGATION

In addition to profound humanitarian motivations associated with preventing death and ameliorating suffering, efforts to prepare for and mitigate results of natural disaster are amply justified in political, social, economic, and environmental terms:

- Between FY 1979 and 1987, the USG spent $2 billion on disaster response outside the U.S.;

- The U.N. reports that during the last two decades, 3 million people have been killed in natural disasters, with another 800 million affected, and physical damage in excess of $23 billion;[1]

- OFDA responded to 55 disaster declarations during FY 1989. During the course of this study, which began in late July 1989, a total of 39 declarations have been issued by U.S. Ambassadors which required OFDA action. (See Annex 9)

- Because of population growth and environmental degradation, both the frequency and the severity of disasters is increasing; the numbers above may well be modest when compared to future costs, should preparedness and mitigation not be supported at adequate levels;

- Because poverty exacerbates already existing vulnerabilities, the poor are at the greatest risk from natural disasters. Their lack of resources means that disasters have serious and long-term social (creation of orphans), economic (infrastructure destruction), and political (instability and food riots) effects which financially and managerially-strapped governments cannot adequately address;

- There is a considerable body of evidence which shows that poverty differentially affects women. This is likely to be true in the case of disasters as well;

- For the same reasons, the considerable development investments made in improving lives in developing countries are also at significantly high risk in disasters. The hard-won gains of an AID-financed rural development scheme, for example, can be lost overnight if no disaster preparation or mitigation actions have been taken. Thus, relatively small investments in preparedness/mitigation can protect much larger investments in development.

- The condition of our environment affects both disasters and development, and is affected by them. The interrelatedness of disaster, development, and the environment is emerging as a dominant issue for the 1990s. Some examples of this relationship are shown below.

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1. Anderson, Mary B. and Peter J. Woodrow, Rising from the Ashes, 1989 Westview Press

Development Activity	Can Help Mitigate The Effect of:
reforestation	floods, siltation, food shortages, drought, famine
nutrition programs	food shortage, drought, famine
development administration	any type of disaster requiring efficient management response by local authorities
food security/storage, poverty alleviation (including employment generation, small scale enterprises etc.)	food shortage, drought, famine, any disaster producing negative socio-economic impacts
regional, national or local planning	earthquakes, volcanoes, typhoons, cyclones etc. when hazard assessments are incorporated in the planning process
urban development	earthquakes, floods, severe storms etc. if appropriate building codes are adopted and enforced
agricultural research	floods, food storage, drought, famine
public works	any type of disaster having a destructive impact on national infrastructure
housing programs	typhoons, cyclones, hurricanes, earthquakes
primary education	any type of disaster in which public awareness is important

The MSI study team saw many instances in which OFDA activities have had a profound effect on disaster preparedness. In each case it is safe to say -- although difficult to quantify -- that OFDA's work resulted in fewer deaths and decreased destruction or caused preventive actions to be taken which will have the same result should disaster strike. For example:

- The Pan Caribbean Disaster Preparedness Program (PCDPP) was fully tested during Hurricane Hugo this year, and OFDA's investments in communications equipment and training meant that affected nations had both the personnel and the information to handle emergency responses locally;

- In Peru, an OFDA-funded tsunami study resulted in relocating several buildings, including the fire station and a home for the elderly, away from a high-risk flood plain;

- In Thailand, plans for a large dam were cancelled when an OFDA seismology study indicated greater than previously known risk of earthquake in that area;

- In Jamaica, OFDA supported the government's efforts to create the Office of Disaster Preparedness which successfully coordinates government resources for preparedness and relief, and which has carried out successful public awareness activities and evacuations in advance of several hurricanes;

- In Indonesia, OFDA worked with the government to create a disaster management center which the U.N. says leaves "no doubt that the preparedness and prevention initiatives have led to the decrease of the victims from disasters."

The new decade has been designated in the UN General Assembly as the International Decade for Natural Disaster Reduction (IDNDR), by resolution 42/169 on 17 December 1987. The objective of the Decade is to reduce through concerted international actions, especially in developing countries, loss of life, property damage and social and economic disruption caused by natural disasters. Eight types of natural disasters are listed in the declaration:

- earthquakes;
- windstorms;
- tsunamis;
- floods;
- landslides;
- volcanic eruptions;
- wildfires; and
- other calamities of natural origin, such as grasshopper and locust infestations.

The first of the five goals of the Decade are to "improve the capacity of each country to mitigate the effects of natural disasters expeditiously and effectively".

A major step toward implementation of the Decade was the appointment by the Secretary General of an International ad hoc Group of Experts, chaired by Dr. Frank Press, President of the National Academy of Sciences. The report of the group (A/44/322), submitted to the Economic and Social Council on 20 June 1989, emphasizes the pluralistic nature of the key participants in the Decade and the importance of an integrated approach. The highest of 11 priorities is "recognition that proper attention and allocation of adequate resources to planning, preparedness and prevention will ultimately lead to the reduction of natural disasters." The report assigns to national governments the key responsibility to implement national programs. Thus, the new decade will seen even greater emphasis on preparedness/mitigation and increased involvement on the part of several donors.

As a result of this study, the MSI team is convinced that disaster preparedness and mitigation activities are vitally in the interest of this and all nations. The report that follows points up successes and the shortcomings of OFDA's non-relief activities over the past decade. Some things, as is always the case, could have been done differently, and better. But as the team looked back and thought ahead, it was obvious that OFDA has already performed an extremely valuable service. Its wide ranging portfolio of preparedness and mitigation activities has demonstrated the value of the approach and increased the world's understanding of the broad variety of preparedness activities. The MSI team hopes that the past shortcomings of OFDA's program cited here are in no way used to obscure the continuing need for OFDA to support disaster preparedness/mitigation activities. The time for a wider consideration of disaster preparedness and mitigation has arrived. OFDA has led the way, and should continue to do so.

II. THE LAST DECADE

OFDA HIGHLIGHTS: 1979 - 1989

In March 1979, OFDA developed its Central Program Strategy Statement (CPSS), which states the Office's three goals:

- Effective emergency relief and rehabilitation
- Host country disaster preparedness
- Early warning systems

These goals have not significantly changed in the course of the intervening ten years. What has changed is OFDA's approach to these goals. OFDA has demonstrated an increased ability to learn from its experience (and that of others), to support and be positively affected by scientific advances and to use these skills to stay in the forefront of disaster preparedness/mitigation worldwide. This is particularly notable since, for a good part of the decade, no individual in OFDA was dedicated to the development and implementation of disaster preparedness/mitigation activities. It is significant that the activities listed by UNDRO as "cutting edge" are very much what OFDA has already been doing: engineering for flood prevention and control; hazard assessment and warning; earthquake-resistant design and construction; and public information and education.

That these goals have remained at the center of OFDA's work on disaster preparedness/mitigation is a tribute to the continuity of the staff and the programs it has developed. During the decade, the office had seven Directors, all of whom came from outside the career service. Each new appointee required briefings, time to settle in and make his or her own way in the new job. Each Director expressed an interest in and commitment to disaster preparedness/mitigation; however the degree to which commitment became a reality differed greatly. While there has been a high frequency of turnover at the top, the staff has maintained a core of well-qualified professionals who have remained in the office for many years.

Throughout the decade OFDA has been regarded as somewhat of an anomaly within AID's organizational structure. Relief activities, although outside the purview of traditional AID programs, have seemed acceptable to many since they responded to a specific, tangible event, and generated goodwill and enjoyed broad support from most of the public. Regrettably the importance of preparedness/mitigation was even less understood by some, for such activities seemed not to fit comfortably with development or humanitarian objectives.

Throughout the decade, OFDA has been insulated from budget cuts which affected many other A.I.D. offices; OFDA has generally had a steadily increasing core budget for its preparedness and mitigation activities. Fiscal years (FY) 84 through 87 showed a dramatic jump in funding level due to the Supplemental Appropriation enacted in response to the Sahel famine. However, this was the exception rather than the rule of OFDA operations. The FY88 budget of $5,655,144 was lower than the previous four years (for reasons given above), but is roughly $300,000 higher than the FY83 budget, and nearly a million dollars more than the FY82. Regional allocations have remained relatively consistent throughout the decade, with Latin America receiving close to 50% of the total budget. The exception is the four-year increase for Africa. The African allocations were, for the most part, passed through to the Bureau for Africa (AFR) and carried no residual management or oversight responsibility.

OFDA's relatively secure and comparatively large budgetary allocations permitted it to pursue an approach which, to some degree, could be characterized as the financing of targets of opportunity. This is neither unusual not inappropriate during the early years of a donor's effort in a relatively new area of interest. Examples of this approach would include A.I.D.'s early leadership in funding nutrition, rural development and non-formal education activities. The hoped for outcomes of such an approach include:

- Increased awareness of the importance of the activities;
- Learning through a diverse set of experiences;
- Reducing the time required to produce tangible results.

All of these outcomes have been, to varying degrees, features of the last decade as far as OFDA is concerned.

Over the decade, OFDA has applied its experience to broaden the definitions of its work and its scope (both geographically and in terms of variety of approaches/activities), and deepen its involvement with priority governments, their people, and their communities. Improved performance and effectiveness, during the decade reflect OFDA's professional attention to its own activities and to advances in its field, and its willingness and freedom to take risks in its choice of activities.

At the beginning of the decade, disaster preparedness was response-oriented, being seen predominently as an issue of managing emergency responses and of stockpiling relief goods. Over the course of the decade, OFDA broadened the scope to include the problem-oriented concept of mitigation. OFDA began studying the causes of disasters, and not simply the most effective response to them.

Ten years ago, precise understandings of what triggered major disaster was not known, let alone the best response to them. Research, most of which was associated with OFDA's early warning activities (Goal 3 above), has given OFDA and its colleagues new understanding of the problems posed by earthquakes, volcanoes, and climatic changes. OFDA's work in increasing knowledge of the mechanics of disasters and of the areas of greatest risk from nature formed a scientific basis for OFDA's mitigation activities. Examples relating to this increase in scientific knowledge include the Volcano Disaster Assistance Program (Case Study 25), the LaPunta Tsunami Study (Case Study 6), and the Global Agro-Climatic Impact Assessment (Case Study 23). (Summaries of case studies appear later in this volume, while the case studies in their entirety are in Volume II.)

Over the course of the decade, OFDA changed the nature of its early warning activities. Recent activities show an increased recognition that effective early warning is an issue of public education and attitudes as much as of technology. The value of first responder training and popular education in changing public attitudes toward early warning has been recognized. Several successful community education programs in Costa Rica, Honduras, and the Philippines attest to this. Additionally, the services of Dade County (Case Study 17) have been broadened to provide training to local search and rescue units, as well as themselves responding to emergencies. Both the Pan American Health Organizations (PAHO) Preparedness Project (Case Study 18) and the grant to Partners of the Americas (Case Study 16) are intended to increase community capacities to handle disasters by benefitting from interactions with U.S. emergency managers. All these initiatives reflect OFDA's more comprehensive approach to making the advances of appropriate technology available to, and actionable by, people at risk.

Ten years ago, OFDA conferences and training events were held largely in the United States, and to a great extent involved a relatively traditional, static model of transfer of U.S. knowledge and experiences to a "student body". As the decade moved forward, OFDA training activities were more sharply focused on the specific regional and professional needs of the overseas participants. Greater use was made of regional expertise in selecting trainers and course materials, and activities gave more emphasis to training trainers, thus creating the local capacity to assume training responsibilities. OFDA also began to see training as a continuous process rather than as an isolated event.

OFDA's recognition of the importance of regional, national, and local context, skills, and leadership/ownership in training and mitigation activities sets a good example for other disaster organizations which operate in a traditional, centralized, "control room" mode. Over the course of the decade, OFDA has become more willing to provide training to people where they are -- both culturally and geographically. The fielding of a Regional Advisors in Latin American and the Caribbean, the South Pacific and, most recently in Africa is only one illustration of this decentralization of approach; the number of activities aimed at increasing local capacity and building local institutions is another.

The decade has seen an emerging awareness of the extent to which environmental degradation causes disaster, and of the intimate link between disasters and development. OFDA has taken part in defining these new themes: it has been part of the Harvard Institute of International Development's project studying links between disasters and development and has funded studies seeking information on the links between climatic change and agriculture prediction, for example. These issues, however, were not dealt with comprehensively by anyone during the decade.

OFDA has long recognized the role of U.S. private voluntary organizations (PVOs) in disaster relief, and has convened annual PVO conferences throughout this decade. Working with PVOs became an area of OFDA's strength, increasingly apparent over the course of this decade.

During the decade, OFDA's relationships with other donors have, in the main, been excellent. OFDA has long coordinated activities with most of the traditional relief-giving agencies. OFDA has worked well with some agencies of the United Nations (UN), particularly the United Nations Development Programme (UNDP) and The United Nations Economic and Social Council (UNESCO), with whom it has collaborated on a number of projects. An exception to this record has been The United Nations Disaster Relief Organization (UNDRO). For sometime now the USG has pursued an arms length relationship with UNDRO and has not provided significant financial support. Recent developments indicate a possible change in this regard.

The close of this decade witnesses the emergence of significant new donors. Japan is an obvious example; its international assistance budget is generous, and includes disaster preparedness, and mitigation; its current approach is oriented toward providing expensive technology. For the UN the relief problems faced in the Horn of Africa have caused a reorganization of the UNDRO, which now is exhibiting an interest in the role of development in disasters, and vice versa. There is an excellent opportunity for OFDA to play a key role with these and other new donors, by encouraging their effective involvement in disaster preparedness and mitigation, by assisting them in defining what that role should be, and by ensuring that there is increased coordination among the growing number of international disaster preparedness donors.

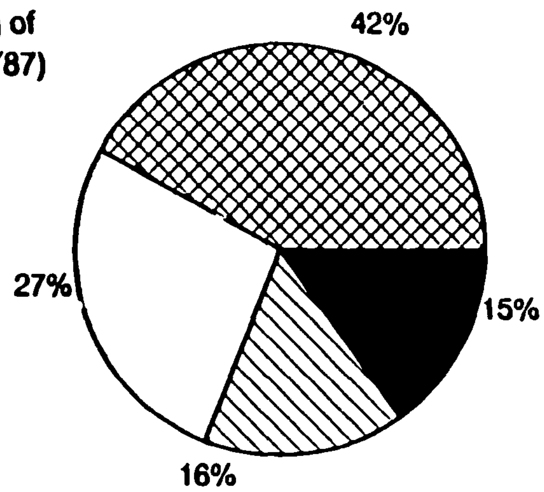
OVERVIEW OF OFDA PORTFOLIO

OFDA's has dual responsibilities for support of both disaster relief and "non-relief" (preparedness and mitigation) programs. Tables 1-8 examine different aspects of OFDA's portfolio over a ten-year period and some relationships between relief and non-relief activities.

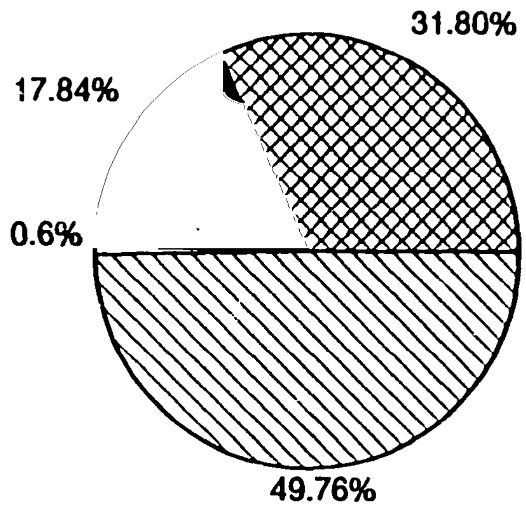
TABLE 1: OVERVIEW OF OBLIGATIONS

OFDA Non-Relief Obligations
FY1979-1988
Total = $50,196,434

(Includes Congressional Supplemental Funding of 6.2 million in FY86, FY87)



OFDA Relief Obligations
FY1979-1987
Total = $130,551,247



Total USG Relief Obligations
FY1979-1987
Total = $2,078,638,699

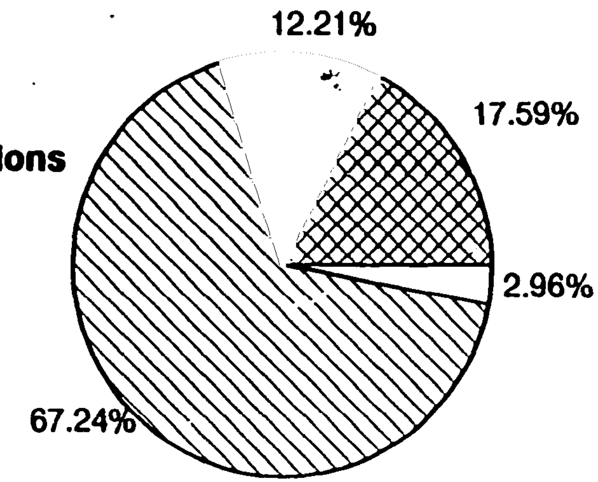
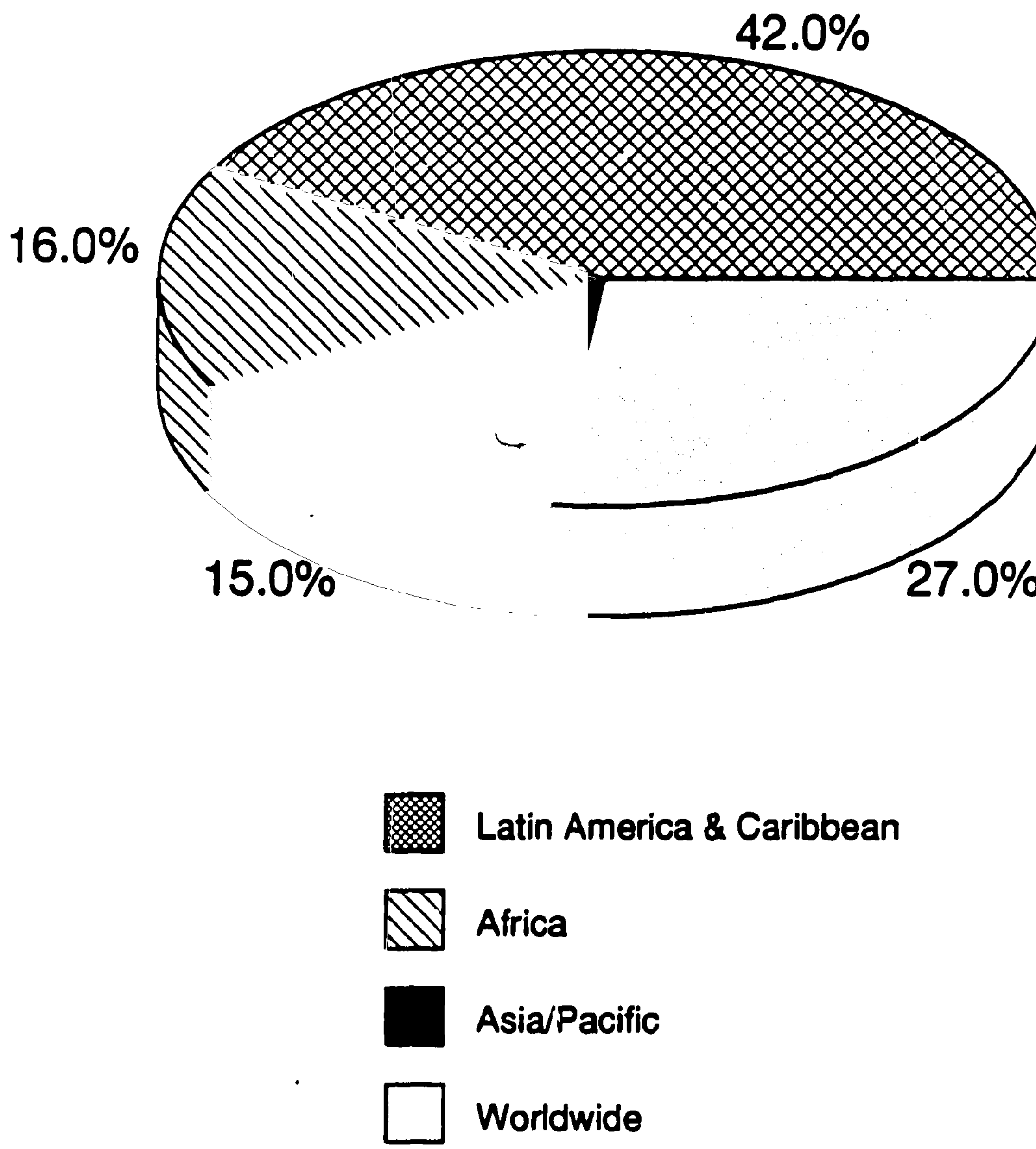


TABLE 2:

SUMMARY OF OFDA NON-RELIEF COMMITMENTS
By: Region
(FY 1979-1988)
$50,196,434
(includes Congressional Supplemental Funding of
$6.2 million in FY 86-87)



033-V36\4th

TABLE 3:

SUMMARY OF OFDA NON-RELIEF COMMITMENTS

By: Threat Addressed

(FY 1979-1988)

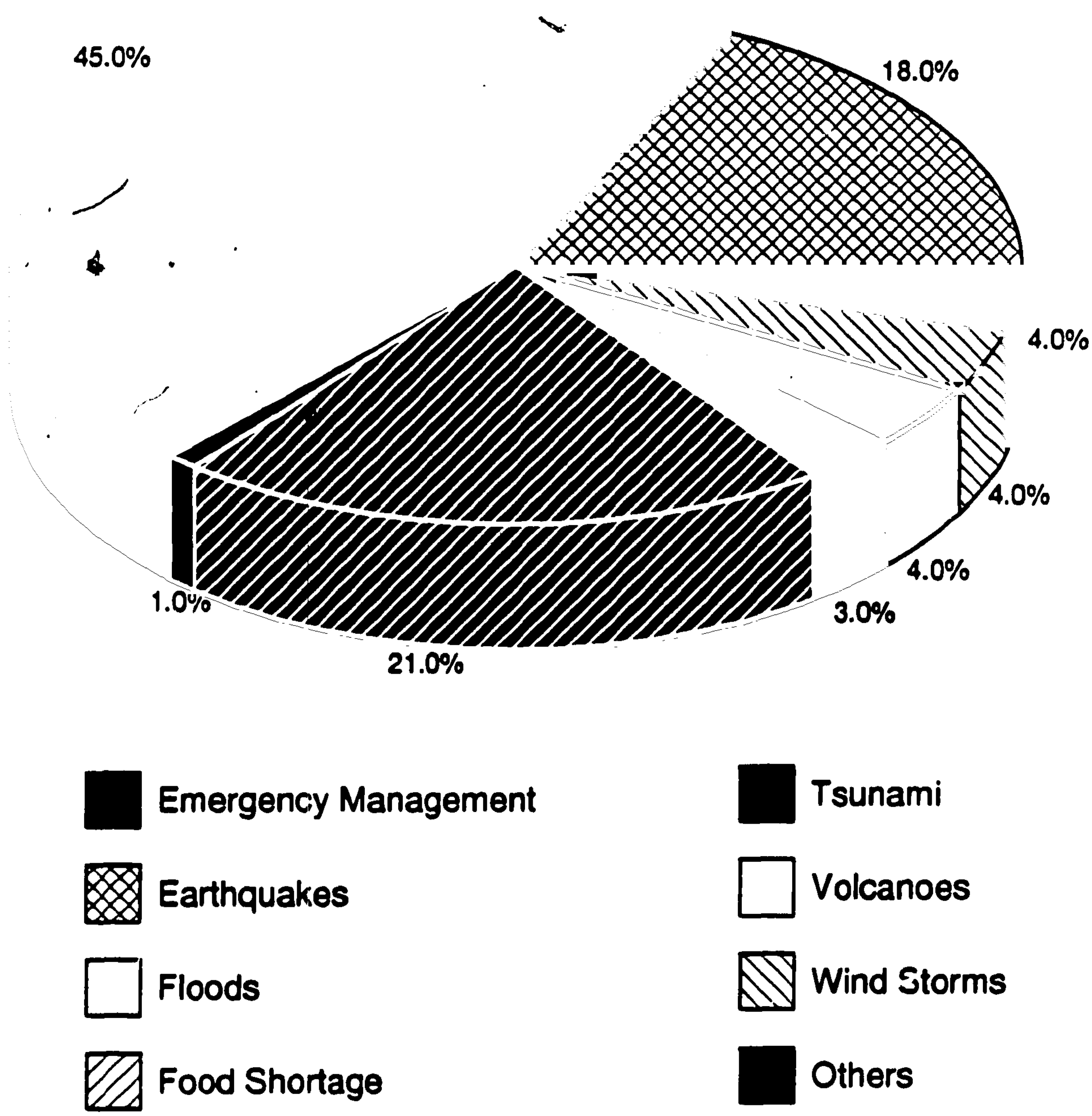


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TABLE 4:

SUMMARY OF OFDA NON-RELIEF COMMITMENTS

By: Program Category

(FY 1979-1988)

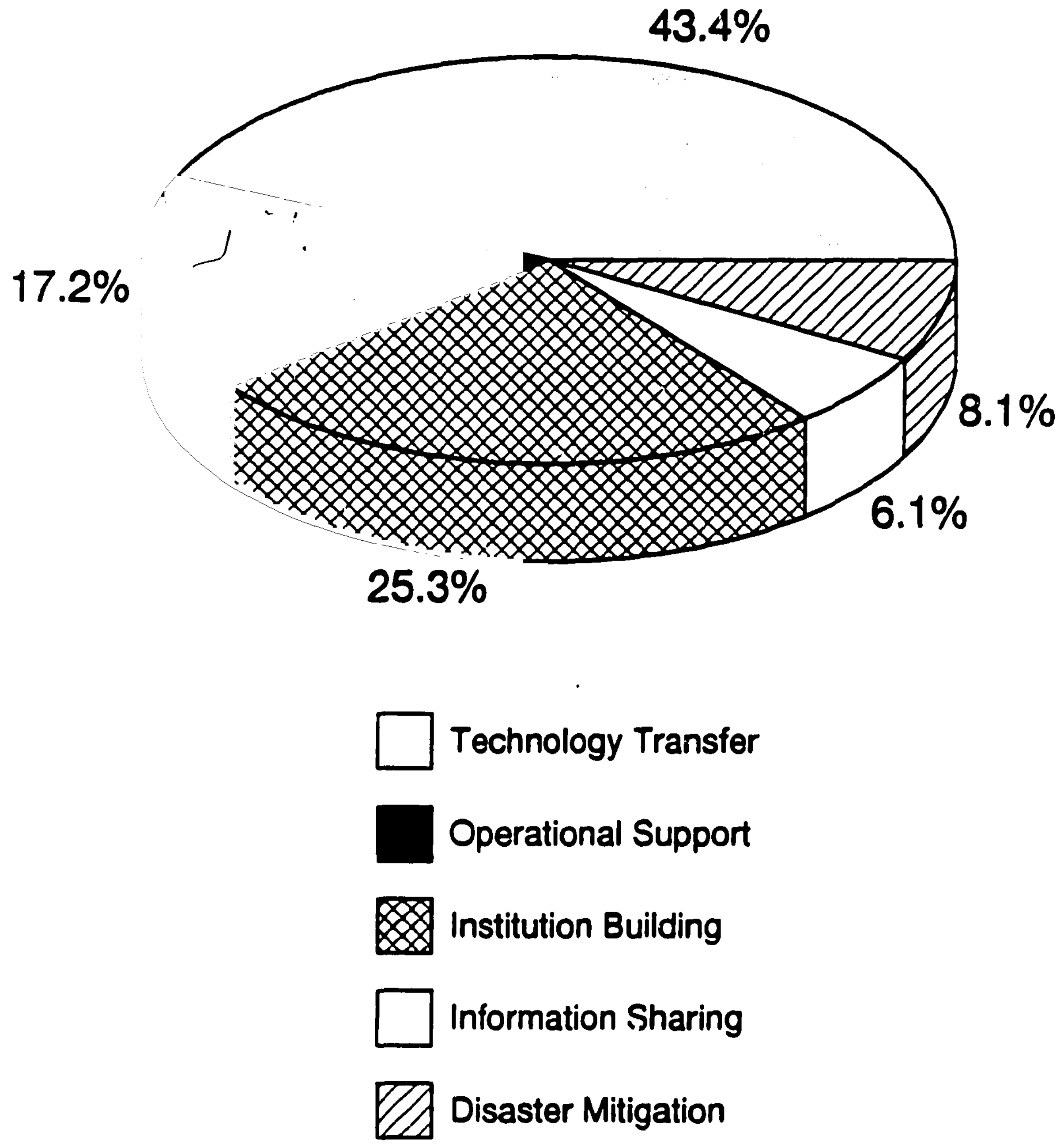

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TABLE 5:

TOTAL OFDA NON-RELIEF COMMITMENTS

FY79 - FY88

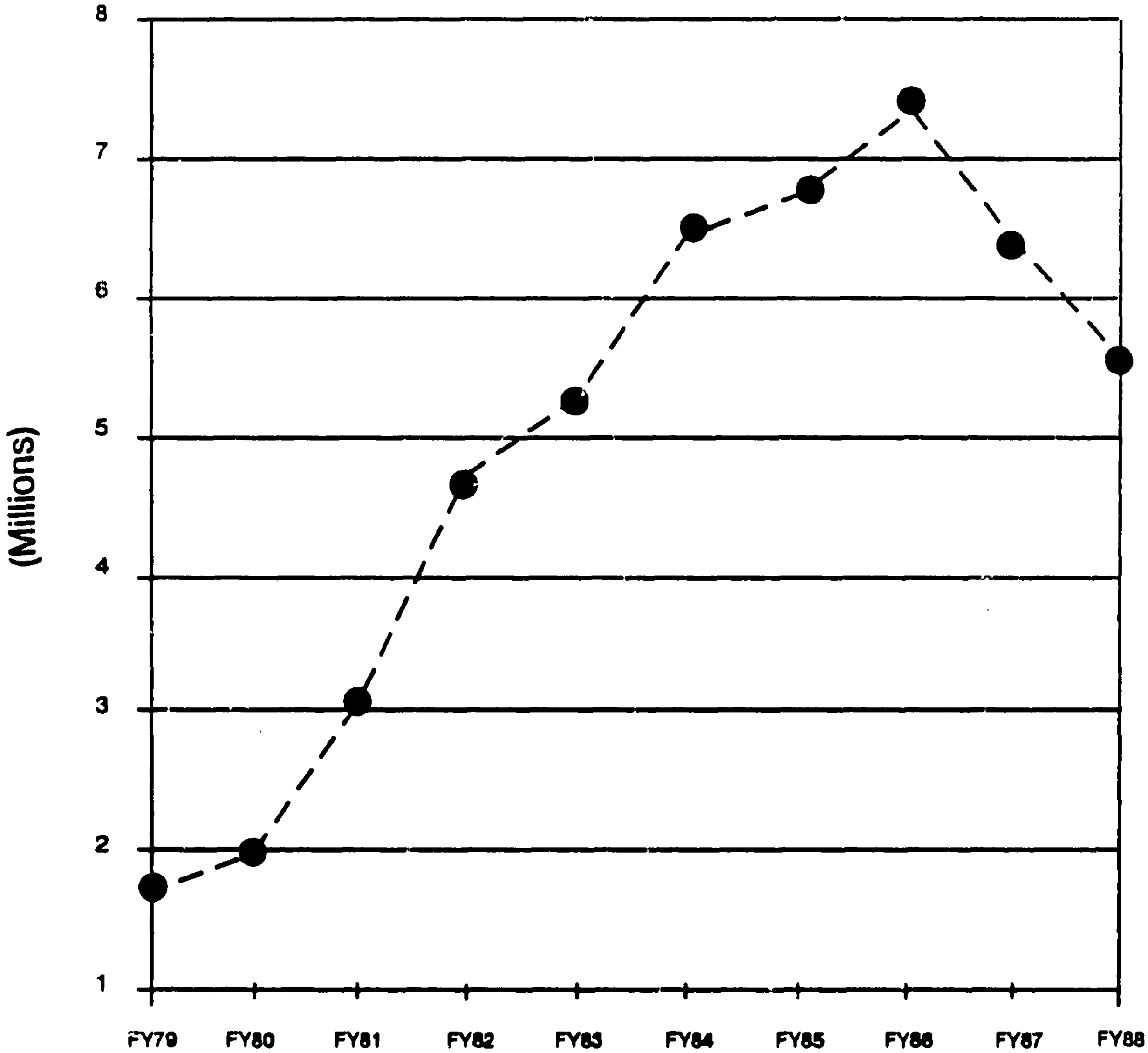

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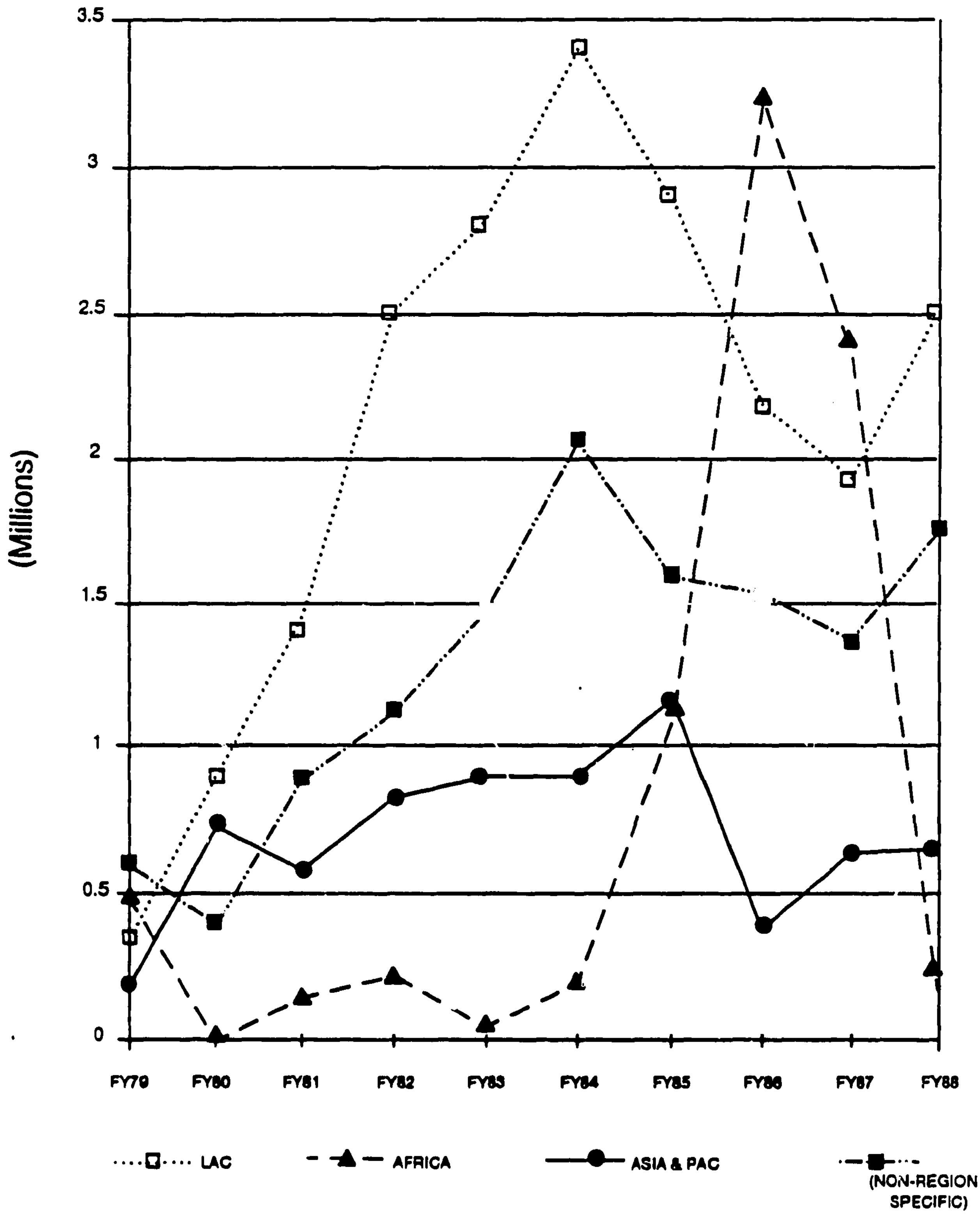
TABLE 6:

OFDA NON-RELIEF COMMITMENTS BY REGION

FY79 - FY88

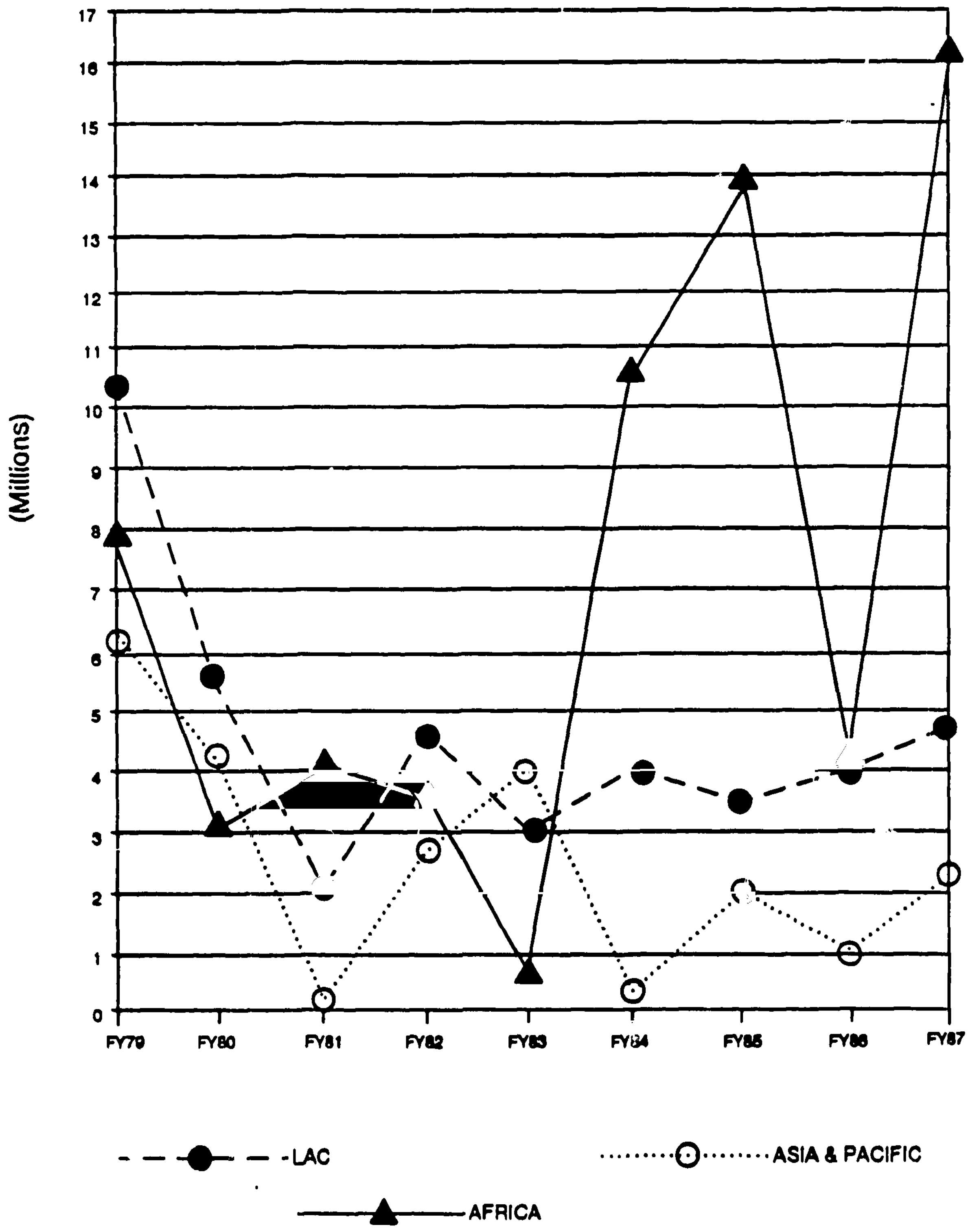


038-V36\4th

TABLE 7:

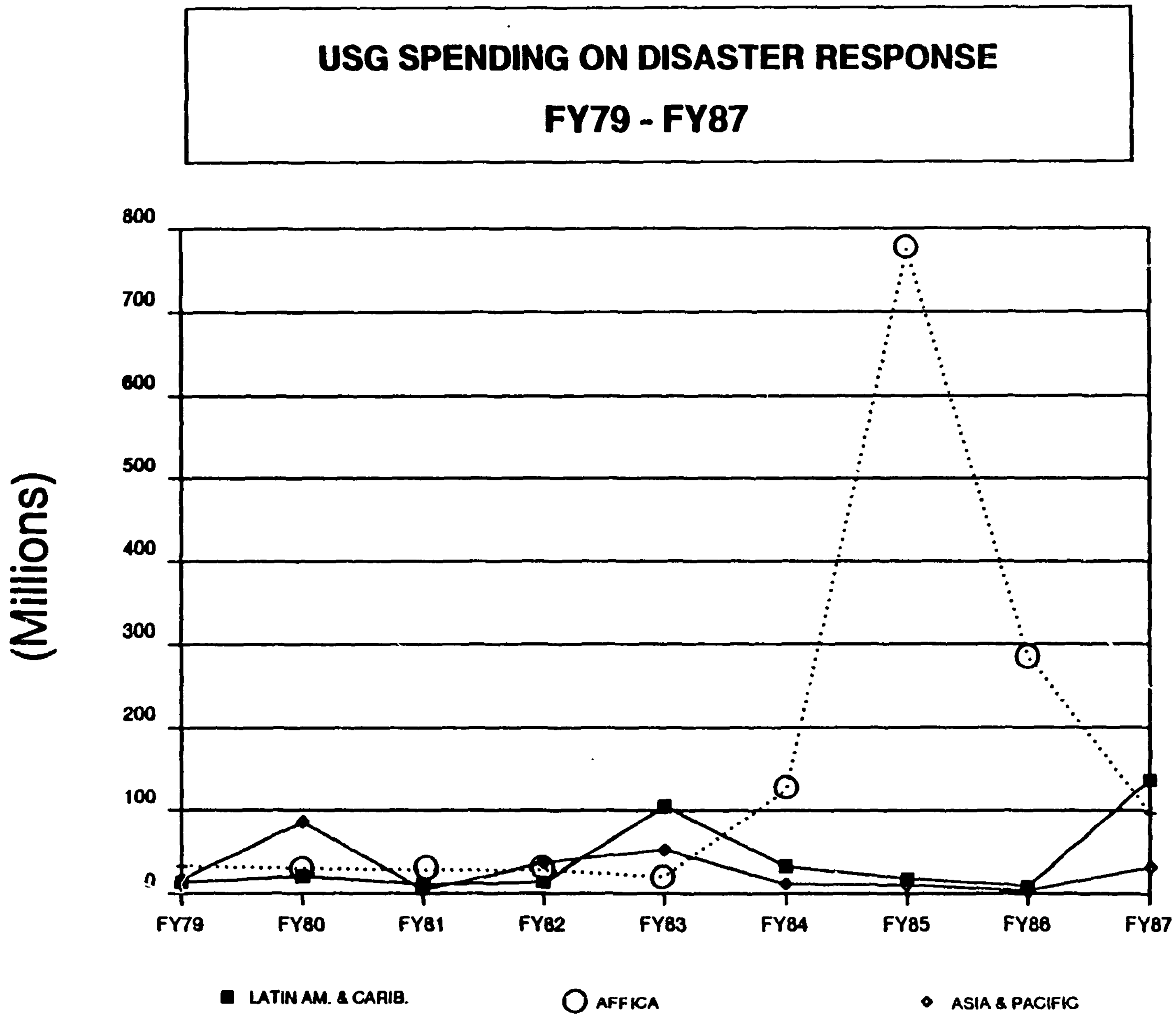
OFDA SPENDING ON DISASTER RESPONSE BY REGION

FY79 - FY87



037-V3/M4th

TABLE 8:



039-V36\4th

SUMMARY OF CASE STUDIES

In the course of this study, the MSI team sampled in some detail 25 of the 478 activities OFDA supported during the years 1979-1989.

Activities to be the subject of case studies were selected using criteria and the process described in Annex 6. One selection criteria was that the activity had to cost over $50,000. Since approximately two-thirds of OFDA's activities cost less than $50,000, MSI also considered a range of these as it wrote the "main" core studies. Table 9 provides an overview of all case studies while Table 10 compares key characteristics of the case studies with OFDA's total portfolio of non-relief activities in excess of $50,000. The table is followed by a summary of each case study. The case studies in their entirety are in Volume II of the report.

TABLE 9: OVERVIEW OF CASE STUDIES

CASE STUDY NO.	FISCAL YEARS	COUNTRY	ACTIVITY	FUNDING MECHANISM	THREAT	CATEGORY	TOTAL
1	1981-83	Jamaica	Hazards Management	Contract	Emergency Management	Institution Building	214,374
-	1982	Jamaica	Communications Preparedness	MA	Emergency Management	Technology Transfer	35,102
-	1981	Jamaica	Management Training Plan	Contract	Emergency Management	Institution Building	10,000
-	1981	Jamaica	Housing (INTERTECT)	Contract	Emergency Management	Disaster Mitigation	1,897
-	1982	Jamaica	Emergency Communications	TA	Emergency Management	Institution Building	1,180
2	1984-85	Dominican Republic	Seismic Network	Grant	Earthquake	Technology Transfer	755,072
-	1983	Dominican Republic	EQ Preparedness	PSC	Earthquake	Institution Building	55,237
3	1983-85, 87-88	Costa Rica	EQ Hazards Red. & Seismic Network	Grant	Earthquake	Technology Transfer	1,453,228
-	1983	Costa Rica	Disaster Plan (Bell)	PO	Emergency Management	Institution Building	9,071
-	1987	Costa Rica	Seismic Meeting	TA	Emergency Management	Information Sharing	2,214
-	1985	Costa Rica	Seismic Network Evaluation	TA	Emergency Management	Operational Support	1,240
4	1981-83, 86-87	Peru	Seismic Network	Grant	Earthquake	Technology Transfer	1,072,508
5	1981	Peru	Preparedness Plan for GOP	Contract	Emergency Management	Institution Building	59,408
-	1986	Peru	Relief Plan	TA	Emergency Management	Operational Support	15,462
-	1981	Peru	Disaster Simulation	TA	Emergency Management	Institution Building	9,135
-	1981	Peru	Earthquake Prediction Evaluation	Contract	Earthquake	Technology Transfer	1,600
-	1987-88	Non-Country Specific	peru Regional Advisor	Contract	Emergency Management	Operational Support	282,792
6	1987	Peru	La Punta Tsunami Study	MA	Tsunami	Technology Transfer	123,400
7	1984	Peru	Adobe Building Testing	MA	Flood	Technology Transfer	144,750
8	1980	Bangladesh	Disaster Alert System	PASA	Wind Storm	Technology Transfer	546,000
-	1979	Bangladesh	Cyclone Warning System	Contract	Wind Storm	Technology Transfer	900
9	1984-85, 87-88	Indonesia	volcano Monitoring & Res.	PASA	Volcano	Technology Transfer	779,217
10	1986-87	Indonesia	Strengthening disaster management	Grant	Emergency Management	Institution Building	350,910
11	1983-84	Philippines	Typhoon Forecasting Program	Contract	Wind Storm	Technology Transfer	559,544
12	1988-89	Philippines	Public Awareness	MA	Emergency Management	Information Sharing	108,716
-	1988	Philippines	Typhoon Early Warning system	PO	Wind Storm	Operational Support	9,363
-	1984	Philippines	Typhoon Threat Program	PO	Wind Storm	Institution Building	5,175
-		Thailand	Asian Disaster Prevention Center Training Assee.	PO	Emergency Management	Institution Building	8,998
13	1981-88	Fiji	South Pacific Severe Storm Warning				611,430
14	1983	Fiji	Cyclone Oscar Disaster Asst.	Grant	Wind Storm	Disaster Mitigation	52,780
-	1987	Fiji	Storm Detection Eval.	PO	Wind Storm	Operational Support	7,824
15	1983-88	Non-Country Specific	OAS Risk & Mitigation	Grant	Emergency Management	Disaster Mitigation	1,407,100
16	1984-88	Non-Country Specific	Partners Preparedness	Grant	Emergency Management	Institution Building	1,862,680
17	1985, 86-87	Non-Country Specific	Dade County	Grant	Emergency Management	Operational Support	646,515
18	1981-87	Non-Country Specific	PAHO Preparedness	Grant	Emergency Management	Institution Building	2,367,719
19	1981-86	Non-Country Specific	Pan Caribbean Disaster Preparedness & Prevention	Grant	Emergency Management	Institution Building	2,203,995
20	1981-83	Non-Country Specific	Earthquake Hazard Mitigation	PASA	Earthquake	Institution Building	673,617
21	1985-89	Non-Country Specific	Asian Institute of Technology/ Dis. Mgmt. Cntr.	Grant	Emergency Management	Institution Building	760,000
22	1981-84	Non-Country Specific	Housing Vulnerability	Grant	Emergency Management	Disaster Mitigation	301,219
23	1977-85	Non-Country Specific	Global Climatic Assessment	PASA	Food Shortage	Technology Transfer	6,224,352
24	1984-86	Non-Country Specific	EQ & TS Mapping	PASA	Earthquake	Technology Transfer	458,961
25	1986-88	Non-Country Specific	VO Dis. Asst. Prog. (VDAP)	PASA	Volcano	Institution Building	527,000

TABLE 10

COMPARISON OF OFDA NON-RELIEF PORTFOLIO AND CASE STUDIES

	PERCENTAGE OF ACTIVITIES (Projects over $50,000)			PERCENTAGE OF BUDGET (Projects over $50,000)	
	# of Case Studies	Case Studies	OFDA Portfolio	Case Studies	OFDA Portfolio
		(%)	(%)	(%)	(%)
GEOGRAPHIC FOCUS:					
- Country Specific	14	56	51	32	22
- Regional	8	32	22	44	51
- Worldwide	3	12	27	24	27
REGION:					
- Africa	0	0	14	0	16
- Asia/Pacific	10	40	16	23	15
- LAC	12	48	43	53	42
- Worldwide	3	12	27	24	27
THREAT ADDRESSED:					
- Earthquakes	5	20	19	20	18
- Emergency Management	11	44	46	44	45
- Floods	1	4	1	1	1
- Food Shortage	1	4	12	20	21
- Tsunami	1	4	2	1	3
- Volcanoes	2	8	2	6	4
- Wind Storms	4	16	5	8	4
FUNDING MECHANISM:					
- Contract	3	12	21	9	23
- Grants	12	48	46	53	32
- Mission Allotment	3	12	10	2	4
- PASAs/RASAs	7	28	27	36	34
CATEGORY OF PURPOSE:					
- Disaster Mitigation	3	12	9	8	8
- Information Sharing	1	4	10	1	6
- Institution Building	9	36	31	38	25
- Operational Support	1	4	15	3	17
- Technology Transfer	11	44	35	50	43

CASE STUDY 1

JAMAICA: NATURAL HAZARDS MANAGEMENT PROGRAM

Begun in 1981, this activity was implemented through three contracts to support the institutional development of the nascent Jamaican Office of Disaster Preparedness (ODP). Initially the effort included .... "designing damage assessment procedures, compiling existing information on essential material and personnel resources for emergency response, and setting forth interim emergency response procedures to guide government agencies in the event of an emergency." The final contract was to identify and survey areas of high vulnerability in Jamaica and to develop emergency actionplans and mitigation strategies for those areas.

The series of contracts achieved their objectives and played a significant role in initially establishing the ODP which has shown itself to be an office capable of coordinating the resources of various government ministries involved in preparedness and relief.

CASE STUDY 2

DOMINICAN REPUBLIC: SEISMIC NETWORK

In mid-1984 OFDA approved a grant for Columbia University's Lamont-Doherty Geological Observatory (LDGO) to install a seismic network in the Dominican Republic. The network was to record and analyze data that could be used to produce hazard maps identifying the areas of the country most vulnerable to earthquakes. The LDGO was responsible for installing the necessary data gathering equipment, generating initial reports, and training the counterpart staff of the Autonomous University of Santo Domingo (UASD) to be capable of independently managing the activity after a three year period.

OFDA wisely discontinued funding of the project after only two years. The UASD unit dealing with the network was subsequently reorganized and provided new leadership. USAID/DR then agreed to provide modest additional assistance. The network is now operating effectively. Seismic information is available to policy makers and planners for use in designing infrastructure and development projects.

CASE STUDY 3

COSTA RICA: EARTHQUAKE AND HAZARDS MITIGATION PROGRAM

The case study summarizes work done from September 1983 to the present to install a national seismographic network and establish an earthquake and volcano hazards mitigation program in Costa Rica. The objective of the project was to limit the impact of seismic events and volcanic eruptions through the installation of early warning equipment. The project was also intended to facilitate a speedy recovery from such events by emphasizing the preparation of the public, government agencies, and institutions in providing relief.

While designing the activity, neither OFDA nor its grantee sufficiently analyzed the relationships and activities of the numerous Costa Rican organizations operating in the volcano and earthquake sector. Thus, the critical need to support institutional development was considered of secondary importance since the project mainly focussed on technology transfer. Although a better appreciation of institutional relationships could have avoided implementation delays, the project nevertheless somewhat increased the grantee's capacity to monitor volcanic threats and assess seismic vulnerabilities.

CASE STUDY 4

PERU SEISMIC NETWORK

This seven year grant was begun in 1981 to upgrade the seismic monitoring capabilities of the Geophysics Institute of Peru (GIP). The grant was implemented by the Carnegie Institute of Washington (CI). By installing expanded or modernized networks, OFDA and scientists in the recipient country hoped to develop data indicating the state of stress and the seismic potential in order to contribute to better understanding of earthquakes. Early warning of impending events through proper location of microseisms was also an explicit hope.

The activity was not completed as designed because of political and economic circumstances. Once the overall political situations clears, the full network can be re-established and continue to provide valuable data.

CASE STUDY 5

LIMA PREPAREDNESS PLAN

Begun in 1981, this grant was to assist the Government of Peru (GOP) in developing short- and medium-term disaster response capabilities. This resulted in a comprehensive seventeen volume report assessing hazards and recommending loss reduction strategies.

The study significantly contributed to an increase in disaster preparedness measures in Lima. The planning effort was well conceived, and did an extraordinarily complete job of assessing the disaster vulnerability of the Lima area. AID staff members to this day use the study as a reference for preparedness work in Peru, and government officials continue to refer to the exercise and many of its key findings.

CASE STUDY 6

PERU: LA PUNTA TSUNAMI STUDY

This 1987 project developed a tsunami early warning system for Peru's main port of La Punta, located just outside the boundaries of the country's capital city, Lima. In addition to the application of early warning technology, the program also developed comprehensive public education and evacuation plans. The Peruvian Civil Defense implemented the program.

The La Punta study might well be a model case for successful implementation of disaster preparedness and mitigation plans. The work is practical and was done with a great deal of participation at many levels and is an exceptionally comprehensive piece of work. The study also suggested zoning restrictions, and recommended that some homes for the elderly be relocated. The project was well designed and managed, and is likely to result in concrete actions to lessen the risk of people to disaster.

CASE STUDY 7

PERU: ADOBE BUILDING TESTING - Phase II

In Peru many of the deaths caused by natural events have resulted from failed adobe housing. In 1983, OFDA provided funding to the Structures Laboratory of Peru's Catholic University to demonstrate improved adobe construction techniques by using the method to replace houses that were destroyed by a flood.

The activity suffered numerous implementation difficulties which resulted in only 114 of the planned 340 replacement houses being completed. The implementing agency's lack of field experience played a critical role in the project being poorly planned and in its failure to produce the expected results. An unresolved design question was whether the activity was meant to be research or rehabilitation. At the time, it was promoted as both.

CASE STUDY 8

BANGLADESH: DISASTER ALERT SYSTEM

Bangladesh, a low-lying country on the shores of the Bay of Bengal, is extremely vulnerable to tropical cyclones. One of the greatest disasters to modern times occurred when a cyclone struck the southern coastline in November 1970, killing perhaps 300,000 people.

A satellite ground station with Automatic Picture Transmission (APT) capability was established in Dhaka during the 1970s. In 1978, the USAID financed an improvement of the system through installation of a Low Resolution Picture Transmission (LRPT) capability. In 1980, OFDA funded a further improvement of the ground station by installing a High Resolution Picture Transmission (HRPT) facility which is the subject of this case study. Subsequently, the USAID provided continuous support to Bangladeshi Space Research and Remote Sensing Organization (SPARRSO). Although the HRPT unquestionably gives better resolution pictures than the LRPT it replaced, it is not clear that the technical improvement had any appreciable impact on early warning or disaster preparedness.

CASE STUDY 9

INDONESIA: VOLCANO MONITORING AND RESEARCH

In 1984 OFDA began funding the Volcano Monitoring and Research Project, which was begun by the U.S. Geological Survey (USGS) in 1981. OFDA provided funding to the USGS to upgrade the Volcanological Survey of Indonesia's volcano monitoring networks, prepare a national volcanic assessment, recommend monitoring strategies for high-risk volcanoes, and assess existing linkages between volcano monitoring and disaster management.

The project produced valuable scientific data that provides a foundation for disaster preparedness work but did not improve linkages between volcano monitoring and disaster management.

CASE STUDY 10

INDONESIA: STRENGTHENING DISASTER PREPAREDNESS AND DISASTER MANAGEMENT

This activity was designed to strengthen key aspects of disaster management through an integrated multi-sectoral approach. Begun in 1986 with external funding provided by OFDA and UNDP, the activity was managed by staff seconded from various Indonesian Government ministries.

The activity has resulted in over 370 Indonesian trained in disaster management and has significantly improved the country's level of disaster preparedness. Although difficult to quantify, the project has almost certainly resulted in reducing deaths and property damage resulting from disasters.

CASE STUDY 11

PHILIPPINES: TYPHOON FORECASTING PROGRAM

In 1983, then-President Marcos made a state visit to the U.S. Knowing that Marcos was interested in a politically-unacceptable proposal to prevent typhoons through mechanical means (cloud seeding, etc.), OFDA quickly prepared a typhoon tracking proposal to forestall any awkward requests. That same year, OFDA contracted with Science Applications, Inc. (SAI) to transfer early warning technology to the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), to fund exchange of scientists between the U.S. and the Philippines, and to train PAGASA staff in the use of new computer hardware and software, as well as in radar technology.

This case, seen alone, seems limited in its applicability to mitigation (rather than early warning). However, OFDA seems to have overcome these initial limitations by funding corollary public awareness activities and by providing an additional direct goal to PAGASA for equipment upgrades and training.

CASE STUDY 12

PHILIPPINES: PUBLIC AWARENESS PROGRAM

Begun in 1988, this is a pilot attempt at educating Philippine elementary students about natural hazards. The Public Awareness Program grew out of the OFDA-funded Typhoon Forecasting Program (Case Study 11); OFDA recognized that early warning technologies could not significantly reduce typhoon risks until public attitudes change.

The high degree of professionalism in planning and designing this activity virtually guaranteed success in the pilot phase. This is a modestly priced, highly innovative, and potentially extremely powerful public education program, taking place in a nation highly at risk for natural disasters. It would seem sensible for OFDA to protect this excellent investment by assisting PAGASA in locating additional donors for Phase II. This appears a natural opportunity for OFDA to leverage additional funds. Also, if evaluations show this project to be as successful as it appears to be, OFDA might well consider similar projects in other nations at high risk. Any country with a well-organized primary education system should be able to replicate this approach to hazard mitigation without too much trouble.

CASE STUDY 13

SOUTH PACIFIC SEVERE STORM DETECTION AND WARNING SYSTEM (SPSSD/WS)

In Fiji, there are frequent violent cyclones. Forecasting such severe storms is the first step in preparing for these, the most common disasters in the region. An activity titled the South Pacific Severe Storm Detection and Warning System (SPSSD/WS) was funded by OFDA between early 1981 and late 1988 at a cost of more than $600,000. It was implemented through Participating Agency Service Agreements (PASAs) with the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA), which in turn contracted with a minority-owned firm to handle actual implementation of the activity.

It is a credit to OFDA that the warning system is functioning and disseminating storm warning information throughout the South Pacific region. Inadequate consideration, however, has been given to the on-going operation and maintenance requirements of a complex technological system. The system's performance could be enhanced by providing both additional technical training and discretionary funds necessary to purchase spare parts. Overall, the project provides a valuable service and is a foundation for developing a comprehensive regional disaster preparedness strategy.

CASE STUDY 14

FIJI: CYCLONE OSCAR DISASTER ASSISTANCE/MITIGATION

In the immediate aftermath of Cyclone Oscar in March 1983, which caused widespread damage to housing in parts of Fiji, OFDA made a grant to the Salvation Army's World Service Office to repair or rebuild damaged housing. The activity was implemented over a five month period and succeeded in rebuilding 174 houses, which exceeded the planned output of 160 houses. The activity was designed to provide relief to disaster victims and, consequently, materials were provided free of charge.

The activity was not designed to incorporate developmental strategies and, as a result, an opportunity to expand the benefits of the investment was lost. However, as housing relief the activity was a success because the number of houses constructed exceeded planned expectations and did so in a timely manner.

CASE STUDY 15

LAC REGIONAL: ORGANIZATION OF AMERICAN STATES NATURAL HAZARDS PROJECT

In 1983, the OAS began the "Natural Hazards Risk Assessment and Disaster Mitigation Pilot Project (NHP) in Latin America and the Caribbean Basin." The project was designed to reduce the negative impacts of disasters by ensuring that development planning incorporates hazards analysis information as a standard procedure. This has led to a large scale effort, begun in 1985, to develop hazards mitigation training materials and courses. Over 215 participants have since completed the four week hazards mitigation training.

The NHP is one of the most important activities being funded by OFDA and offers tremendous potential to reduce the effects of future natural events. It is significant that the NHP systematically collects, catalogues, and then disperses hazards analysis information that is produced by numerous, previously funded, OFDA activities including seismic networks.

CASE STUDY 16

PARTNERS OF THE AMERICAS EMERGENCY PREPAREDNESS PROGRAM

Begun in 1984, this activity was designed to creatively permit U.S. emergency managers to provide expert volunteer technical assistance to their counterparts in Latin America and the Caribbean. In part, OFDA decided to use Partners because of their established network of programs in 31 countries throughout the region. This activity supports preparedness and prevention systems addressing day-to-day emergencies such as kitchen fires and traffic accidents, as well as large catastrophic events such as earthquakes, hurricanes, nuclear accidents, and airplane crashes.

The proper functioning of the program is dependent upon interaction between the small program staff in Washington, D.C., and volunteer managers in U.S. states and over 30 countries. Not surprisingly, this has led to widely varied understandings of what the EPP is to accomplish and large differences in efficiency between subcommittees in different countries. In the Dominican Republic, EPP activities have significantly improved the professional skills of the emergency medical sector, but, in other countries, the program has produced inconsistent results.

CASE STUDY 17

DADE COUNTY

Since 1985, the Department of Emergency Services of Dade County, Florida has received funding from OFDA to provide emergency management training and operational support throughout Latin America and the Caribbean. Services have included developing disaster plans, organizing emergency operations centers, providing communications assistance, and conducting in-country training of emergency response personnel. In addition, Dade County is on stand-by to provide international search and rescue services to support OFDA relief operations.

Dade County has been active in providing operational support for OFDA's relief operations including sending search and rescue teams to Armenia and Mexico City following earthquakes, and setting-up and managing an emergency communications system in the Caribbean following Hurricane Hugo.

Implementation of the activity through the Spring 1989 was marred by inadequate attention to the administrative and accounting aspects of the job. However, inspite of these problems, both the operational support and training provided by Dade County has always been delivered with a high degree of professionalism.

CASE STUDY 18

PAHO PREPAREDNESS

This grant was begun in 1981 to support PAHO's effort to develop emergency preparedness activities in the public health sector throughout Latin America and the Caribbean. Current PAHO activities related to disaster preparedness include: 1) support for preparation of the health related components of the national emergency plans; 2) training; 3) production of publications; and 4) promotion of the inclusion of material on disaster preparedness and response in the curricula of schools of medicine, public health and nursing. These activities are financed through funds provided by numerous donors, including OFDA and CIDA.

The EPP is an exceptionally well designed and documented program. The program's wide range of activities has undoubtedly improved the region's state of disaster preparedness and its capacity to manage disasters.

CASE STUDY 19

PAN CARIBBEAN DISASTER PREPAREDNESS AND PREVENTION PROJECT

The Pan Caribbean Disaster Preparedness and Prevention Project (PCDPPP) was conceived to improve the status of disaster preparedness and response in the Caribbean Region "through an inter-agency multi-sectoral project aimed at promoting disaster management and loss reduction initiatives." This has led to improved communications; both between disaster affected countries and relief agencies, and within the affected countries themselves. In addition, mechanisms were developed to insure the protection of development investments. Project outputs have included comprehensive national emergency management policies for each participating country and training of over 2,000 Caribbean nationals in disaster management.

The PCDPPP has significantly improved the disaster management capabilities throughout the Caribbean. This was demonstrably evident in the PCDPPP's management of relief operations following Hurricane Hugo. All of the countries affected by the hurricane had designated and trained disaster managers and a functioning emergency communications system. In addition, relief supplies were delivered in a timely manner and were appropriate for the needs of the victims.

CASE STUDY 20

SOUTHEAST ASIAN REGIONAL PROGRAM FOR EARTHQUAKE HAZARDS MITIGATION

The Southeast Asian Regional Program for Earthquake Hazards Mitigation was implemented in 1980 to document the seismic history and assess seismic vulnerabilities of the ASEAN nations. This information was then to be used to develop mitigation strategies and prepare building codes for vulnerable areas. The rationale for the activity was clear: earthquakes were thought to pose a significant regional threat but data to confirm this did not exist.

A series of books on the region's seismology was completed and is considered by experts to be comprehensive, accurate, and definitive. Although the project failed to bridge the gap between seismology and mitigation, it did produce the critical information on which future comprehensive earthquake engineering studies, architectural design criteria, and public awareness activities can be based.

CASE STUDY NO. 21

ASIAN INSTITUTE OF TECHNOLOGY, ASIAN DISASTER PREPAREDNESS CENTER

The Asian Institute of Technology's Asian Disaster Preparedness Center (ADPC) was started with a core support grant from OFDA. It provides training, information and technical assistance for the entire Asia and Pacific region, with emphasis on the larger countries of Asia, particularly Philippines, Bangladesh, Thailand, and Indonesia.

The ADPC has made substantial progress toward long-term institutional and financial sustainability by adhering to a market orientation aimed at meeting the priority disaster management needs of national governments in the region and major donors. Many of the 307 alumni of the ADPC courses have subsequently conducted their own disaster management training courses, multiplying many-fold the impact of the Center.

CASE STUDY 22

HOUSING IMPROVEMENT AND VULNERABILITY REDUCTION IN THE SOUTH PACIFIC

The case study examines a series of grants that assisted Pacific island governments in mitigating cyclone damage on the housing sector. The activity was comprehensively designed to assess vulnerabilities, improve housing codes, disseminate information on improved construction techniques and improve the disaster management capabilities of the region's governments. The grants were implemented through the East-West Center's Pacific Islands Development Program in collaboration with Intertect.

The activity generated great initial enthusiasm, but, in the end, failed to completely achieve its intended results. However, housing vulnerability assessments were completed as were cyclone mitigation guidelines. The main shortcoming of the activity was that the information it generated was not adequately distributed due to the lack of a sustained effort.

CASE STUDY 23

GLOBAL AGRO-CLIMATIC IMPACT ASSESSMENT

Between FY 1977 and 1985, OFDA supported a cluster of activities entitled Global Climatic Impact Assessment and Technology for Disaster Early Warning and Technical Assistance in the Developing World. The key USG agencies involved in the activities were NOAA and NASA. The project uses interpretation of satellite imagery to monitor crop production and predict food shortages. OFDA supported the research, development, testing and evaluation of technologies designed to permit greater lead time in famine warning. OFDA financial support ceased in FY 1985 and AID's Africa Bureau funded a separate project aimed entirely at Sahelian countries entitled Famine Early Warning Systems (FEWS).

During the period of implementation, OFDA recorded 107 droughts in over 44 countries. Clearly an activity intended to reduce such widespread effects of drought, famine and food shortages is a wise expenditure of money. In fact, the activity advanced the USG's capacity to report on and analyze climatic effects on agriculture production; it assured a steady flow of information could be available to decision-makers. The link between research and application, however, was not successfully forged. Greater emphasis on the needs of those who could actually apply the data to an action program would have enhanced the activity's impact.

CASE STUDY 24

CIRCUM-PACIFIC EARTHQUAKE AND TSUNAMI MAPPING: WORLD WIDE

This activity was implemented by the USGS. It's main objectives were to develop and implement analytical techniques to determine the conditional probability for the recurrence of large or great earthquakes over the next 20 years. During the activity seismic potential of 119 seismic gaps were examined. The Southwest Pacific region presently contains the majority of high probability gaps. High potential gaps near population centers include Jama, Ecuador and Southeastern Guatemala. Many segments of Central America are presently assigned intermediate probabilities but will become areas of high concern over the next 10-20 years.

Implementation went smoothly and the scientific data is presented in ways which can be extremely useful to national decision-makers. Unfortunately, OFDA has not disseminated the information in a way to ensure its integration into national and regional planning processes.

CASE STUDY 25

VOLCANO EARLY WARNING AND DISASTER ASSISTANCE PROGRAM

The Volcano Disaster Assistance Program (VDAP) implemented primarily by the USGS, was begun in 1986 to develop a volcano early warning disaster assistance program capable of providing rapid technical response to actual or potential volcano crises worldwide. Assistance includes on-site monitoring of volcanoes by crisis assistance teams, on-going mapping and analysis of volcano hazards, and analysis of threat information needed to determine the necessity for emergency evacuation.

VDAP has been quite successful in providing rapid and effective emergency technical responses to actual or potential volcano crises. Some progress has also been made in assisting a number of countries to train staff and build and equip facilities in order to better cope with volcano hazards. However, VDAP's objective of institutionalizing this capacity is far from fulfilled. OFDA, in coordination with other donors, should make long-term plans for moving further toward this objective.

CASE STUDY 26

TRAINING

Throughout the past decade, training has been central to OFDA's strategy of building the capacity of USAID-assisted countries to prepare for and manage disasters. Though not well documented, OFDA's extensive effort has resulted in thousands of participants trained, with efforts focussed on the Caribbean, Latin America, and Asia. Without question, OFDA-sponsored training has vastly improved the disaster management capabilities of numerous countries. The vast majority of training has been provided by grant-supported intermediaries including AIT/ADPC, Dade County, Partners of the Americas, PAHO, OAS, and PCDPPP (all of which were chosen for case studies).

In spite of the large numbers of participants trained, in general, this has been done in an ad hoc manner. However, recently, OFDA's Regional Advisor in Costa Rica has made important progress toward creating a multi-year regional training plan. This effort in Costa Rica should be continued and refined and OFDA should create similar plans for other regions, particularly Africa. By creating plans to identify and then address training priorities, OFDA will improve its ability to build local disaster management capacities.

CASE STUDY 27

OFDA FIELD MANAGEMENT

In 1984 OFDA began placing contract personnel in regional positions in order to better manage its activities. The subject of OFDA field management was discussed with USAID staff and host country representatives in nine countries, as well as five individuals who have regional field responsibilities.

OFDA contract field staff are well-qualified and have considerably increased OFDA's capacity to plan and provide training, technical assistance and represent OFDA well in a wide-range of situations.

The Latin American "team" (three in Costa Rica and one in Peru) is a model of the type of skills OFDA needs, whether via contract or order means, to properly plan and monitor OFDA's wide-ranging program.

CROSS CASE ANALYSIS/SYNTHESIS

INTRODUCTION

As field work was undertaken in connection with the case studies, an effort was made to answer standard questions about each activity. This was accomplished using an instrument called the Case Study Data Sheet (see Annex 7) which catalogued and, where appropriate, "graded" or rated the performance of a number of factors which the team identified as being important to most, if not all, of the activities. A scale of zero to five was used, with five the best score, to assess the first twelve factors. The average of the scores recorded for the 12 factors was considered to be an overall measure of performance. Table 11 records the scores for the 12 factors and ranks each of the 25 scored activities based on the average overall score. Case study writers were not able to score all factors for all activities; however, 87% of possible scores were recorded. The distribution of scores was as follows:

Score	Frequency
5	93 (35%)
4	65 (25%)
3	59 (22%)
2	29 (12%)
1	17 (6%)

This yielded an average score for all factors of 3.7. By setting a range of 10% above and below 3.7 as average, the following categories were established:

- Above Average or High Performance 4.08 and above
- Average or Medium Performance 4.07 - 3.33
- Below Average or Low Performance 3.32 and below.

The team was concerned that the importance of individual factors might be over-represented in comparison to others. Also, it became clear that certain correlations could be emphasized by clustering individual scores together. Therefore, the twelve factors were placed into five clusters and the scores averaged by activity and by cluster. The nature of each cluster and the factors it included, along with comments on the scores appear below. Impressions on the comparative effectiveness of various activities, some of which were not necessarily a matter of analysis of factor scores, are also included as appropriate. The results of the cluster scoring are shown in Table 12.

OFDA currently defines its portfolio according to threat and category. Although we recommend a different approach to how the portfolio should be conceptualized (See Table 18), all analysis in this section retains the categorization currently used by OFDA, which is as follows:

Threat	Category
Earthquake	Operational Support
Flood	Institution Building
Tsunami	Disaster Mitigation
Volcano	Technology Transfer
Storm	Information Sharing
Civil Strife	
Cyclone, Hurricane, Tornado	
Displaced Persons	
Drought, Food Shortage	
Epidemic	
Fire	
Infestation	
Landslide	
Power Shortage	

These categorizations were used, for example, in the cost-effectiveness calculations when the cost of an activity studied was compared to comparable activities in the OFDA portfolio.

CLUSTER ANALYSES

Activity Relevance and Setting

This cluster was designed to gauge the extent to which OFDA focussed on disaster threats of major importance in the region or country involved. It included the first four factors on the Case Study Data Sheet:

Factor 1. Percent of population vulnerable to the threat addressed by the activity;
Factor 2. Frequency of type of disaster(s);
Factor 3. Historical impact of such disasters in terms of deaths, injuries, property, infrastructure and socio-economic development;
Factor 4. Future potential of disasters, the relative probabilities that such disasters will reoccur in the future.

The Case Study authors found that, for the most part, the activities studied concentrated on centrally important threats to life, and potential damage. The data collected affirmed this impression. The average relevance score of the activities was 4.12, out of a possible five.

A closer analysis of the data indicated some differentiations in activity relevance. For example, the activity with the highest relevance score was the Public Awareness activity in the Philippines, a country-specific activity which addresses multiple threats in a highly disaster prone and heavily populated nation (Case Study 12). This same multiple threat characteristic also affected the scores of most regional activities such as Case Study 15, the OAS Natural Hazards Project (4.75) and Case Study 19, the PCDPP activity (4.75) The fact that country-specific and regional activities addressing multiple threats scored consistently high may be a bias of the data sheet questionnaire. As the activity area expands, however, both the potential and frequency of disasters are likely to increase. These results seem to suggest that disaster mitigation activities can be designed to have maximum relevance by addressing multiple threats throughout a large geographic and heavily populated country or region rather than addressing a specific threat in only one country.

Lower scoring activities in terms of relevance included Case Study 3, the Seismic Network in Costa Rica (3.00) and Case Study 9, the Volcano Monitoring and Research Project in Indonesia (3.00). Both scored low for different reasons. The Indonesian activity received a low score because only 2% of the population is threatened, and even though there is a high probability of serious eruptions in the next 10-20 years, only a few people are likely to be affected. The Costa Rican activity's low score was because historically the impact of volcanoes and earthquakes in that country were relatively modest and there is only an average chance of such events in the next twenty years.

Meanwhile, the lowest relevance score in this factor (1.5) earned was by the La Punta Tsunami Study in Peru (Case Study 6), a activity which was highly rated in all other respects. The La Punta area (the city of Callao) had not experienced a serious tsunami in over 200 years. This, of course, does not mean that the city might not be hit tomorrow. However, the possibilities of an earthquake followed by a tsunami in the area were rated by experts as 3.00 which means that there is a medium probability that an event will occur again in the next twenty years. Therefore, in this case, we felt the activity was worth doing despite its low relevance scores, for if a tsunami strikes Callao, deaths and damage would be great.

In conclusion, OFDA did exceptionally well in choosing to fund activities which addressed major recurring threats generally of the highest magnitude. It is also clear that as OFDA develops new criteria for activity selection, measures of activity relevance similar to the first four factors of MSI's Case Study Data Sheet should be adapted to allow comparisons among competing proposals.

Management Performance

The second cluster of factor ratings attempted to gauge the effectiveness of the design and management of the activities for which case studies were written. Factors included in this management cluster included:

Factor 5. Relationship between activity Inputs and Outputs;
Factor 6. Relationship between activity Outputs and Purpose, or overall objectives;
Factor 10. Activity management;

The average score for all activities rated for the three factors was 3.65, or roughly the overall average of all factor scores. Generally, the design of the activity, the degree to which what was to be done and why, scored higher than ratings given to management during the implementation phase.

Scores concerning the design of activities showed limited success in defining the relationship between items funded (Inputs) and exactly what was expected to happen as a result of the expenditures (Outputs). For example, the Partners of the Americas activity (Case Study 16) scored low (2.67) in this category because there was only a vague definition of what OFDA funds were expected to accomplish. Likewise, the ASEAN Regional Earthquake Mitigation Program (Case Study 20) did not specifically define activity Outputs.

The next level in activity design linking outputs to meeting overall activity objectives (or Purpose) was also problematic, although most activities did marginally better at defining this relationship than linking inputs and outputs. In general, because OFDA did not insist that any particular standard format or framework be used in activity proposals or other documentation, scoring these design factors was difficult. In over two-thirds of the cases, MSI Case Study authors had to "tease out" the design aspects of the activity from various documents. The logic and design detail was seldom available in an organized and easily recoverable fashion.

Other findings about activity design include:

- Activities in which USAIDs played a role were, in general, better designed than those which did not have that involvement. Examples include the Seismic Network in the Dominican Republic (Case Study 2), the Preparedness Plan and the La Punta Tsunami Study in Peru (Case Studies 5 and 6) and the Disaster Management Center in Indonesia (Case Study 10). The superior nature of these designs was, in part, due to the fact that USAIDs are more accustomed to using standardized activity documentation and a process for consideration of activities.

- Regional activities such as those run by PAHO, AIT/ADPC and OAS also scored high in terms of design, perhaps due to the rigor of the grantees, the higher degree of scrutiny given to these expensive activities by OFDA (see Case Studies 18, 21 and 15) or both.

The management of OFDA's activities as measured by factor 10 of the Case Data Sheet showed a definite correlation between the quality of design and the management of the activity while under implementation. Of the ten activities which scored 4 or 5 for quality of design, seven also scored well above average in terms of management; none had management scores of below average. Three activities received management scores well below average: Dade County (Case Study 17), the ASEAN Regional Earthquake Mitigation Project (Case Study 20) and the Satellite Early Warning System in Fiji (Case Study 13) while ten others were average or only slightly below average.

Information about whether management responsibility was clear within the USG or within the host government and other implementing agencies was not systematically collected in the Case Study Data Sheets. However, the team found several instances where such lack of clarity caused problems and, in some cases, increased activity costs.

One example is the Costa Rica Seismic Network Earthquake/Volcano Mitigation Project (Case Study 3) where conflicts and confusion between and among the U.S. grantee and several Costa Rican agencies delayed implementation, eventually forced the grantee to withdraw and in a scramble by OFDA to find and contract another implementing agency to continue the activity.

After this activity became a problem, full-time OFDA contract staff with regional responsibilities were assigned to Costa Rica. The difficulties of this activity would probably not have occurred, or at least would have been caught considerably sooner, had such staff been in the field earlier in the decade.

In conclusion, the data and first hand impressions indicated that OFDA has done an average job of designing and managing the activities included in the case studies. More important was that OFDA's design and oversight of activities was highly inconsistent, leaving much room for improvement.

Institution Building

The cluster used to measure institution building included two factors:

Factor 8. Financial sustainability;
Factor 9. Institutional sustainability.

This cluster received an overall average rating of 2.94. This was the lowest by a significant degree: the next lowest average score was 3.18, while the highest was 4.12. Weaknesses in institution building was observable in mitigation activities around the world, regardless of cost, date of inception, or Purpose.

There were slight differences in scores between regions, and a distinct one between regional and country-specific activities. Country-specific activities in Latin America and the Caribbean scored highest in the cluster (2.8 for financial sustainability and 3.5 for institutional sustainability). Country-specific activities in Asia scored second highest (2.5 and 2.7). Regional activities were lower: 2.2 and 3.2 in Latin America and the Caribbean and 2.6 and 2.6 in Asia. Worldwide activities scored lowest overall at 2.0 for each of the two factors. Thus, all ratings for financial and institutional sustainability were below the overall factor average of 3.7.

The data and observations suggest the following:

- Activities are most effective in attaining institutional and financial sustainability when they are specific to one country. This may be because such activities engender a greater sense of responsibility and clearer "ownership" of the activity.

- On average, regional activities have been more effective in Latin America than elsewhere in attaining institution building objectives. This is probably due to the selection of highly professional intermediaries such as PAHO and the OAS, the ease of monitoring nearby activities and, since 1985, the existence of a regional staff.

- Although limited in both cases, greater success was realized in attaining institutional objectives than financial objectives. OFDA works through host governments and other institutions generally judged as sustainable. At the very least they are likely to continue existing. However, consistent budget shortfalls and unplanned (although possibly foreseeable) additional costs require a different and more sophisticated type of judgement. Miscalculation or lack of attention to such financial matters during activity design lowered the scores for activities across all regions. Financial planning and realistic cost assessment were weaknesses in most of the activities examined.

Of the 25 activities studied, ten were classified as having institution building as the main purpose. The ten institutional building activities had an average score of 2.8 for financial sustainability and 3.2 for institutional sustainability. Although these scores were higher than some activities with other Purposes, they still remained below the overall average range.

There are several possible reasons for the low scores of institution building activities. First, it is often an illusive objective. Second, AID (and other development institutions) have focused a great deal of time and effort in institution building with only mixed success over longer periods of time than OFDA has been able or prepared to commit to this objective. Third, real success in this area requires a long term commitment of resources -- one which OFDA is either unable or unwilling to make given some of its current constraints.

The role of an implementing agency in institution building involves careful planning for training of human resources, financial needs and technical assistance. Many of the case studies showed shortcomings in providing the training that would ensure that OFDA's intervention could run smoothly. Case authors noted that while initial training needs were often met, little provision was made for periodic retraining or skills upgrading and/or additional training necessitated by staff turn-over.

In other cases, low scores reflected inadequate financial planning. For example, a number of technology transfer activities got low scores because the cost of the equipment upgrades had not been included in the original budget. Frequently activities had "rolling budgets"--each year new costs would emerge and be covered by OFDA. In only two cases, the Jamaica Hazards Management (Case Study 1) and the Indonesian Disaster Management Center (Case Study 10), was it clear that all recurring costs for benefit sustainability were being met outside of OFDA funding.

Based on the results of the twenty-five case studies, the team feels that OFDA will need to concentrate on improving its approach to institutional and financial sustainability.

<u>Training</u>

An effort was made to collect and score activities in which training was a prominent feature. Cluster four included only one item (factor 7), which consisted of a series of questions to be completed for activities which included training. Those cases which included training as a component received an average score of 3.41.

Training was a feature of sixteen of the twenty-five case studies and a separate Case Study on training was also written. Comments on training are included in the section on institutional sustainability above and in the Training Case Study (26).

Activity Acceptability and Follow-On

Cluster 5 included two factors:

Factor 11. Acceptability of the activity to the key organizations involved in implementation

Factor 12. If the activity envisaged follow-on activities, the degree to which there was a relationship (programmatic and financial) between the initial and follow-on activity.

The acceptability of the OFDA activities to key organizations, entities or individuals involved in implementation was found to be below the average scoring.

Specific findings from the data were:

- Host governments were aware of the activity prior to implementation in 19 of 23 cases, and only in the case of Partners of the Americas (Case Study 16) did it appear some host governments were unaware. In about two-thirds of the activities, it was determined that the host government had the opportunity to review and comment on the activity's design and purpose prior to its implementation. In the other instances, it was either unclear whether the government had a formal opportunity for review or whether some general assent had been given.

- Once activities were underway, host governments were described as "fully and actively supportive" of 11 of the 25 activities, and "generally supportive" of 11 activities. In only one instance was the host government rated as "ambivalent to mildly supportive." The team is unaware of a comparable measure of AID's development activities; however, the level of support would seem to compare favorably to most country programs.

- Within AID itself the situation was less clear. In 14 of the 25 activities it appeared that USAIDs were aware of the activity prior to its implementation. In six other instances it was difficult to determine whether USAIDs had advance awareness of the activities (but it seemed likely they were aware, however vaguely, of the proposed activity). In only three cases -- the Philippines Typhoon Forecasting (Case Study 11), the OAS Risk and Mitigation (Case

Study 16) and the Partners of the Americas activities (Case Study 15) -- was it clear that the USAIDs had not been aware of the activity before implementation.

Apparently, in only half the cases did the USAIDs have the opportunity to review and comment on the activity's design prior to its implementation. Nevertheless, after implementation was underway USAID seemed to be "generally supportive" of 11 of the activities and "fully and actively supportive" of eight. Only in the cases of the Philippines Typhoon Forecasting and Partners of the Americas were the USAIDs "skeptical or unenthusiastic", perhaps due to the lack of prior involvement mentioned above.

An analysis of follow-on actions, indicated that the design of nine activities explicitly envisaged follow-on activities after completion of the activity. In three of the nine, the follow-on had yet to begin, either because the activity was still underway or because negotiations for the follow-on were still incomplete. Of the remaining six activities, follow-on activities successfully building upon the initial activity were already underway. Thirteen activities did not explicitly envisage any follow-on efforts at the design phase; however, there was nevertheless some kind of follow-on in five of the thirteen.

COST-EFFECTIVENESS

Clearly, some activities were more successful than others -- they produced more outputs, introduced new technologies, strengthened a target institution, created a larger or more sustainable stream of benefits than other activities. However, some of these more successful activities were also much more expensive. How to control for costs, and approach some measure of cost effectiveness?

As mentioned in the section entitled Scope of Work/Methodology, the procedure for measuring activity cost-effectiveness was to construct a fraction. For this study, the numerator of the cost-effectiveness fraction is the average score of factors 1 to 12, which we considered to be a measure of overall effectiveness or performance (the terms are used synonymously). The denominator is an arbitrary cost comparison based on the relationship between the cost of an individual activity reviewed in a case study and the average cost of OFDA-funded activities which were similar when sorted in terms of threat and category. Arithmetic results greater than 1 are taken to reflect relative degrees of cost-effectiveness; results less than one are taken to reflect cost-ineffectiveness.

The statement of our findings begins with a discussion of the numerator, effectiveness. This is followed by a discussion of the denominator, cost. It concludes with the cost-effectiveness results that this method generated.

Effectiveness

Table 11 shows the ranking of the 23 scored activities, based on the average score of Factors 1 to 12 while Table 12 shows the Factor Cluster scores. We took the overall average calculated in Table 11 to be a rough measure of effectiveness and performance; it corresponded quite well to the team's subjective judgments about the quality and impact of the Case Study activities. Several features of the rankings are notable:

- Effectiveness and funding are poorly correlated. Activities with above average performance had budgets ranged from $80,000 to $2.2 million and had an average cost of $876,000. Activities with below average performance had a similar range of budgets, from about $123,000 to just under $2 million, with an average cost of about $984,000.

- Effectiveness and area coverage are highly correlated. Above-average effectiveness ratings included seven of the 11 regional and worldwide activities but only five of the nine country-specific activities. Of the five activities top-rated on performance, four have regional coverage: AIT/ADPC (Case Study 21), PCDPPP (Case Study 19), PAHO Preparedness (Case Study 18), and OAS Risk & Mitigation (Case Study 15).

- Effectiveness is highly correlated with the "threat" and "category" classifications. Eight of the ten Emergency Management/Institution Building activities were ranked above-average in effectiveness, and nine of the 11 Technology Transfer activities were ranked as having below-average performance.

- Effectiveness is moderately correlated with region. Seven of the twelve activities in Latin American and the Caribbean are ranked above-average in performance, while only three of the nine activities in Asia and the Pacific are above-average. The two rated worldwide activities are equally divided.

- Effectiveness is moderately correlated with funding mechanism. Activities ranked above-average include seven of the eleven grants, but five of the six PASAs are ranked below-average in performance. The three activities funded through contracts and the three funded through USAID allotments are divided and too small a sample to be significant. Funding mechanisms used for each activity are shown as part of Table 9 Overview of Case Studies.

Cost

Using data supplied by OFDA and prepared by B*AH, the budgets of activities selected for detailed Case Study were compared with other OFDA-funded activities. Table 13 (Comparative Costs, by Category), is a listing of all of the pertinent OFDA-funded activities. The 25 sets of activities that were selected for Case Study were classified into 12 groups based on six broadly defined threats and five categories. Four of the groupings contain only activities selected for case studies; six of the 25 activities are in these four groups. The other eight groups contain a total of 49 OFDA-funded activities that were not selected for Case Study, as well as 19 Case Study activities. The average budget for each group of activities was calculated as a basis for comparing the budgets of individual Case Study activities, which were then assigned a factor score on the basis of an arbitrary distribution.

Ratio of Case Study Comparative cost	Cost factor
0.01 - 0.75	1
0.76 - 0.99	2
1.00	3
1.01 - 2.00	4
> 2.00	5

The activities selected for Case Study were costlier than the average for their groups; of the 19 Case Study activities for which there was a cost comparison with other OFDA-funded activities, 12 ranked "4" or "5" while only seven ranked "1" or "2".

Cost-Effectiveness Calculations

The procedure for calculating cost-effectiveness did not support firm conclusions about the cost-effectiveness of individual activities or about groups of activities. Table 14, Cross Case Analysis - Including Cost-Effectiveness, shows the estimation of effectiveness, the comparative cost, and the arithmetic result of the cost-effectiveness fraction. In this table, the cases are listed in decreasing order of cost-effectiveness.

The procedure introduced systematic biases that resulted in the comparatively smaller activities receiving higher cost-effectiveness scores. Large activities, in comparison to the average, tended to receive negative cost effectiveness scores because of the incomplete methodology. No activity with a budget of more than $560,000 was rated positively cost effective.

The problem with the procedure is clear. The numerators of the cost-effectiveness fractions range from 2.30 to 4.64, while the denominators range from 1 to 5, the numbers associated with comparisons with average costs of groups of similar activities. The average costs of groups of activities ranges from about $52,000 to nearly $1.5 million.

As Table 14 shows, no activity with a cost comparison score of greater than 3 was rated as being cost-effective. By definition, this score is equal to the average costs of activities in that group. Therefore, this approach to calculating cost-effectiveness was not sufficiently comprehensive to accommodate these variations.

A second approach began by ranking activities in terms of total cost to OFDA. Activities greater than $1.1 million were considered "High Cost," activities of between $350,000 and $1.1 million were ranked "Medium Cost," and activities with an OFDA budget of less than $350,000 were termed "Low Cost."

Activities were then grouped by the performance ranges shown at the beginning of the chapter.

The nine-cell matrix shown in Table 15 offers a second measure of cost-effectiveness. In this, three activities were low in cost (under $350,000) and high in performance: Strengthening Disaster Management in Indonesia (Case

Study 10), Hazards Management in Jamaica (Case Study 1), and Public Awareness in the Philippines (Case Study 12). At the other extreme, Partners Preparedness (Case Study 16) and Earthquake Hazards Reduction and Seismic Network (Costa Rica Case Study 3) had high costs and low performance.

In addition to the aggregate scores on factors 1- 12 that were used as an overall measure of effectiveness, the Case Study Data Sheets enabled investigators to record four possible adjustments to the cost-effectiveness ratio. These adjustments were deaths, injuries, property, and development. As with other factors, scores ranged from a low of 1 to a high of 5. A high cost effectiveness adjustment score might indicate that a activity might have an impact that differed from its actual performance, especially if it was targeted at a critical hazard. The adjustments for deaths and injuries were aggregated and divided into three groups. "High prevention potential" activities had a total score of 8 to 10 on the two factors. "Medium" activities had a total score of 4 to 7. "Low potential" activities scored only 1 to 3. A similar procedure grouped and activities according to their scores on potential to avoid property damage and minimize negative impact on socio-economic development.

Table 16 lists activities grouped by cost and the cost-effectiveness adjustments for deaths and injuries. The activities with the highest potential to prevent deaths and injuries were the La Punta Tsunami Study (Case Study 6), VDAP (Case Study 25), Dade County (Case Study 17), OAS Risk and Mitigation (Case Study 15), Global Climatic Assessment (Case Study 25) and PCDPPP (Case Study 19).

Table 17 lists activities grouped by cost and the cost-effectiveness adjustments for property and development. Regardless of cost, most activities are rated as having "medium" potential to save property and minimize negative developmental impacts. Only the OAS Risk Reduction & Mitigation activity (Case Study 15) ranked "High" and only the Bangladesh Disaster Alert System (Case Study 8) and the ASEAN Earthquake Hazard Mitigation (Case Study 20) activities ranked as having "Low" potential.

TABLE 11

CROSS CASE ANALYSIS
FACTOR SCORES
(arranged in descending order of overall average scores)

NO.	ACTIVITY	FACTOR SCORES 1	2	3	4	5	6	7	8	9	10	11	12	TOT	AVERAGE
10	Str. Disaster Management	5	5	3	5	5	5	5	4	4	5	5	N/A	51	4.64
21	AID/ADPC	5	5	3	5	5	5	5	4	4	4	5	N/A	50	4.55
19	PCDPPP	5	5	4	5	4	4	4	N/A	5	3	5	N/A	44	4.40
24	Circum Pacific EQ & TS Mapping	3	5	3	5	5	5	N/A	N/A	N/A	5	4	N/A	35	4.38
18	PAHO Preparedness	5	5	4	5	5	5	4	4	2	3	5	5	52	4.33
15	OAS Risk & Mitigation	5	5	4	5	4	5	4	3	4	4	4	N/A	47	4.27
1	Hazards Management	5	4	4	5	4	4	N/A	5	5	3	5	3	47	4.27
12	Public Awareness	5	5	5	5	4	5	4	3	3	3	4	N/A	46	4.18
25	VO Dis. Asst. Prog. (VDAP)	4	4	5	5	4	3	4	3	3	4	5	5	49	4.08
17	Dade County	5	5	4	5	3	4	4	3	3	2	4	4	46	3.83
2	Seismic Network (D.R.)	5	2	2	5	4	5	3	4	4	4	5	2	45	3.75
5	Preparedness Plan for GOP	3	3	2	5	5	4	N/A	3	3	5	4	4	41	3.73
14	Cyclone Oscar Disaster Asst.	5	5	3	5	4	5	2	1	1	4	4	N/A	39	3.55
9	Volcano Monitoring & Res.	1	5	1	5	2	4	2	5	4	3	5	5	42	3.50
11	TY Forecasting Program	4	5	5	5	2	3	2	3	3	3	3	4	42	3.50
23	Global Climatic Assessment	N/A	5	4	5	I/D	4	N/A	1	1	4	3	N/A	27	3.38
7	Adobe Building Testing	4	4	2	5	2	3	N/A	3	3	4	4	3	37	3.36
8	Disaster Alert System	3	5	5	5	4	2	2	1	2	3	5	3	40	3.33
16	Partners Preparedness	5	5	4	5	2	3	3	1	2	3	3	N/A	36	3.27
6	La Punta Tsunami Study	1	1	1	3	5	5	N/A	3	3	5	5	4	36	3.27
22	Housing Vulnerability	3	5	2	5	4	2	N/A	3	3	3	3	3	36	3.27
13	SPSSD/WS	5	5	3	5	3	2	3	1	2	2	5	3	39	3.25
3	EQ Hazards Id. & Seismic Net.	4	3	2	3	3	4	4	3	4	3	4	1	38	3.17
4	Seismic Network	3	4	4	5	2	4	3	2	3	3	4	1	38	3.17
20	EQ Hazard Mitigation	2	5	2	5	1	2	N/A	1	1	2	2	N/A	23	2.30
	AVERAGE SCORES	3.96	4.4	3.24	4.84	3.44	3.88	3.41	2.78	3.00	3.48	4.20	3.33		3.71

TABLE 12

CROSS CASE ANALYSIS
FACTOR CLUSTER SCORES

CASE STUDY NO.	ACTIVITY	CLUSTER 1 SETTING AVERAGE 1,2,3,4	CLUSTER 2 MGMT AVERAGE 5,6,10	CLUSTER 3 INSTIT. AVERAGE 8,9	CLUSTER 4 TRAINING FACTOR 7 SCORE	CLUSTER 5 ACCEPTANCE AVERAGE 11,12
1	Hazards Management	4.50	3.67	5.00	N/A	4.00
2	Seismic Networks	3.50	4.33	4.00	3	3.50
3	EQ Hazards Red. & Seismic Net.	3.00	3.33	3.50	4	2.50
4	Seismic Network	4.00	3.00	2.50	3	2.50
5	Preparedness Plan for GOP	3.25	4.67	3.00	N/A	4.00
6	La Punta Tsunami Study	1.50	5.00	3.00	N/A	4.50
7	Adobe Building Testing	3.75	3.00	3.00	N/A	3.50
8	Disaster Alert System	4.50	3.00	1.50	2	4.00
9	Volcano Monitoring & Res.	3.00	3.00	4.50	2	5.00
10	Str. Disaster Management	4.50	5.00	4.50	5	2.50
11	TY Forecasting Program	4.75	2.67	3.00	2	3.50
12	Public Awareness	5.00	4.00	3.00	4	2.00
13	SPSSD/WS	4.50	2.33	1.50	3	4.00
14	Cyclone Oscar Disaster Asst.	4.50	4.33	1.00	2	2.00
15	OAS Risk & Mitigation	4.75	4.33	3.50	4	2.00
16	Partners Preparedness	4.75	2.67	1.50	3	1.50
17	Dade County	4.75	3.00	3.00	4	4.00
18	PAHO Preparedness	4.75	4.33	3.00	4	5.00
19	PCDPPP	4.75	3.67	5.00	4	2.50
20	EQ Hazard Mitigation	3.50	1.67	1.00	N/A	1.00
21	AIT/ADPC	4.50	4.67	4.00	5	2.50
22	Housing Vulnerability	3.75	3.00	3.00	N/A	3.00
23	Global Climatic Assessment	4.67	4.00	1.00	N/A	1.50
24	EQ & TS Mapping	4.00	5.00	N/A	N/A	4.00
25	VD Dis. Asst. Prog. (VDAP)	4.50	3.67	3.00	4	5.00
	AVERAGE SCORES	4.12	3.65	2.94	3.41	3.18

TABLE 13

COMPARATIVE COSTS BY CATEGORY

Case Study	Country	Region	Activity	Funding Mechanism	Threat	Category	Project Cost	Average Cost	Comparative Cost	Factor 13 Score
15	Non-Country Specific	LAC	OAS Risk & Mitigation	Grant	EM	Dis. Mit.	932,500		2.84	5
15	Non-Country Specific	LAC	OAS Risk & Mitigation	Grant	EM	Dis. Mit.	474,600		x	
22	Non-Country Specific	SoPac	Housing Vulnerability	Grant	EM	Dis. Mit.	257,871		0.52	1
No	Non-Country Specific	Caribbean	Building Codes	MA	EM	Dis. Mit.	216,000			
No	Non-Country Specific	Caribbean	Building Codes	MA	EM	Dis. Mit.	100,102			
							1,981,073	495,268		
1	Jamaica	Caribbean	Hazards Management	Contract	EM	Inst. Bldg.	214,374		0.52	1
5	Peru	Latin Amer.	Preparedness Plan for GOP	Contract	EM	Inst. Bldg.	59,408		0.14	1
10	Indonesia	Asia	Str. Disaster Management	Grant	EM	Inst. Bldg.	350,910		0.85	2
12	Philippines	Asia	Public Awareness	MA	EM	Inst. Bldg.	80,000		0.19	1
16	Non-Country Specific	LAC	Partners Preparedness	Grant	EM	Inst. Bldg.	1,862,680		4.49	5
18	Non-Country Specific	LAC	PAHO Preparedness	Contract	EM	Inst. Bldg.	612,469		3.58	5
18	Non-Country Specific	LAC	PAHO Preparedness	Grant	EM	Inst. Bldg.	870,250		x	
19	Non-Country Specific	LAC	PCDPPP	Grant	EM	Inst. Bldg.	2,203,995		5.32	5
21	Non-Country Specific	Asia/Pacific	AIT/ADPC	Grant	EM	Inst. Bldg.	835,000		2.01	5
No	Non-Country Specific	Worldwide	Hazards Training	PASA	EM	Inst. Bldg.	606,901			
No	Haiti	Caribbean	Preparedness	PSC	EM	Inst. Bldg.	114,305			
No	Non-Country Specific	LAC	Preparedness Assessment	Contract	EM	Inst. Bldg.	61,404			
No	Non-Country Specific	Worldwide	Building Conference	Grant	EM	Inst. Bldg.	75,000			
No	Non-Country Specific	Pacific	Preparedness/Rural Dev.	Grant	EM	Inst. Bldg.	188,835			
No	Non-Country Specific	Worldwide	PVO Preparedness Plans	Contract	EM	Inst. Bldg.	55,237			
No	Non-Country Specific	Pacific	Disaster Survey	Grant	EM	Inst. Bldg.	68,294			
No	Non-Country Specific	LAC	Preparedness (LRCS)	Contract	EM	Inst. Bldg.	235,455			
No	Non-Country Specific	LAC	EM Course	MA	EM	Inst. Bldg.	111,000			
No	Barbados	Caribbean	Preparedness	MA	EM	Inst. Bldg.	92,080			
No	Non-Country Specific	Worldwide	CARE EM Workshop	Grant	EM	Inst. Bldg.	54,700			
No	Madagascar	Africa	Red Cross Society	Grant	EM	Inst. Bldg.	143,803			
No	Non-Country Specific	LAC	Natural Hazards	Contract	EM	Inst. Bldg.	217,400			
No	Non-Country Specific	LAC	Oil Spill	PASA	EM	Inst. Bldg.	361,006			
No	Non-Country Specific	Caribbean	First Aid	Grant	EM	Inst. Bldg.	100,000			
No	Non-Country Specific	Worldwide	Peace Corps/Prepared.	PASA	EM	Inst. Bldg.	376,480			
							9,950,980	414,624		

TABLE 13

COMPARATIVE COSTS BY CATEGORY

Case Study	Country	Region	Activity	Funding Mechanism	Threat	Category	Project Cost	Average Cost	Comparative Cost	Factor 13 Score
2	Dominican Republic	Caribbean	Seismic Network	Grant	EQ	Tech. Trans.	755,072		1.71	4
3	Costa Rica	Latin Amer.	EQ Haz. Red. & Seismic Net.	Grant	EQ	Tech. Trans.	1,021,081		3.29	5
3	Costa Rica	Latin Amer.	EQ/VO Mitigation	Contract	EQ	Tech. Trans.	432,147		x	
4	Peru	Latin Amer.	Seismic Network	Grant	EQ	Tech. Trans.	1,072,508		2.43	5
24	Non-Country Specific	Worldwide	EQ & TS Mapping	PASA	EQ	Tech. Trans.	394,799		0.89	2
No	Non-Country Specific	Pacific	Seismic Risk Evaluation	Grant	EQ	Tech. Trans.	606,304			
No	Non-Country Specific	Worldwide	Seismic Network	PASA	EQ	Tech. Trans.	150,000			
No	Non-Country Specific	Caribbean	Seismic Network	Grant	EQ	Tech. Trans.	61,416			
No	Dominican Republic	Caribbean	Earthquake Network	PASA	EQ	Tech. Trans.	173,040			
No	Non-Country Specific	LAC	Agroclimatic Assess.	PASA	EQ	Tech. Trans.	427,887			
No	Panama	Latin Amer.	EQ Hazards Reduction	PO	EQ	Tech. Trans.	261,322			
No	El Salvador	Latin Amer.	Seismic Hazards Eval.	PASA	EQ	Tech. Trans.	135,300			
No	Non-Country Specific	Asia	EQ Mitigation	PASA	EQ	Tech. Trans.	195,380			
No	Non-Country Specific	Caribbean	Seismic Equipment	PO	EQ	Tech. Trans.	50,000			
							5,736,256	441,250		
7	Peru	Latin Amer.	Adobe Building Testing	MA	FL	Tech. Trans.	144,750	144,750	1.00	3
6	Peru	Latin Amer.	La Punta Tsunani Study	MA	TS	Tech. Trans.	123,400		0.30	1
No	Chile	Latin Amer.	Early Warning System	PASA	TS	Tech. Trans.	682,850			
No	Non-Country Specific	Worldwide	Tsunani Threat Anal.	Contract	TS	Tech. Trans.	411,164			
							1,217,414	405,805		
25	Non-Country Specific	Worldwide	VO Dis. Asst. Prog. (VDAP)	PASA	VO	Inst. Bldg.	527,000	527,000	1.00	3

TABLE 13

COMPARATIVE COSTS BY CATEGORY

Case Study	Country	Region	Activity	Funding Mechanism	Threat	Category	Project Cost	Average Cost	Comparative Cost	Factor 13 Score
17			Dade County	Grant	EM	Op. Supp.	646,515		1.29	4
Special			Regional Advisors	MA/TA	EM	Op. Supp.	678,848			
No	Non-Country Specific	Worldwide	Info Network/OFDA	Contract	EM	Op. Supp.	746,255			
No	Non-Country Specific	Worldwide	Info. Support (VITA)	Grant	EM	Op. Supp.	66,530			
No	Non-Country Specific	Worldwide	Preparedness Seminar	Contract	EM	Op. Supp.	397,513			
No	Non-Country Specific	LAC	Peru Regional Advisor	Contract	EM	Op. Supp.	282,792			
No	Non-Country Specific	LAC	Planning Assistance	Contract	EM	Op. Supp.	58,028			
No	Non-Country Specific	Worldwide	Disaster Course (UoW)	Grant	EM	Op. Supp.	183,161			
No	Non-Country Specific	Worldwide	Information Support	Contract	EM	Op. Supp.	2,388,168			
No	Non-Country Specific	Caribbean	Program Evaluation	IQC	EM	Op. Supp.	65,000			
No	Non-Country Specific	Worldwide	Booz Allen Evaluation	IQC	EM	Op. Supp.	51,817			
No	Non-Country Specific	Worldwide	BADES	Grant	EM	Op. Supp.	74,000			
No	Non-Country Specific	Worldwide	Disaster Simulation	Contract	EM	Op. Supp.	73,479			
No	Non-Country Specific	Worldwide	Expert Support	RSSA	EM	Op. Supp.	2,055,116			
No	Dominican Republic	Caribbean	Field Support	PSC	EQ	Op. Supp.	55,237			
No	Non-Country Specific	LAC	Workshop Package	Contract	EM	Op. Supp.	104,146			
No	Non-Country Specific	Worldwide	Lessons Learned	Contract	EM	Op. Supp.	79,610			
							8,006,216	500,389		
23	Non-Country Specific	Worldwide	Global Climatic Assessment	PASA	EM	Tech. Trans.	4,224,352		2.84	5
No	Non-Country Specific	LAC	LifeNet-Video Coverage	Grant	EM	Tech. Trans.	175,000			
No	Non-Country Specific	Caribbean	Preparedness	Contract	EM	Tech. Trans.	64,145			
							4,463,497	1,487,832		
20	Non-Country Specific	Asia	EQ Hazard Mitigation	PASA	EQ	Inst. Bldg.	673,617		1.85	4
No	Non-Country Specific	Asia	EQ Engineering	PASA	EQ	Inst. Bldg.	55,000			
							728,617	364,309		

TABLE 13

COMPARATIVE COSTS BY CATEGORY

Case Study	Country	Region	Activity	Funding Mechanism	Threat	Category	Project Cost	Average Cost	Comparative Cost	Factor 13 Score
9	Indonesia	Asia	Volcano Monitoring & Res.	PASA	VO	Tech. Trans.	779,217		1.14	4
No	Ecuador	Latin Amer.	UNDRO EM Programs	Grant	VO	Tech. Trans.	592,180			
							1,371,397	685,699		
14	Fiji	SoPac	Cyclone Oscar Disaster Asst.	Grant	WS	Dis. Mit.	52,780	52,780	1.00	3
8	Bangladesh	Asia	Disaster Alert System	PASA	WS	Tech. Trans.	546,000		0.95	2
11	Philippines	Asia	TY Forecasting Program	Contract	WS	Tech. Trans.	559,544		0.98	2
13	Fiji	SoPac	SPSSD/WD	PASA	WS	Tech. Trans.	361,180		1.07	4
13	Fiji	SoPac	Satellite EWS	PASA	WS	Tech. Trans.	250,250		x	
							1,716,974	572,325		

TABLE 14

CROSS-CASE ANALYSIS
INCLUDING COST-EFFECTIVENESS
(arranged in decending order according to average cost-effectiveness score)

CASE STUDY NO.	ACTIVITY	TOTAL COST	AVERAGE OF FACTORS 1-12	FACTOR 13 SCORE	COST EFFECTIVENESS
1	Hazards Management	214,374	4.27	1	4.27
12	Public Awareness	108,716	4.18	1	4.18
5	Preparedness Plan for GOP	59,408	3.73	1	3.73
22	Housing Vulnerability	301,219	3.27	1	3.27
6	La Punta Tsunami Study	123,400	3.27	1	3.27
10	Str. Disaster Management	350,910	4.64	2	2.32
24	EQ & TS Mapping	458,961	4.38	2	2.19
11	TY Forecasting Program	559,544	3.50	2	1.75
8	Disaster Alert System	546,000	3.33	2	1.67
25	VD. Dis. Asst. Prog.	527,000	4.08	3	1.36
14	Cyclone Oscar Disaster Asst.	52,780	3.55	3	1.18
7	Adobe Building Testing	144,750	3.36	3	1.12
17	Dade County	646,515	3.83	4	0.96
2	Seismic Network	755,072	3.75	4	0.94
21	AIT/ADPC	760,000	4.55	5	0.91
19	PCDPPP	2,203,995	4.40	5	0.88
9	Volcano Monitoring & Res.	779,217	3.50	4	0.88
18	PAHO Preparedness	2,367,719	4.33	5	0.87
15	OAS Risk & Mitigation	1,407,100	4.27	5	0.85
16	Partners Preparedness	1,862,680	3.27	4	0.82
13	SPSSD/WS	611,430	3.25	4	0.81
23	Global Climatic Assessment	6,224,352	3.38	5	0.68
4	Seismic Network	1,072,508	3.17	5	0.63
3	EQ Hazards Red. & Seismic Net.	1,453,228	3.17	5	0.63
20	EQ Hazard Mitigation	673,617	2.30	4	0.58
	AVERAGE	970,550	3.71	3.24	1.63
	TOTAL COST	24,264,495			

1451.045

TABLE 15: COMPARISON OF COST AND PERFORMANCE

	HIGH PERFORMANCE Average Score of Factors 1-12 of 4.08 - 4.64	MEDIUM PERFORMANCE Average Score of Factors 1-12 of 3.33 - 4.07	LOW PERFORMANCE Average Score of Factors 1-12 of 2.30 - 3.32
LOW COST *<$350,000*	Strengthening Disaster Management (Indonesia, #10) Hazards Management (Jamaica, #1) Public Awareness (Philippines, #12)	Preparedness Plan for GOP (Peru, #5) Cyclone Oscar Disaster Assistance (Fiji, #14) Adobe Building Testing (Peru, #7)	La Punta Tsunami Study (Peru, #6) Housing Vulnerability (ANE, #22).
MEDIUM COST *$350,000 - $1.1 Million*	Asian Institute of Technology/Asian Disaster Preparedness Center (ANE, #21) Volcano Disaster Assistance Program (Worldwide, #25) Circum Pacific Earthquake & Tsunami Mapping (ANE, #24).	Dade County (LAC, #17) Volcano Monitoring & Research (Indonesia, #9) Typhoon Forecasting Program (Philippines, #11) Disaster Alert System (Bangladesh, #8) Seismic Network (Dominican Republic, #2)	Seismic Network (Peru, #4) Earthquake Hazard Mitigation (ANE, #20) South Pacific Severe Storm Detection Warning System (Fiji, #13)
HIGH COST *>$1.1 Million*	OAS Risk Reduction & Mitigation (LAC, #15) PAHO Preparedness (LAC, #18) Pan Caribbean Disaster Preparedness & Prevention Project (LAC, #19)	Global Climatic Assessment (Worldwide, #23)	Partners Preparedness (LAC, #16) Earthquake Hazards Reduction & Seismic Network (Costa Rica, #3)

Each project's geographic area and case study number are in parentheses.

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TABLE 16: COMPARISON OF COST AND POTENTIAL TO PREVENT DEATHS & INJURIES

	HIGH POTENTIAL TO PREVENT DEATHS & INJURIES Average Score of Factors 1-12 of 4.08 - 4.64	MEDIUM POTENTIAL TO PREVENT DEATHS & INJURIES Average Score of Factors 1-12 of 3.33 - 4.07	LOW POTENTIAL TO PREVENT DEATHS & INJURIES Average Score of Factors 1-12 of 2.30 - 3.32
LOW COST *<$350,000*	La Punta Tsunami Study (Peru, #6)	Preparedness Plan for GOP (Peru, #5) Public Awareness (Philippines, #12) Adobe Building Testing (Peru, #7) Strengthening Disaster Management (Indonesia, #10) Hazards Management (Jamaica, #1) Housing Vulnerability (ANE, #22)	Cyclone Oscar Disaster Assistance (Fiji, #14)
MEDIUM COST *$350,000 - $1.1 Million*	Volcano Disaster Assistance Program (Worldwide, #25) Dade County (LAC, #17)	Volcano Monitoring & Research (Indonesia, #9) Typhoon Forecasting Program (Philippines, #11) Disaster Alert System (Bangladesh, #8) South Pacific Severe Storm Detection Warning System (Fiji, #13) Asian Institute of Technology/Asian Disaster Preparedness Center (ANE, #21) Circum Pacific Earthquake & Tsunami Mapping (ANE, #24)	Seismic Network (Peru, #4) Earthquake Hazard Mitigation (ANE, #20) Seismic Network (Dominican Republic, #2)
HIGH COST *>$1.1 Million*	OAS Risk Reduction & Mitigation (LAC, #15) Global Climatic Assessment (Worldwide, #23) Pan Caribbean Disaster Preparedness & Prevention Project (LAC, #19)	Partners Preparedness (LAC, #16) Earthquake Hazards Reduction & Seismic Network (Costa Rica, #3) PAHO Preparedness (LAC, #18)	

Each project's geographic area and case study number are in parentheses.

TABLE 17: COMPARISON OF COST AND POTENTIAL TO AVOID PROPERTY DAMAGE & NEGATIVE SOCIO-ECONOMIC DEVELOPMENT AND PROJECT Average Factor Score of 4.08 - 4.64, 3.33 - 3.83, 3.27 - 2.30

	HIGH POTENTIAL AVOIDANCE OF PROPERTY DAMAGE AND NEGATIVE SOCIO-ECONOMIC DEVELOPMENT Average Score of Factors 1-12 of 4.08 -- 4.64	MEDIUM POTENTIAL AVOIDANCE OF PROPERTY DAMAGE AND NEGATIVE SOCIO-ECONOMIC DEVELOPMENT Average Score of Factors 1-12 of 3.33 - 4.07	LOW POTENTIAL AVOIDANCE OF PROPERTY DAMAGE AND NEGATIVE SOCIO-ECONOMIC DEVELOPMENT Average Score of Factors 1-12 of 2.30 - 3.32
LOW COST *<$350,000*		Preparedness Plan for GOP (Peru, #5) Public Awareness (Philippines, #12) Adobe Building Testing (Peru, #7) Strengthening Disaster Management (Indonesia, #10) Hazards Management (Jamaica, #1) La Punta Tsunami Study (Peru, #6) Cyclone Oscar Disaster Assistance (Fiji, #14) Housing Vulnerability (ANE, #22)	
MEDIUM COST *$350,000-$1.1 Million*		Volcano Monitoring & Research (Indonesia, #9) Typhoon Forecasting Program (Philippines, #11) Seismic Network (Dominican Republic, #2) South Pacific Severe Storm Detection Warning System (Fiji, #13) Asian Institute of Technology/Asian Disaster Preparedness Center (ANE, #21) Volcano Disaster Assistance Program (Worldwide, #2) Seismic Network (Peru, #4) Dade County (LAC, #17) Circum Pacific Earthquake & Tsunami Mapping (ANE, #24)	Disaster Alert System (Bangladesh, #8) Earthquake Hazard Mitigation (ANE, #20)
HIGH COST *>$1.1 Million*	OAS Risk Reduction & Mitigation (LAC, #15)	Partners Preparedness (LAC, #16) Earthquake Hazards Reduction & Seismic Network (Costa Rica, #3) PAHO Preparedness (LAC, #18) Global Climatic Assessment (Worldwide, #23) Pan Caribbean Disaster Prparedness & Prevention Project (LAC, #19)	

Each project's geographic area and case study number are in parentheses.

HYPOTHESES, CONCLUSIONS AND LESSONS LEARNED

During the course of our early discussions and interviews, the team developed a set of hypotheses to shape our research. These hypotheses express the general impressions (or conventional wisdom) of a variety of people, team members and non-members, knowledgeable about OFDA. Each hypothesis is discussed along with a summary of the team's findings.

RESOURCE ALLOCATION

> ***Hypothesis #1:*** Procedures are not in place to ensure systematic review and comparison of competing activities, which results in several personalized resource allocation strategies within OFDA.
>
> ***Finding:*** Confirmed

Frequently activities appear to have been started with an initial grant of seed money (almost like a venture capital investment). If the initial effort was deemed successful, additional money followed. Often decisions to continue were made without the benefit of an evaluation. If the funding implications of the original vision were extensive, funding could be expanded or contracted according to budget availability.

Until a few years ago, formal office-wide reviews of all non-relief funding proposals were conducted which required documentation to be circulated throughout OFDA. Apparently, this system was replaced by a less structured process which, in turn, was replaced by a very informal process. Currently, proposals can be advanced through a review process involving small groups or one-on-one meetings. Although an Annual Budget Submission (ABS) has been prepared for all of OFDA's operations, it has varied considerably in the degree to which it addresses non-relief activities. Thus, even when a formal review was required of individual proposals, it appears that judgments were not often made between the relative merits of several competing activities. Consequently, our impression is that very few proposals are actually turned down, although some may receive funding which is reduced in either level or duration from the original purpose.

Changes in procedures over the years have been, to a fair degree, due to a constant turn-over of Office Directors during the last decade. There have been seven Directors. With each new appointment staff members needed to adjust to varying management styles and different degrees of interest in preparedness/mitigation. When considered against that backdrop, there is a surprising degree of consistency in the portfolio.

During the course of this study, the new Office Director, Andrew Natsios initiated an intensive renew of OFDA's policies and procedures. One outcome of this has been the preparation of guidance to the staff on the process by which all future preparedness/mitigation activities are to be reviewed and an outline for the preparation of proposals. Also being prepared is a standard format to be used for all funding proposals. These actions are a step in the right direction and the team hopes that the final products will be consistent with observations made in this study.

Conclusions

Apparently, OFDA has used its annual funding mechanism as a major way of controlling project implementation. OFDA does not have a consistent system designed to select priority activities from alternative methods of achieving strategic goals and then monitoring both costs and implementation closely throughout the life of the activity. Therefore, OFDA is left only with the granting or withholding of funds as a means of establishing goals and ensuring project compliance. The more common practices of goal setting and establishing uniform monitoring, reporting, and evaluation systems are not routinely followed. This lack of systems can, in and of itself, have negative effects on project success.

Lessons Learned

OFDA's acceptance of less than rigorous project design standards and then modifying funding levels or duration of activities inhibits the achievement of full impact by the activities funded.

Since OFDA has not set office-wide priorities for approaches to disaster preparedness and mitigation, there is no efficient way to make preliminary choices on the kinds of activities in which to invest. Consequently, OFDA resources have been used in an eclectic, rather than a focused, manner; funded activities appear to be aimed at attempting a little bit of everything. This was not an unreasonable approach to a targets of opportunity approach pursued throughout the last decade. However, it is not appropriate for the future.

Hypothesis #2: Africa is underfunded relative to its needs.

Finding: Confirmed

Only 18 of the 126 activities undertaken by OFDA since FY 79 which exceed $50,000 have been in Africa. None were considered either interesting or relevant enough to justify a field visit during the study. Indeed, only 16% of OFDA's non-relief activities since FY 79 (or approximately $8 million) has been spent on bilateral or regional activities in Africa. This does not include money spent as part of worldwide activities; however African expenditures are small relative to the other regions.

The Overview of OFDA's Portfolio shows that \$6.2 million of the total of \$8 million was obligated in FY 86 and 87 when Supplemental Appropriations for the Sahael were included in A.I.D.'s legislation. These amounts were "pass throughs" in the form of grants to PVOs and grants and contracts related to the start up of the FEWS project (See Case Study 23). OFDA retained only minimal responsibility for monitoring these activities.

This level of support for preparedness/mitigation seems inappropriately low when one considers that between FY 79 and 88, OFDA allocated over 50% of its relief funds (or about \$65.7 million) to Africa while over 70% of all USG relief expenditures during the same period (or almost \$1.469 billion) went to that region.

Possible reasons for this might be:

- Africa has relatively few natural disasters and emphasis has been on natural rather than slow onset man-made disasters, such as famine.

- In selecting its priority countries, OFDA has given equal weight to need and the ability of a recipient country to effectively utilize funds (absorptive capacity). The latter consideration makes it difficult for Africa to compete.

Conclusions

OFDA and other disaster preparedness organizations have limited experience in dealing with slow-onset disasters (which are dominant in Africa), and OFDA lacks an experience base in that continent on which to build a preparedness/mitigation portfolio. As mentioned, African nations are less likely to meet OFDA's criterion for absorptive capacity than are countries in Latin America and Asia.

A key theme of this report is the need for a broader definition of mitigation. This definition is predicated on the proposition that many development interventions can help mitigate the effects of disasters - (e.g., agricultural activities intended to improve food security, feeding programs which reduce nutritional vulnerability, etc.). A broadened definition would be most appropriate in Africa where poverty, disease, and economic and political stability lead to food shortages, which in turn generate large-scale migration (both within and across international boundaries). Thus, if disaster mitigation activities had been linked with specific types of development programs, A.I.D.'s overall objectives would have been more completely defined and operationalized in Africa during the last decade.

Lessons Learned

OFDA's two criteria for selecting priority countries (need and absorptive capacity) are weighted against African nations, which has meant that OFDA has been reluctant to risk its resources in this region. Given the needs of Africa, OFDA's lack of response is not representative of its leadership role in investing in new -- if high-risk -- attempts at preparing for and mitigating the effects of all types of disasters. It is in Africa that the greatest potential for economic, social, and political disruption from slow onset natural disasters now exists.

Given the above, OFDA will need to consider seriously its future role in Africa. Key considerations will be: (a) how to integrate its activities with AFR's development efforts; (b) its policy toward providing relief and non-relief assistance aimed at interval migrations; and (c) the need for institution building efforts which will require considerably more time than those already funded in other regions. This latter point is especially important given OFDA's acknowledged limitations regarding long-term commitments.

> ***Hypothesis #3:*** Infrequent but dramatic threats occurring in geologic time (earthquakes, volcanoes and tsunamis) receive a relatively large proportion of the budget compared to those occurring in meteorologic time.
>
> ***Finding:*** Confirmed

Table 3 shows that the combined expenditures on earthquakes, volcanoes and tsunamis have accounted for over 25% of all money which has been allocated over the last decade.

Expenditures on these threats pose some particularly difficult dilemmas for policy makers. First, the frequency of occurrence is difficult to predict, and the long recurrence interval may call into question the wisdom of the investment. For example, there has been no earthquake in the Dominican Republic this century (Case Study 2) and no tsunami has hit La Punta, Peru for 200 years. (Case Study 6) On the other hand, seismographic equipment recently sent to Colombia in the aftermath of the eruption of Nevado del Ruiz has already played a pivotal role in alerting residents to an eruption this summer. Second, interventions have involved the use of technologies which require relatively large expenditures of money. Third, it is not at all guaranteed that the linkages between alert - decision - warning - and public action will all be successful. Thus, expenditures in technologies which place a significant claim on resources are a necessary but not sufficient condition to deter deaths, injuries and property damage. This is particularly true in dealing with earthquakes.

Conclusions

Over the past decade, OFDA's investments in technology have resulted in significant advances in the ability of developing nations to provide early warnings of volcanoes and tsunamis. The costs have been high for the results achieved, however, and some technological limits have been reached. At the same time, the frequency with which events such as typhoons and floods occur make the return of these investments both larger and easier to measure.

The frequency with which a given disaster is likely to occur is only one element in determining where OFDA resources should be invested. Equally important are the percentage of population at risk from that type of disaster and its potential impact. As Table 11 shows, activities relating to geologic disasters scored an average of 3.1 ("average") on these four factors (frequency, population vulnerability, impact, and potential); those related to meteorologic disasters scored 4.4 (5 is "outstanding").

Lessons Learned

In the complicated weighing of factors necessary to make wise investment decisions, infrequently-occurring disasters need to be measured carefully in terms of population vulnerability and destructiveness of the event, as the value of the investment may remain hypothetical for a long time. This is also the reason why it makes benefit-cost analysis impossible to undertake.

> ***Hypothesis #4:*** Activities have not been designed to ensure a comprehensive approach to disaster preparedness/mitigation from a unified funding source, thus reducing development impact.
>
> ***Finding:*** Generally Confirmed

OFDA operations are predominantly focused on disaster response. Therefore, the office has operated under a "notwithstanding any other provision" clause in A.I.D.'s legislation which is essential to its relief efforts. Because of this, OFDA has resisted "projectizing" its disaster preparedness and mitigation activities along the lines of regular A.I.D. procedures. Therefore, in all but a few instances, documentation was not prepared spelling out a multiyear approach, program objectives and the budget required to accomplish it. Many of the activities reviewed in detail (See for example, in Case Studies 4, 11, 13 and 15) would have benefited greatly from closer adherence to the discipline of A.I.D.'s project design, monitoring and evaluation processes and procedures. Thus, while existing procedures have produced some activities which has been excellent in all aspects of their design and implementation, the OFDA staff would benefit greatly from training intended to upgrade design, monitor and evaluation skills.

Conclusions

OFDA prizes its flexibility and quick response time - hallmarks of effective emergency relief activities. However, this approach has carried over to OFDA's procedures for investing in disaster mitigation activities. While pressure may also be felt from individuals and organizations having a vested interest in the undertaking of these activities, these activities should not be designed nor funded in haste, and should not be funded as one-time events. Mitigation and preparedness are processes, and need better design and longer time-frames in their planning and implementation. OFDA needs to seek a balance between its previous systems and the complete adoption of Handbook 3. The team believes that such a balance can be maintained permitting OFDA the flexibility it needs while also introducing new discipline into its own unique needs.

ᵌ problems mentioned above are compounded by the fact that OFDA has funded so many small activities. Approximately 75% of all activities listed in the B*AH report had total life of project funding of less than $50,000 while 52% of all activities cost less than $10,000. The distribution of funding is as follows:

Funding Level	No. of Activities	% of Total
	Above $50,000	
> $1 million	10	(2.1%)
$500,000 - $1 million	21	(4.4%)
$100,000 - $500,000	52	(10.9%)
$50,000 - $100,000	39	(8.2%)
	122	25.5%
	Below $50,000	
$40,000 - $50,000	18	(3.8%)
$30,000 - $40,000	16	(3.3%)
$20,000 - $30,000	20	(4.2%)
$10,000 - $20,000	50	(10.5%)
$1 - $10,000	252	(52.7%)
	356	74.5%

This present severe problems. First, many of the activities are training events, conferences or workshops which are directly or tangentially related to a major activity. To the extent that they are implemented as freestanding events and not successfully integrated into broader activity objectives, development impact is limited. Second, absent a strategy based upon the accomplishment of several objectives, there has been a tendency to fund a hodgepodge of activities. Third, the large number of small activities, each requiring its own set of administrative actions is time consuming, staff intensive and diverts energy away from broad based, comprehensive planning and implementation.

Lessons Learned

Both the impact and the sustainability of OFDA's investments in disaster preparedness and mitigation are sometimes undermined by short-term time horizons, patterns of incremental funding and the funding of many small activities.

> ***Hypothesis #5:*** Investments in science and technology have had limited impact on the basic problems of disaster preparation and mitigation.
>
> ***Finding:*** Generally Confirmed

By the 1980s, a significant backlash had developed to the unbounded optimism of the 1960s and 1970s regarding the role of technology. However, the balanced view was that technologies which were user-friendly, user-responsive and fully effective in addressing a variety of socio-economic concerns could make powerful contributions. Therefore, OFDA chose to make substantial investments in the research, development and application of a variety of technology.

This investment produced some important results. For example, there is no doubt that OFDA activities have advanced the state of the world's knowledge in areas such as:

- Prediction of drought (Case Study 23);
- Understanding the dynamics of earthquakes, volcanoes and tsunami and the probability of a significant event (Case Studies 3, 9, 20, 24 and 25);
- Severe storm prediction (Case Studies 8, 11 and 13).

OFDA appears to have been prudent in its selection of appropriate rather than overly sophisticated technology. For example, the USGS, in cooperation with OFDA, has successfully transferred U.S.-produced seismic and volcano monitoring instrumentation to developing countries around the Pacific Rim during the last decade. Instead of installing "high tech" digital seismology instruments being developed and tested by DOD's Advanced Research Projects Agency (DARPA) and the private U.S. electronics industry, OFDA and the USGS installed standardized appropriate drum-recorder seismographs with basic radioed telemetry to central recording, computer processing facilities. The USGS helped to train foreign nationals in the operations and maintenance of these instruments and facilities, many of which were familiar to them during the years of graduate geophysics training in the U.S. and other developed countries. Also, in designing the tsunami early warning system in Chile, OFDA chose equipment which can be readily serviced in Chile and which met the needs of the Chileans.

Improved information is a prerequisite for better preparedness/ mitigation activities. It permits more comprehensive planning and, presumably, more cost-effective interventions. Thus, more and better knowledge is a basic building block. However, the existence of improved scientific data is only a part of a very complicated equation. In some cases, the information is not acted upon for reasons completely beyond the control of the activity (e.g. Ethiopia, where continuation of food shortages were part of a political agenda). In others, the information may not have been complete enough (Case Study 13), or not readily accessible to decision makers (Case Study 23). Often the emergency managers may not be trained or supported in ways which permit them to act in a timely and appropriate way to the data. Finally, the potential contribution of the technology may have been diminished by a lack of attention to recurring costs and foreign exchange needed to maintain the equipment (Case Studies 8 and 13).

The purpose of technological interventions directed toward preparedness is to produce action on the ground. Activities such as the La Punta Tsunami Study (Case Study 6) have successfully integrated this concern with the technology. Also, training incorporated into specific activities or conducted through national and regional training institutes will increase the probability of this objective being successfully accomplished (Case Studies 10, 15, 17 and 21).

Interventions directed toward mitigation have a different objective. Ideally the data generated will become an integral part of a national, regional or local planning process. Thus, the end result of these activities would be rational spatial planning decisions designed to reduce the potential impact of disasters on the socio-economic growth of a country, region or locality. The OAS Risk Assessment Activity (Case Study 15) has had limited success but offers great potential in this regard while the Circum-Pacific Earthquake and Tsunami Warning Activity has not yet realized this potential (Case Study 24).

Conclusions

OFDA's experience in its technology investments mirrors that of most of the world during the past decade: technology is only effective when what it produces is internalized and acted upon by human beings. It is a poor investment if it stands alone; a far better one when part of an integrated program which addresses the need to prepare people to use it.

Lessons Learned

Technology alone results in neither preparedness nor mitigation of disasters. Its effectiveness is directly proportionate to the attention paid to ensuring that people know how to use and respond to its outputs.

PLANNING

> *Hypothesis #6:* Efforts at institutionalizing indigenous preparedness capacity have had limited success.
>
> *Finding:* Generally Confirmed

A key factor in the development process involves a devolution of authority, responsibility and leadership to locally responsible public and private sector organizations. Disaster preparedness and mitigation activities funded by OFDA have increasingly supported this trend; however, the record is not consistently good through out all of the regions.

At the beginning of the decade, OFDA provided the major source of conceptual and financial leadership in the field of non-relief activities. Training was predominantly in the U.S. and approaches were "Made in the U.S.A." Throughout the decade, almost 43% of OFDA allocations were in Latin America, which also benefited substantially from the 27% of total funding allotted to Non-Region Specific activities. This is the region which, by virtue of its historical relationship with the U.S. and its state of socio-economic development, would be most able to begin institutionalization of indigenous preparedness and mitigation activities. During the decade, strong regional organizations (Case Studies 18 and 19) have developed and capable national organizations have grown, especially in countries where OFDA has concentrated its efforts (e.g. Peru, Costa Rica and Jamaica).

The trend started later in Asia. Establishment of the ADPC at the AIT in 1986 (Case Study 21), the Indonesian Disaster Management Center in 1986 (Case Study 10) and the Philippines Disaster Relief Center all offer tangible evidence of this trend. Virtually nothing has been done in Africa, with or without OFDA assistance. A possible exception is the work funded by AFR under the Famine Early Warning Systems (FEWS) project, the predecessor to the OFDA-funded Global Climatic Assessment activity.

One important consideration is the role U.S. emergency managers play in the objective of institutionalization of indigenous capacity. Without a doubt, U.S. disaster managers have accumulated a considerable wealth of experience. Programs at the state and local level would seem to offer the most relevant experience. OFDA has recognized the potential for important technical assistance from U.S. emergency managers to other parts of the world. Grants with Dade County (Case Study 17) and Partners (Case Study 16) as well as Fairfax and Montgomery Counties are tangible examples. While conceptually this is an attractive idea, there are important considerations which must be fully integrated into such programs. For example, training based upon the use of equipment and technologies not realistically available in the host country will not be useful. Also, each country will involve a different level of commitment (political, budgetary, societal, etc.) to the concept of preparedness/mitigation and training will need to take that into account. For example, training which explicitly or implicitly assumes that preparedness/mitigation is a generally accepted concept will be of limited relevance to some participants.

The role of U.S. emergency managers in disaster response is also critical to the objective of developing local capacity. In an environment which emphasizes rapid response, the tendency will be to involve expatriates. While these judgments have to be made on a case-by-case basis, national and local officials can test their training only during a disaster. Thus, as in all technical assistance efforts, OFDA needs to strive for an appropriate mix of expatriate and local efforts. This is considerably more complex than normal A.I.D. technical assistance in which indigenous personnel are on the job and being challenged to perform on a daily basis. In most countries a career in emergency management is not a realistic option due to factors such as salary, low priority, the politicalization of appointments, etc. Therefore, when an event occurs requiring a rapid response many of the people trained may not be available to answer the call. This implies a continual monitoring of a wide variety of emergency response organizations by OFDA in order to make quick decisions on their capacity to react to a specific event. This is a task which may be beyond the capacity of OFDA's limited staff.

OFDA has been sensitive to these considerations. However, especially in Latin America and selected countries in Asia, the tendency toward relying on local institutions will need to continue.

Conclusions

In general, institutionalizing preparedness capacities would require a plan by OFDA which incorporates this objective into many of its activities. Devolution of authority, responsibility, and leadership are not accidental outcomes of activities, but long-term, planned results. As discussed above, capacities are least likely to be institutionalized at the local level in activities which center on technology transfer, and most likely in those which involve community-based or first-responder training.

Lessons Learned

OFDA's role in building local capacities has increased over the course of this decade, but it remains a case-by-case occurrence, rather than a major area of emphasis. While this should be an explicit goal, the tension between the need for rapid response and institution building will be equally present.

> ***Hypothesis #7:*** OFDA has had limited impact upon A.I.D.'s development planning and vice versa.
>
> ***Finding:*** Confirmed

The finding related to Hypothesis 4 cites OFDA's unique operating arrangements relative to the rest of A.I.D. It makes the point that activities have not always been designed in a manner to ensure comprehensive definition of a clearly defined activity. This is likely to reduce or even mitigate the types of long term development impacts sought by most of A.I.D.'s organizational units. Thus, the interrelationship between A.I.D.'s regular development objectives and those of OFDA become minimal.

Some OFDA staff members strongly believe that disaster mitigation activities should be more in the mainstream of A.I.D.'s concerns. They feel that these activities are not understood by other parts of A.I.D. and that their attempts at greater integration have fallen on deaf ears. At the same time, it must be recognized that OFDA has an image problem in this regard. Reasons for this include:

- The overwhelming impression that OFDA is solely a relief organization;
- Application of the "notwithstanding" clause to the preparedness/mitigation portfolio;
- Limited staff capacity to direct and manage activities in accordance with the basic elements of A.I.D.'s project cycle (design, monitoring, evaluation);

Conclusions

OFDA has two different and sometimes conflicting roles: emergency response and non-relief. The second role overlaps with what AID bureaus do, yet OFDA follows different procedures than do AID's "development" bureaus. As stated above, this creates an image problem for OFDA that cannot be overcome without some changes in its methods of operation.

Lessons Learned

If OFDA wishes to increase its impact within A.I.D., it will need to emphasize that its non-relief activities are substantively different from its relief work, and will need to adopt the more "developmental" procedures of AID's project cycle for designing, monitoring, and evaluating its activities. As mentioned earlier, modifications of A.I.D. normal procedures to reflect OFDA's particular circumstances would be entirely appropriate.

> ***Hypothesis #8:*** Traditional cost/benefit analysis is inappropriate and new methodologies have not been developed to measure the cost-effectiveness of preparedness and mitigation activities.
>
> ***Finding:*** Confirmed

From a practical, rather than an academic, perspective, cost/benefit calculations present some extremely perplexing analytical problems which are summarized below.

Comparability. Cost/benefit analysis is most useful in making decisions among investments which are addressing a similar problem (e.g. all potential seismic early warning systems) and/or seeking similar direct benefits (e.g. deaths averted). The OFDA portfolio addresses a multiplicity of problems and seeks a wide variety of benefits.

Benefit Streams. The unpredictable nature of disasters can radically affect the cost/benefit analysis. For example, a seismic network installed immediately prior to an earthquake produces an immediate stream of benefits while an identical network installed elsewhere could become obsolete without making a single prediction; thus yielding few benefits.

Measuring Benefits. If the purpose of the activity is to prevent deaths and injuries, than the benefits must be calculated based upon the value of a life. This is complex enough if tried within a single country setting. It becomes virtually impossible across countries unless the value of a life is assumed to be the same all over the world. For example, FEMA has resisted making this quantification since in the U.S. the value of a life is considered almost priceless.

Relative vs. Absolute Measures. Measuring benefits in terms of member of lives saved would bias all investments toward countries with large populations. Loss of a few percent of the population in some countries could imply millions of people while loss of 40%-50% of the population in smaller countries might mean a few thousand.

Discount Rates. Selection of an Internal Rate of Return (IRR) can have a major influence on the outcome of the calculations. In countries with runaway inflation rates it is difficult to select a proper rate. Potential investments in two countries with wildly differing IRR could render comparisons useless.

Cost-effectiveness measures are more reasonable to consider. In conducting the case studies, the team attempted to calculate cost-effectiveness. This was difficult since no system was in place to collect the appropriate data during implementation of the activities studied. The section entitled Cross Case Study Analysis discusses the approach taken and the problems encountered. While the efforts were not entirely successful, this attempt could be a learning process upon which a future system can be built.

Conclusions

The adoption of cost-effectiveness measures implies that they will be used as a criterion in selecting among competing proposed activities. Thus, making it an important tool for use in planning and monitoring activities. Using it, retrospectively as was done in this study, often after a project has ended, is not the best use of this instrument.

OFDA should adopt (and adapt) a cost-effectiveness system similar to the one developed for this study. However, to be meaningful, this change must be part of the general systems improvements suggested throughout the study. In other words, cost-effectiveness analysis must be an integral part of an entire system.

Lessons Learned

The proper use of cost-effectiveness analysis requires that systems be in place and appropriate data available. When this is not the case, the technique cannot yield meaningful results.

Hypothesis #9: Activity data are not collected and shared in a way to facilitate monitoring and evaluation of ongoing activities.

Finding: Confirmed

OFDA and its implementing partners do collect project information, and reports are submitted. However, this is not done systematically or in a manner which helps in monitoring and evaluation. In the Public Awareness Program in the Philippines (Case Study 12), the proposal was specific as to Outputs: materials produced and tested, teachers trained, etc. Quarterly reports included information on achievements and the activity was easy to evaluate. On the other hand, the Partners Emergency Preparedness Program (EPP) had no tangible Goal and project documents do not detail specific Outputs. (Case Study 16). That activity was virtually impossible to evaluate. This lack of project documentation and information also inhibits OFDA's ability to learn from its own successes, as judgments on Outputs and Purpose are sometimes instinctive, rather than being objectively verifiable.

In order for an activity to be monitored and evaluated, it must have a stated Purpose(s), clearly defined Inputs and Outputs, and a broadly expressed Goal. Since OFDA's non-relief activities are aimed at preventing or lessening the effects of uncontrollable events, rather than achieving a tangible gain, it is particularly important that, as an absolute minimum, activities under consideration give intermediate measures of success

(Outputs) e.g., numbers of persons trained, seminars held, papers published, building codes reviewed, etc.

Conclusions

The lack of activity data at OFDA is one symptom of the larger issues of strategy-setting, planning, and activity selection procedures discussed above. Like cost-effectiveness analysis, activity data is a management tool which is of best use in a fully-functioning strategic management system.

Lessons Learned

Imprecisely formulated activity plans make the collection of data, and its use in evaluation and monitoring, virtually impossible. While there is activity data on a number of OFDA non-relief activities, it is not fully useful to OFDA's internal learning systems until it is universally available.

> ***Hypothesis #10:*** OFDA has successfully leveraged its resources.
>
> ***Finding:*** Generally Confirmed

Leveraging can be considered in several different contexts. The most traditional measure involves the question of whether an initial investment (usually by donor) leads in a direct way to further investment by others (usually donors or host governments). This is often an explicit, planned objective incorporated into the design of the activity. In some cases, leveraging becomes an unplanned feature of an investment by laying the groundwork for future investments which would not have otherwise been made. Leveraging can also be the result of conceptual leadership which raises consciousness and therefore leads to increased allocations by other donors or host governments to broad goals rather than to the support of an individual activity. Finally, leveraging can also be considered as a sustainability objective in which the end result is that the local institutions independently operate the activity without external assistance.

Conclusions

Leveraging has not been a consistently planned for outcome within OFDA. However, there are numerous examples of successful leveraging. They include the PCDPP which receives multi-donor support and a $15 million Japanese investment in an earthquake early warning programs in Peru and Mexico. In both cases, early OFDA investments were the pre-condition for subsequent donor decisions.

Certainly OFDA's leadership role has helped shape the approaches (including funding levels) taken by other important donors. Although not directly quantifiable this definitely represents a form of leveraging. In some cases, usually involving othe USG agencies, however, the situation may have been the reverse, i.e., others have leveraged OFDA resources in support of program objectives already underway.

The examples cited above have focussed on leveraging of resources from other donor organizations. Equally as important is insuring the long-term financial and institutional sustainability of regional, national and local organizations. OFDA's record to date on this objective received the lowest cluster factor score in the Cross Case Analysis indicating that much work needs to be done in this area.

Lessons Learned

OFDA should explicitly include leveraging objectives into its future activity design process. This is important in terms of donor resources (as more funds are available in a world wide basis) and local institutions (as responsibility continues to devolve to regional, national and local organizations).

MANAGEMENT

Hypothesis #11: Training has been on an ad hoc basis.

Finding: Confirmed

Training was the subject of an extensive Case Study (26) which addresses this point.

Conclusions

The magnitude of the training effort being funded by OFDA is considerable. Significant training activities have been undertaken in the LAC and ANE Regions. Some training activities have been conducted for the AFR Region, but these have been modest.

OFDA training can be placed in two broad categories: training in the use of transferred technologies, and training for disaster managers, responders, and other professionals involved in preparedness.

The study found that, in general, the first type of training is not as successful as the second. OFDA's contractors for technology projects are not necessarily skilled trainers, and project designs frequently short-change the need for re-training, training up-grades, and repeating training for new staff.

The second type of training, especially as performed by AIT, PAHO and the PCDPP gets high scores. This training is generally intended to develop indigenous capacity (individual and institutional) for disaster response, and its use of national or regional teachers and its focus on training trainers is effective. In some other activities, however, the absence of explicit training goals inhibits success.

Lessons Learned

Systems to identify, plan, implement, and evaluate training are not in place, so training is generally on an ad hoc basis. However, some of the individual contractors/institutions have developed well-defined training programs with carefully articulated objectives. In many instances, institutions undertaking the training do not have a mechanism or system to assess the training requirements for a particular country, which results in marginal training being undertaken. This is due mainly to the lack of any comprehensive training strategy at OFDA to guide its implementors in planning activities.

Hypothesis #12: USAIDs have little systemic involvement with OFDA's non-relief activities.

Finding: Generally Confirmed

In roughly 60% of the case studies, the team found that the USAID was clearly aware of an OFDA funded activity prior to its implementation. This is not solely due to a shortcoming in how OFDA conducts itself; non-relief activities have certainly been low priority for all but a few USAIDs. Interestingly enough, this was equally true for country-specific and non-country specific activities. On the other hand, Factor 11 ratings, which measured acceptability on the part of the USAID and the Host Government, showed an above average score of 4.2 (the average for all 12 factors was 3.7).

Mission involvement is highest in Latin America. This is certainly due to: (a) the size and duration of OFDA's program in the region and (b) the existence of the Regional Advisors in Costa Rica and Peru. However, the team noted the lack of an organized process in which USAIDs would review proposed activities and comment on them well before an obligation of funds.

Conclusions

Increased USAID involvement is a useful operational goal for OFDA to pursue. It is extremely difficult to assure in those countries where OFDA has no staff representatives or regular contacts. Therefore, OFDA's decision to replicate its regional management approach outside of Latin America, in the South Pacific and most recently in Sudan, is likely to increase the involvement of USAIDs. Both relief and non-relief activities require strong project management skills, many of which are generally applicable in both areas. Therefore, training programs designed to strengthen OFDA staff skills would be highly desirable. In addition to strengthening skills, such training could also be expected to improve even more the interchangeability of staff in these areas. It should also lead to greater efficiencies and free up more time to manage.

Lessons Learned

A model to promote greater USAID involvement might be the Bureau for Science & Technology (S&T). It solicits ideas from USAIDs, receives responses of interest at the concept stage and then often receives partial funding through a buy-in mechanism. Washington-based Sector Councils are intended to ensure coordination between activities which share similar technical objective. A Sector Council for Disaster Preparedness and Mitigation, chaired by OFDA would involve regional bureaus and consequently make sure that more information was available to the USAIDs.

> ***Hypothesis #13:*** Crisis management systems needed for relief work are inherently incompatible with those needed for development planning/disaster preparedness/ mitigation.
>
> ***Finding:*** Generally Confirmed

The basic characteristics of work in each area can be shown as follows:

Relief	Non-Relief
Immediate	Long-term Sustained
Equipment/Supplies	Institution Building
Single Event	Integrated
Reactive	Proactive

This, of course, does not mean that an individual cannot be capable of effectively performing in both areas. In that sense, the skills are not inherently incompatible. However, for individuals to work smoothly in both undertakings, proper incentives, both formal and informal, must be in place. This involves a commitment from senior management to give equal credence to both aspects through both organizational arrangements and job descriptions. Also, the reward system both within the Agency and OFDA must recognize performance in both areas. This has not been the case since preparedness/ mitigation has been organizationally and administratively downgraded throughout the decade. At one time, there were two divisions: Relief and Preparedness; then the office was reorganized on a geographic basis. Individual responsibilities for preparedness/mitigation were reduced and downplayed in job descriptions. Now, one concerned OFDA employee says, "We do disaster preparedness on our lunch hours."

Therefore, while individuals with the proper mix of skills and direction could do both, current operational practices have caused them to be more separate than integrated.

Conclusions

While the skills required for crisis management are not necessarily different from those for strategic management, the systems of each do differ. As mentioned above, the latter is inherently a proactive approach, where long term objectives and the strategies to reach them are defined by the office, and where time frames are long and preparation detailed. Not only must incentives and rewards differ, but so must procedures, practices, and mind-set.

Lessons Learned

Given the vastly different time and response needs of relief and preparedness, it is very difficult to use the same operational systems for both. This study has expressed concern about the way relief procedures are being used in preparedness and mitigation activities; however OFDA deserves great credit for accomplishing as much as it has in non-relief work, since current procedures and incentives often impede the accomplishment of this objective.

INTERNATIONAL ENVIRONMENT

> ***Hypothesis #14:*** OFDA has had a position of world leadership in the field of disaster preparedness and mitigation.
>
> ***Finding:*** Confirmed

This has been the case (See the section entitled Highlights of the Last Decade) even though disaster preparedness and mitigation has not always enjoyed the attention it deserves.

OFDA leadership has been both conceptual and operational. It has clearly been at the forefront of the conceptual changes which moved from prevention to preparedness to mitigation. At all phases of these conceptual changes, OFDA's role has been as a shaper of ideas, a raiser of consciousness and an experimenter. It has also been an operational leader due in part to the availability of funding at a level which permitted these concepts to be made reality and to demonstrate to others the utility of disaster preparedness/mitigation.

Conclusions

Leadership for the 90's will be different than leadership in the 70's and 80's. Many more donors and national governments are convinced that investments in preparedness/mitigation are justified. With this broader acceptance will come additional budgetary resources, perhaps in part due to the increased international attention resulting from the IDNDR.

All these factors imply that the USG and OFDA will need to define its future leadership within a broader framework of international cooperation, increased funding and the increased need for greater donor coordination.

Hypothesis #15: The utility of disaster mitigation and its relationship to long term development is becoming increasingly appreciated throughout the international development community.

Finding: Confirmed

The MSI team found evidence on both sides of this hypothesis, but the balance of judgment is for confirmation. It is our considered judgment that, among the difficult development lessons learned during the past decade, two small achievements have been the donors' greater appreciation of the utility of disaster mitigation and greater appreciation of the relationship to long-term development. These are recently-learned lessons, however, and the balance would have been against confirmation of this hypothesis only a few years ago. The increased appreciation of these two points is due mainly to the role of OFDA which, more than any other organization in the world, has raised the consciousness and awareness of many donors and individuals.

Several important donors are increasing their understanding of, and levels of funding for, disaster mitigation. Sweden, Norway and Switzerland have sustained significant disaster mitigation approaches for many years. The U.K., Canada, France, and Japan are more recent newcomers to this group. Japan in particular seems poised to link foreign aid grants with its considerable engineering capabilities to package solutions to major hazards in the context of the IDNDR. The World Bank and Asian Development Bank (ADB) are reviewing their loan portfolios to identify opportunities for linkages between disaster mitigation and their pipeline of infrastructure loans.

If the international development community is increasing its appreciation of rapid-onset natural disasters, the record is not as clear for the slow-onset catastrophes which have had important man-made as well as "natural" causes. The popular view of the 1984-86 drought and famine in the Sahel considers them to be fundamentally "natural," but the work of Wijkman and Timberlake, cited in the literature review as being one of the seminal books of the decade, marked a small but perceptible change of attitude. More recently, several publications have clarified complex links such as those in Africa among population pressure, poor management, civil strife, and meteorological events.

The decade under review, 1979-1988, witnessed the greatest industrial accident and the greatest nuclear accident that has yet occurred. The release of methylisocyanate (MIC) at the Union Carbide plant in Bhopal and the explosion and release of radioactive isotopes at Chernobyl were shocking reminders of the inadequacies of preparedness for such contemporary events. Both the Communist Economic Community (COMECOM) and the European Economic Community (EEC) countries were unprepared, individually and as groups, to respond rationally to the atomic cloud that settled over most of Europe, and the city, state and federal authorities in India were unable to provide first aid or proper medical care to the (MIC) victims. Although the lessons learned from these grim events may be fewer and more poorly applied than desireable, there is little doubt that there is greater appreciation of the potential for industrial and nuclear disaster today than there was ten years ago. Strong support for the IDNDR is the clearest evidence of what seems to be a new outlook. What lies behind this is not very clear, however.

Conclusions

The utility of disaster preparedness/mitigation could better be demonstrated by OFDA if it had sufficient data to prepare a small number of thoroughly-documented studies on its most successful cases. Several of the activities in this study would, with proper research, offer compelling evidence to support this proposition.

The relationship of disaster preparedness and mitigation to development is a thornier issue, discussed in the chapter, The Case for Disaster Preparedness and Mitigation. Again, OFDA could make this case in a series of articles or papers based on its own experience, as disasters disproportionately destroy the minimal gains made by the poor through development activities. In making this case, however, OFDA would need to recognize that the linkage implies that knowledge about the dynamics of development and the systems which encourage it must be central to its own future operations.

Lessons Learned

OFDA's work should provide ample evidence that disaster preparedness and mitigation is effective in achieving its objectives as articulated over the last decade. However, the data available are not organized in a way which permits the case to be made easily. Therefore, more useful data need to be collected and refined in a way designed to make the case more clearly.

The link to long term development with particular emphasis on the environment has not been a strong one in the past. However, it should become a major focus of the international community. This presents OFDA with an opportunity to continue to exercise an important leadership role.

III. TO THE YEAR 2000

HYPOTHESES

As a framework for considering OFDA's optimal role, responsibilities, and structure in the future, the team again developed a series of hypotheses. These hypotheses attempt to describe some relevant aspects of what the world will be like during the next decade: what kinds of disasters will be prevalent; who the disaster relief, preparedness, and mitigation program actors will be; and how the operations of these programs will be carried out. These hypotheses, with a brief description of their potential affect on OFDA, are given below. These are intended to generate discussion within OFDA about the nature of the future as it moves toward a Strategy Statement for the Decade; they are certainly not comprehensive. They also are reflected in the recommendations which follow this section.

THE WORLD

1. The absorptive capacity of countries which are currently weak performers relative to others will remain as is, or decline.

2. Africa will be in a constant state of disaster response requiring continued large allocations of relief funds.

3. The revolution in information management technologies will continue, reaching rural communities throughout the Third World.

4. The IDNDR will increase international awareness and donor/recipient cooperation in the field of disaster preparedness and mitigation.

5. Global and regional environmental concerns will become a focal point for broad-based international cooperation, including programs in disaster/preparedness and mitigation.

6. Traditional distinctions between disaster preparedness/mitigation, socio-economic development, and environmental concerns will markedly diminish.

Implications

Hypotheses 1 and 2 will pose a dilemma for OFDA should it continue using absorptive capacity as a criterion for establishing its priorities. Many of the nations of Africa will continue to suffer from slow-onset disasters through the rest of this century and hence pose an enormous continuing need for the strengthening of local capacity.

Hypotheses 3 through 6 offer OFDA more hope. The opening of rural, often impoverished areas to improved information flows makes an important audience for disaster mitigation efforts much more accessible, and will be an integral feature of the continued devolution of authority and responsibility. Increased international cooperation based upon environmental concerns can provide OFDA with the opportunity for continued leadership. However, for that to happen, OFDA will need to make some policy and management changes in how it conducts its business.

THE DISASTERS

7. There will be a marked increase in the frequency and severity of man-made and technologically-induced disasters.

8. Due to an increase in the number of people living in vulnerable areas, and the continued deterioration of the environment, the severity of natural disasters of all kinds will increase, and will continue to have disproportionate impact on the poor.

Implications

Both these hypotheses pose challenges to the way OFDA operates, and require immediate attention. Experience in preparing for and mitigating the effects of man-made and technological disasters is limited throughout the international community. Man-made disasters are generally caused by environmental degradation e.g., de-forestation resulting in floods and mud slides; over-use of marginal land and depletion of water reserves resulting in famine; toxic waste emission, changing weather patterns, etc. Technological disasters, like the Exxon Valdez oil spill, Chernobyl, and Bhopal, are rapid-onset, but have no real pattern of warning or of effect. Much work needs to be done to learn more about the causes of these disasters in order to take preventive, as well as ameliorative, actions. In this regard, OFDA has been working with corporations and professional associations to: (a) highlight the problem, (b) encourage them to undertake risk analysis, and (c) promote the preparation of appropriate preparedness plans. This offers new potential for OFDA leadership throughout the next decade, both as a promoter of the concept and as a partial funder of selected preparedness plans which would then become models for threat-specific concerns.

The increasing severity of disasters is a matter of record: the increase in world population, the damage to the environment already sustained, and the effect of world-wide inflation on the replacement costs of infrastructure have all ensured that today's disasters are, on the average, more expensive - in all ways - than those of the past. In addition, vulnerability is intimately related to poverty. This is a powerful argument to overcome the barriers to forging an intimate link between development programs and disaster mitigation programs. Each must integrate the approaches and strategies of the other in order that both the poverty and the vulnerability are simultaneously addressed.

THE ACTORS

9. An increased number of donors will allocate a substantially greater level of resources to disaster relief, preparedness and mitigation.

10. Regional and country level institutions will increasingly take the lead in developing and managing disaster preparedness and mitigation activities.

11. Trends toward the increased involvement of local officials and the populace in disaster response will continue.

Implications

For OFDA, the continued emergence of Third World institutions as the definers and implementors of their assistance programs will allow a more rapid devolution of leadership and responsibility for disaster preparedness and mitigation. Its efforts to date at building local capacity provide OFDA with a base upon which it can build in the future.

New donor interest in, and funding for, disaster preparedness and mitigation can help OFDA, particularly if it takes steps to solidify and advance its role as a leader and innovator in the field. At the same time, however, OFDA will need to put more effort into donor coordination including the compilation of more complete information on funding levels and the nature of activities funded by other donors.

THE MANAGEMENT

12. Continued competition for resources will place a high premium on the strategic management of a portfolio of activities to accomplish objectives which are larger than those of individual projects, requiring considerable attention to planning, monitoring, evaluation, and accountability.

13. OFDA's role will change from a funder of the development and application of science and technology to a user of existing ones.

14. Leveraging other's resources to accomplish OFDA's objectives will be a important aspect of future funding decisions.

Implications

The first hypothesis assumes that current budgetary pressures will continue, and that funding will increasingly be based on demonstrated and clearly understood results. During the course of our review of OFDA's portfolio, the team concluded that the current distinctions used to categorize its activities (i.e., institution building for disaster response, technology transfer and enhancement, disaster mitigation, information sharing) were of limited utility. We suggest that future planning and budget decisions should be based on the contribution which individual projects make to a few well defined objectives, or Purposes in the Logical Framework hierarchy. If this approach is followed, strategic planning can proceed based upon a series of activities which will be measured according to their contribution (Inputs - Outputs) to Purposes which transcend any individual project. This should greatly improve impact, as well as the aggregate cost-effectiveness of OFDA's portfolio. Table 18 suggests an approach to categorizing OFDA's portfolio for the purpose of future strategic planning.

The second hypothesis is a corollary to the first: as the flow of new resources becomes dependent on results, the likelihood of large-scale investments in activities which are not immediately and visibly related to preventing or alleviating human suffering will diminish. Since the connection between technology investments and immediate results can be tenuous, unless fully integrated into a comprehensive plan, OFDA's role as a funder of new research and applications can be expected to diminish. This will also be true because of the increase in other donor activity which will spur the development of some new technologies without OFDA financial participation.

Both of these hypotheses lead to the conclusion that leveraging will need to be an important component of future decisions.

RECOMMENDATIONS

RESOURCE ALLOCATION

1. Increase resource allocations to Africa

This recommendation is predicated on a view of the future which foresees large scale continuing need throughout most of the region. Latin America and Asia have reached levels of competence which far exceed Africa's and it seems appropriate to redress that imbalance. An opportunity exists since many of A.I.D.'s regular development projects in Africa have links with disaster preparedness and mitigation efforts. It is impossible to recommend a level of funding especially since efforts should concentrate on institution building and therefore may not need large sums of money early. We suggest the following steps as an approach to pursuing this objective.

- Involving AFR in the selection of several priority countries on which to concentrate.
- Replicating OFDA's regional management system by creating a small OFDA staff presence in at least one of the priority countries.
- Funding two or three small mitigation/preparedness activities in each priority nation (or region, or sub-region), and using the ensuing activity as a means of creating links to and coordinating activities with environment and development-oriented implementors in that area.
- Use OFDA field staff presence to ensure activities are closely documented, in order to learn what approaches are most effective.
- Make investments on a five-year, pilot basis.

2. Continue the current downward trend in the percentage of budget allocated to technology transfer activities and ensure that objectives involving technology transfer are fully integrated with all other aspects of an activity's performance (See discussions in Hypothesis 5 in Retrospective Review and Hypothesis 13 in To The Year 2000.)

3. Develop a system similar to that used for the Case Study Data Sheet to help assess new proposals and make allocative decisions

In effect, the system was field tested during our retrospective evaluation of 25 activities. All questions were not relevant to every situation; however, the system worked well. Clearly, OFDA's future allocative decisions considerations should include:

- Project Relevance and Setting;
- Management;
- Institution Building;
- Training;
- Project Acceptability and Follow-Up.

4. <u>Fund only those activities which clearly contribute to a limited number of Purposes as identified in a new Strategy Statement for the Decade</u>. (See Planning.)

PLANNING

5. <u>Prepare a new Strategy Statement for the Decade</u>.

Such a statement could be premised upon a view of the future such as the one developed for this study (see <u>Toward the Year 2000</u>).

Conceptual aspects of the strategy could include:

- Adopting broader definition of mitigation to include, and then link with, a variety of development interventions;

- Relating activities explicitly to environmental concerns;

- Promoting the devolution of authority and responsibility closer to the site of actual events;

- Identifying no more than five Purposes (or objectives) which would be the focal points for all OFDA's activities;

- Selecting of Purpose statements to reflect program objectives as opposed to the current categorization of the portfolio which is based on means (see Table 18 for a suggested set of Purposes).

6. <u>Promote the acceptance of a broad definition of disaster mitigation and its relationship to development and the environment</u>

Within A.I.D., steps might include a Memo to the Administrator seeking endorsement of the concept and proposing the following tangible steps:

- Creating a Sector Council on Disaster Preparedness and Mitigation chaired by OFDA;

- Reviewing existing and planned regional bureau companion activities which contribute to disaster preparedness/mitigation as well as development objectives and identifying opportunities for possible collaboration;

- Installing a system intended to ensure more comprehensive USAID involvement in the design and implementation of OFDA funded activities.

7. <u>Integrate the discipline of the Logical Framework into both the design of activities and strategic planning</u>

MANAGEMENT

8. <u>Install management systems appropriate to OFDA's needs</u>

The systems should be tailor-made to balance OFDA's need for better documentation on the one hand and flexibility on the other. The system would seek to improve:

- Design;
- Review of proposals within OFDA, A.I.D./W, USAID and Host Governments;
- Monitoring/Reporting;
- Oversight;
- Evaluation.

9. <u>Revise current approaches to how small activities are managed</u>

OFDA now follows a staff intensive, time consuming approach to its management of small activities. This limits staff capacity to think and plan in a more strategic way. To correct this OFDA could:

- Enter into a contract with an intermediary to review and approve small grants (contracts of less than $20,000);

- Fund only activities (including training events, workshops, and conferences) which contribute directly to the Purposes identified in the Strategy Statement for the Decade.

10. <u>Ensure that relief and non-relief activities are treated as co-equal considerations within the office</u>

This objective should be able to be accomplished through adoption of the recommendations suggested in this study and the attention given to non-relief by senior OFDA management, including the soon to be appointed Deputy Directory scheduled to come from the ranks of the Senior Foreign Service. Thus, no change in organizational structure seems to be necessary at this time.

11. <u>Develop a comprehensive and operationally useful participant training data base designed to promote consistent evaluation and follow-up</u>.

12. <u>Establish clearer working relationships with contractors placed in field management positions</u>

Areas which are not consistently clear are:

- Levels of authority and responsibility;
- Personnel evaluations;
- Benefits.

13. Consider the use of contractual methods designed to ensure greater ease of access to needed consultant assistance.

The mix of funding mechanisms may well change with a reduction in PASA and an increase in grants and contracts. If that is the case, OFDA would benefit from greater use of some of AID's existing mechanisms which permit funding decisions to be made from a universe of pre-qualified firms. Examples are Indefinite Quantity Contracts (IQCs), Matching Grants and Co-Financing programs.

INTERNATIONAL ENVIRONMENT

14. Reaffirm the USG's commitment to provide leadership in this field during the next decade

Inherent in this commitment is a recognition that maintaining the status quo is not an acceptable policy alternative and that the next decade will require new policies and perspectives. (See To the Year 2000).

15. Participate fully in the IDNDR

Features of such participation could include:

- A clear articulation to other donors of the program areas of OFDA's intended concentration thus fostering improved coordination;
- Identification of and funding for tangible proposals which might contribute to the IDNDR e.g., hosting an international conference or workshop on disaster preparedness/mitigation;
- Building upon recent steps to reopen a regular dialogue with UNDRO;
- Collection of better information on other donor activities.

Table 18

POSSIBLE CATEGORIZATION OF OFDA PORTFOLIO

1. Purpose: Improve the RESPONSE capability of selected disaster relief providing organizations as measured by: (a) timeliness, (b) effectiveness, and (c) efficiency of operation

   Illustrative Outputs: Preparedness plans; communications procedures; regional disaster centers, regional stockpiles

2. Purpose: Improve the PLANNING AND FORECASTING capability of selected organizations as measured by: (a) integration of disaster relief with preparedness and development, (b) shorter lead times for the analysis of raw data, and (c) longer lead time and higher correlations between predictions and actual events

   Illustrative Outputs: Hazards risk analyses; land use data; increased priority given to disaster preparedness; continuous monitoring of a naturally occurring event

3. Purpose: Mitigate the effects of disasters by upgrading PHYSICAL FACILITIES as measured by: (a) percent of vulnerable facilities upgraded to accepted standards; and (b) reduced damage caused by events following the upgrading ; and (c) design and construction of new structures to accepted standards

   Illustrative Outputs: Building codes; enhancement of capital facilities

4. Purpose: Modify the BEHAVIOR of individuals concerned with disaster relief and/or members of vulnerable population groups

   Illustrative Outputs: Public awareness programs; improved inter- and/or intra-agency coordination

5. Purpose: Improve OFDA's OPERATIONAL CAPACITY as measured by: (a) a reduction in person hours of administration per dollar of expenditure; and (b) improvement in the speed and quality of OFDA's response capability.

   Illustrative Outputs: Consultant lists; management information systems

IV. IMPLICATIONS FOR A.I.D. AND OFDA

OVERVIEW

One of the basic premises of the study is that the USG will continue its leadership position in the field of disaster preparedness/mitigation and that A.I.D. and OFDA will be charged with the responsibility to implement the mandate.

The team believes that this is a logical extension of the experience of the decade. This is a propitious time for the U.S. to consolidate its previous records at a time when an international political consensus is emerging regarding environmental degradation and its effect upon both natural and man-made disasters.

To continue its leadership position, A.I.D. and OFDA must recognize that maintenance of the *status quo* will not be an acceptable policy alternative. Additional budgetary resources might be required to accomplish this objective. If so, increases should be conditioned upon the development of a strategy statement and the adoption of changes in OFDA's internal management along the lines mentioned in this study. It's important to note that OFDA has already taken a series of steps in this regard.

The two sections which follow include schematic decision trees (Table 19) and an illustrative one-year work plan for OFDA (Table 20).

DECISION HIERARCHY
PLANNING/RESOURCE ALLOCATION

AID -- POLICY	■ Establish disaster preparedness/mitigation as an Agency-wide priority and concern ■ Include disaster preparedness/mitigation activities as an integral part of long term, sustainable and environmentally sensitive economic development objective
AID -- OPERATIONS	■ Create a Sector Council on Disaster Preparedness/Mitigation chaired by OFDA ■ Incorporate disaster preparedness/mitigation concerns into the CDSS documentation in selected countries
OFDA -- POLICY	■ Prepare a Strategy Statement for the Decade to address the need to: – establish 3-5 program-oriented purpose statements for the portfolio – increase the priority to Africa – increase support for the growth of regional, national and local institutions – prepare for the anticipated increase in the frequency and severity of man-made, technologically induced disasters – fully integrate technology transfer objectives into overall activity design, monitoring and evaluation – develop activities which recognize the differential effects of disasters on the poor and women
OFDA -- MANAGEMENT	■ Fund only those activities which would produce Outputs directly contributing to the Purposes ■ Incorporate methodologies utilized in this study: – The Logical Framework – Identification of factors (and clusters of factors) most important to activity performance ■ Estimates of cost-effectiveness such as the nine-cell matrix ■ Increase the involvement of regional bureaus and USAIDs in the design monitoring and evaluation of preparedness/mitigation activities

DECISION HIERARCHY
MANAGEMENT

AID -- POLICY

- Increase the effectiveness and relevance of disaster preparedness/mitigation activities

AID -- OPERATIONS

OFDA -- POLICY

OFDA -- MANAGEMENT

- Modify existing operations
- Upgrade existing management systems dealing with all aspects of design, monitoring and evaluation appropriate to OFDA's specialized needs rather than simply adopting AID's regular procedures
- Change the way small activities are managed
- Ensure that relief and non-relief activities are treated as co-equals within the office
- Establish a comprehensive and operationally useful training data base designed to promote consistent evaluation and follow-up
- Establish clearer working relationships with contractors placed in field management positions

TABLE 19
(3)

DECISION HIERARCHY
INTERNATIONAL ENVIRONMENT

AID -- POLICY **AID -- OPERATIONS**	■ Reaffirm the USG's commitment to continue to provide a leadership role in disaster preparedness/mitigation ■ Participate fully in the IDNDR
OFDA -- POLICY **OFDA -- MANAGEMENT**	■ Define areas of leadership building upon prior experience and comparative advantage ■ Establish a Donors Working Group on disaster preparedness/mitigation and its relationship to economic development and the environment ■ Continue to explore possible collaboration with UNDRO ■ Collect more complete information on other donor activities

FIRST YEAR WORKPLAN

TABLE 20

OFDA

Months: 1 2 3 4 5 6 7 8 9 10 11 12

1. Conduct an office-wide workshop on evaluation
2. Prepare an annual evaluation plan for the office
3. Conduct an office-wide workshop on project design and monitoring
4. Review current OFDA goals (as expressed in 12/19 memo) in light of this study and merge them as appropriate
5. Consider/adopt new approaches to categorizing the OFDA portfolio as a basis for strategic planning
6. Prepare a Strategy Statement for the Decade
7. Prepare/secure approval of a Memo to the Administrator which:
   - Affirms the USG's intention to provide leadership in this area
   - Establishes disaster preparedness/mitigation as an Agency-wide concern
   - Endorses a broad definition of disaster preparedness/mitigation to include long term, sustainable environmentally sensitive development
   - Creates a Sector Council-like mechanism under OFDA chairmanship

FIRST YEAR WORKPLAN - CONT'D

OFDA

	1	2	3	4	5	6	7	8	9	10	11	12
8. Consider/adopt a series of operational changes which: ■ Installs management systems appropriate to OFDA's needs ■ Revises current approaches to the management of small activities ■ Ensures that relief and non-relief are treated as co-equals ■ Develops a comprehensive and operationally useful participant training data base ■ Establishes clearer working relationships with contractors placed in field management positions												
9. Implement policy guidance in the Memo to The Administrator												

SCOPE OF WORK

ANNEX 1

OBJECTIVE

The purpose of this study is to review the last ten years of OFDA non-relief activity, to draw lessons and ideas from this experience base, and to apply them to OFDA's future plans, with the ultimate goal of reducing loss of life and property in affected foreign countries.

The purpose is to help OFDA and actors reach a consensus on what are achievable goals and objectives for the Office over the next 10 or more years.

ARTICLE III - STATEMENT OF WORK

The work effort under this delivery order is broken down into the following tasks and deliverables.

Task I Orientation

The contractor shall hold kick-off meeting with the OFDA technical officer and other designated by the officer. The contractor will review all relevant documents and data previously compiled by OFDA for this effort. Two types of documents which will be useful are the Activity Profile Forms, which summarize the goals, objectives and accomplishments of each activity; and the Chronology Profile Forms, which give a much more detailed chronology of the events that actually occurred during the activity.

The contractor shall also review the OFDA training plan, strategy statements, Congressional Presentations and other related documents, including project reports and other project deliverables, which will be supplied by OFDA.

Task 2 Design of a Conceptual Analysis Framework

Phase I

The contractor shall devise a framework to guide the policy research effort and from which specific analysis questions will be drawn. This framework will be based on cost-effectiveness analysis, cost-benefit analysis, strategic planning, and other appropriate methods and will take into account humanitarian, political, economic and social factors.

Phase II

The contractor shall also analyze the data collected in Phase 1, and analyze the amount of funding by type of OFDA activity, the amount of funding by type of threat, and the amount of funding by region.

<u>Task 3 Development of Analysis Questions and a Workplan</u>

The contractor shall write and deliver a workplan laying out a detailed work schedule and person-loading plan for completing the project.

One portion of the workplan will be devoted to listing and discussing the the analysis questions raised in Phase 1. The questions can be divided into three areas: evaluation of activities, lessons learned, and strategic design for the future. Some of the questions in these three areas include:

A. Evaluation of Activities

1. By what empirically-evident criteria can assess the extent to which an activity or portfolio of activities achieves its explicit, intended objectives?

2. Given these criteria and the evidence to make their application operational, to what extent did the activity meet its intended objectives?

3. What factors contributed to this level of achievement? What was the impact of various factors such as:

   a. Relationship of the activity to the A.I.D. Mission project
   b. Level of mission commitment and interest
   c. Appropriateness of the activity to the country setting
   d. Funding levels
   e. Recrency and type disasters
   f. Personal commitment by one or more key staffers
   g. Access to top-level in-country decision makers
   h. Inherent conflicts between objectives
   i. Use of existing versus new institutions or relationships
   j. Role of the private sector
   k. Local financial ability to sustain projects with non-OFDA or USG funds.

4. Are there any implicit objectives that were achieved? Should such implicit objectives be made explicit in future undertakings?

5. If objectives were achieved to a considerable degree, were the means of doing so efficient and cost-effective? Were the activities sustained by non-OFDA support after the project was complete (if applicable)? If relevant, were significant structural improvement initiated in the host country government or emergency management as a result of OFDA activities?

6. Did the training meet identified needs, positively affect, and become integrated with the host country emergency management system? Did it provide a pool of identifiable, readily available, trained personnel who have helped respond to disasters?

B. Lessons Learned

7. Did the activity generate any significant positive or negative side effects or unintended consequences? Should these be incorporated or recognized in future similar efforts?

8. What notable successes and benefits were achieved and what can be learned from these achievements? Are any of these benefits quantifiable in terms of lives, property, or A.I.D. funds and programs saved?

9. In an activities objectives were not realized, were the lessons learned incorporated into later similar activities?

C. Strategic Design for the Future

10. From the answers to the above questions, can conclusions be drawn on how OFDA should expand, contract, or otherwise adjust its future non-relief activities in order to achieve a higher level of cost-effective impact on disaster preparedness world-wide?

11. What would be the optimum allocation of resource by OFDA in preparedness by regions and countries, activity types, and types of hazards? Are there any areas that are significantly under- or over-address? Viewed from the country level, what factors have been used to target and approve funds and new preparedness projects?

12. Also with respect to targeting, is the current level of preparedness funding reasonably commensurate with the need and the threat? Are there other factors, such as other donors, that play a role in a reasonable resource allocation strategy? What would happen if this funding level was expanded/contracted/kept the same?

13. What innovative ideas do OFDA staff and other emergency managers have about out OFDA should expand, contract or adjust its future preparedness activities, and about how outside, non-OFDA funds can be leveraged for disaster preparedness?

14. What should the relationship be between OFDA and other A.I.D. bureaus and missions in the preparedness area? What should be relationship be with other donors, and with the private sector?

15. Given the unpredictable and recurrent disaster relief obligations of OFDA, how should preparedness efforts be managed and integrated with relief activities?

16. Has OFDA assumed new preparedness responsibilities over the years, and if so, do these activities impact on future directions of the non-relief portfolio?

The contractor may wish to add other questions to the above.

Task 4 Devising Case Selection Criteria

From a profile of all OFDA funded non-relief activities since 1978, the contractor shall, in consultation with OFDA, identify approximately 30 activities as potential candidates for in-depth analysis. Activities selection criteria will include the following:

1. Ensure that each selected activity has reached a sufficient stage of completion to warrant analysis, or has been in place long enough to permit measurement of impact.

2. Where possible, select activities whose relative effectiveness has been exposed to a relevant threat. Where exposure to a threat is not actual, then a "scenario analysis" approach should be used based on a peer review of a given hypothetical event.

3. Select activities that offer potential scope for answering the key analysis questions.

4. Select a range of activities that reflects the major categories of threats.

5. Select a range of activities that reflects the three major OFDA geographic regions.

6. Select a range of activities that reflects the major types of OFDA assistance offered, especially training.

7. Select a range of USAID mission which have a variety of levels of involvement and interest by mission staff and Mission Disaster Relief Officers (MDROs).

It is understood that with a relatively small number of selected activities it will be impossible to satisfy all the above-listed criteria; what is sought is satisfaction of the largest number of criteria possible. It is also understood that the small number of projects to be selected is not large enough to utilize statistical probability sampling techniques; what is required here is "purposive or judgmental sampling".

A few OFDA-funded projects have already been individually evaluated. Such evaluations do not necessarily exclude these projects from the sampling frame.

Task 5 Data Collection

Data collection efforts will be undertaken by the contractor to answer the analysis questions. Sources of data will include the following:

- Activity Profile
- Chronology Profile Forms
- Funding records
- Interim reports
- Final reports and other deliverables
- Activity files at OFDA
- Activity files at grantee or contractor locations in D.C.
- Activity files on-site overseas
- Interviews with OFDA Project officers and staff, other A.I.D. staff,
- Grantee staff in D.C., and grantee staff on-site overseas
- Phone interviews with in-country officials, other donor officials, mission staff and related PVOs
- Where appropriate to the activity, surveys of participants and beneficiaries.

Prior to visiting each site, the contractor will review the "evaluability" of each activity to ensure that it will provide useful answers to the analysis questions. It may be necessary to design somewhat different evaluation plans for each site or for each type of activity, and to eliminate sites that are not suitable for evaluation. Some sites may not require visits, or may require only short visits, as it may be possible to hire local staff to follow-up with brief survey evaluations by participants and beneficiaries of past funded activities.

The contractor and OFDA will agree on sites to be selected.

Task 6 Data Analysis and Synthesis

Data will be collected and analyzed using a case study approach, with each activity treated as a case. Each case will be written up and made available as part of the draft and final reports. The contractor shall devise a cross-case analysis technique for evaluating and answering the research questions.

Conclusions drawn from the cases will be supplemented by the results of answers to the research questions that are focused on future preparedness activities. The contractor will ensure that OFDA staff are closely involved in answering and trying to reach consensus on these answers. The contractor will hold an interim workshop after returning from the field work and prior to submission of the draft final report with OFDA/LAI staff in which these questions and answers will be discussed.

When appropriate, and in consultation with OFDA, the contractor will also convene one or more short (one day) meetings of specialists who are recognized as a experts in such fields as volcanology, seismology, tsunamis and hurricanes. Preference will be given to experts located in the Washington, D.C. area. Costs associated with convening such meetings will be included as part of the contractor's efforts. The contractor shall also hold a series of meetings with appropriate OFDA officials as part of the strategic planning component of this study.

Task 7 Progress Reports, Draft and Final Reports

The contractor shall meet with the OFDA Project Officer on a bi-weekly basis to discuss progress to date and to identify and discuss any problems or progress milestones anticipated for the project.

The contractor shall submit a draft final report consisting of case studies, cross-case analysis and synthesis, findings and recommendations, and executive summary. The report will include, for all case studies, bibliographic citations of all published technical papers, and interim and final reports, irrespective of origin and language of the document. After an OFDA review, of approximately two weeks, and a briefing on the study findings to OFDA staff, a final report will be submitted.

After the final report is submitted, the contractor shall be available to hold a briefing on findings for senior A.I.D. officials.

ARTICLE IV - DELIVERABLES/REPORTS

The contractor shall submit four (4 copies of the following Deliverables/Report to the Project Officer, Barry Heyman, OFDA/LAC:

1. Analytic Framework
2. Set of analysis questions
3. Workplan
4. Case selection criteria
5. List of site visits
6. Draft and final reports
7. Oral briefing

ARTICLE V - TECHNICAL DIRECTIONS

Technical Directions during the performance of this delivery order will be provided by Barry Heyman, OFDA/LAC.

LIST OF ACRONYMS

ABS	Annual Budget Submission
A.I.D.	Agency for International Development
AIT	Asian Institute of Technology
ACDC	Australian Counter-Disaster College
ACEMP	Agro-Climatic Environmental Monitoring Project, Bangladesh
ADPC	Asian Disaster Preparedness Center, AIT
AFR	Bureau for Africa, A.I.D.
ANE	Bureau for Asia Near East, A.I.D.
APT	Automatic Picture Transmission
ASEAN	Association of Southeast Nations
AVHRR	Advanced, Very High Resolution Radio-Meter, Sensor
B*AH	Booz*Allen Hamilton
BAKORNAS PBA	National Coordinating Board for Natural Disaster Relief, Indonesia
BMG	Baden Meteorologidan Geofisika, Indonesia
CAAF	Civil Aviation Authority of Fiji
CARICOM	Caribbean Community
CDSS	Country Development Strategy Statement
CERESIS	Center for Regional Seismoloy for South America
CI	Carneige Institution
CIDA	Canadian International Development Agency
COMECON	Communist Economic Community
COST	The Committee on Science & Technology, ASEAN
CP	Congressional Presentation
CPSS	Central Program Strategy Statement, OFDA
CUP	Catholic University of Peru
DASP	Disaster Assistance Support Program, United States Forest Service
DISC	Decision Information Systems Corporation
DOD	Department of Defense
EEC	European Economic Community
EIS	Emergency Information System
EMSEC	Emergency Services Committee, Fiji
EPP	Emergency Preparedness Program
EQ	Earthquake
EWC	East-West Center, University of Hawaii
FAO	Food and Agriculture Organization, United Nations
FEMA	Federal Emergency Management Agency
FEWS	Famine Early Warning System
FMD	Fiji Meteorological Department
FY	Fiscal Year
GIP	Geophysics Institute of Peru
GIS	Geo-referenced Information System
GMS	Geostationary Meteorological Satellite
GNZ	Government of New Zealand
GOBD	Government of Bangladesh
GOCR	Government of Costa Rica
GOF	Government of France
GOI	Government of Indonesia

LIST OF ACRONYMS (Cont'd)

GOJ	Government of Jamaica
GOP	Government of Peru
GOP	Government of Philippines
HRPT	High Resolution Picture Transmission
ICRC	International Committee of the Red Cross
IDNDR	International Decade for Natural Disaster Reduction
ILO	International Labor Organization
INDECI	Institute of Civil Defense, Peru
IRR	Internal Rate of Return
IQC	Indefinite Quantity Contract
IVS	Institute of Volcanology and Seismology, Philippines
LAC	Bureau for Latin America and the Caribbean, A.I.D.
LACIE	Large Area Crop Inventory Experiment
LDGO	Lamont-Doherty Geological Observatory, Columbia University
LORCS	League of Red Cross Societies
LRPT	Low Resolution Picture Transmission
MDRO	Mission Disaster Relief Office, A.I.D.
MIS	Methylisocyanate
MSI	Management Systems International
NAPA	National Association of the Partners of the Americas
NAS	National Academy of Sciences
NASA	National Aeronautic and Space Administration, U.S.
NFPA	National Fire Protection Association
NHP	Natural Hazards Program of the Organization of American States
NHRAP	Natural Hazard and Risk Assessment Project, OAS
NOAA	National Oceanic and Atmospheric Administration, U.S.
NWS	National Weather Service, U.S.
OAS	Organization of American States
ODP	Office of Disaster Preparedness, Jamaica
OECD	Organization for Economic Cooperation and Development
OFDA	Office of Foreign Disaster Assistance, A.I.D.
PAGASA	Philippines Atmospheric, Geophysical and Astronomical Services
PAHO	Pan American Health Organization
PASA	Participating Agency Service Agreements
PCDPP	Pan Caribbean Disaster Preparedness and Prevention
PED	PAHO's Emergency Preparedness Program
PIA	Philippine Information Agency
PID	Project Implementation Document
PIDP	Pacific Island Development Program (University of Hawaii, East-West Center)
PMRRC	Prime Minister's Relief and Rehabilitation Committee, Fiji
PP	Project Paper
PSC	Personal Services Contract
PVO	Private Voluntary Organization
RFP	Request for Proposals
RRC	Relief and Rehabilitation Committee, Fiji
RS	Remote Sensing
RSSA	Resources Support Services Agreement
SAI	Science Applications, Inc.
SAWSO	Salvation Army World Services Office

LIST OF ACRONYMS (Cont'd)

SEASEE	Southeast Asian Association of Seismology and Earthquake Engineering
SOW	Scope of Work
SPARRSO	Space Research and Remote Sensing Organization, Bangladesh
SPSSD/WS	South Pacific Severe Storm Detection and Warning System
THRUST	Tsunami Hazards Reduction Utilizing Systems (Peru)
TS	Tsunami
TY	Typhon
UASD	Autonomous University of Santo Domingo
UCR	University of Costa Rica
UCSC	University of California, Santa Cruz
UK	United Kingdom
UNA	Autonomous National University, Costa Rica
UNDP	United Nations Development Programme
UNDRO	United Nations Disaster Relief Office
UNESCO	United Nations Economic and Social Council
UNICEF	United Nations Children's Emergency Fund
USAID	U.S. Agency for International Development (used for overseas offices)
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USG	U.S. Government
USGS	U.S. Geological Survey
VDAP	Volcano Disaster Assistance Program
VO	Volcano
VSI	Volcanological Survey of Indonesia
WDB	World Data Base
WHO	World Health Organization

LIST OF INTERVIEWS

UNITED STATES

ACADEMY OF FIRE SCIENCE

W.J. Muniz, Director

AGENCY FOR INTERNATIONAL DEVELOPMENT/WASHINGTON
BUREAU FOR AFRICA

Sidney Bliss, Office of Project Development/Southern Africa
Phyllis Dichter, Director, Office of Sahel and West Africa Affairs
Fred Fischer, Director, Office of Southern Africa Affairs
Cynthia Rozeli, Chief, Office of Project Development/Southern Africa

BUREAU FOR LATIN AMERICA AND CARIBBEAN

Garber Davidson, Assistant General Counsel
Angel Diaz, Jamaica Desk
Paula Feeny, Chief, Office of Development Resources, Health and Nutrition Division
Peter Kolar, Assistant Director/Dominican Republic
Ingrid Peters, OIC, Grenada/Eastern Caribbean Islands Desk
Frederick Schieck, Deputy Assistant Administrator
James Schill, Bureau for Latin America and the Caribbean

BUREAU FOR PROGRAM AND POLICY COORDINATION

Janet Ballantyne, Center for Development Information and Evaluation
Harold Gray, PVO Liaison, Office of Planning and Budget
George Hill, Associate Assistant Administrator, Office of Planning and Budget

BUREAU FOR ASIA NEAR EAST

Christopher Brown, Indonesia/South Pacific Desk

OFFICE OF FOREIGN DISASTER ASSISTANCE

Frederick M. Cole, Assistant Director/Chief, Asia & Pacific Division
Ollie Davidson, Assistant Director/Chief, Operations Support Division
Cindy Davis, Project Manager, Information Services
Ray Dionne, Operations Officer, Asia & Pacific Division
Art Feller, Communications, Operations Support Division
Bill Garvelink, Assistant Director/Chief, Africa & Europe Division
Ellery Gray, Medical Officer, Operations Support Division
LeVonne Harrell, Operations Officer, Latin America & Caribbean Division
Faye Henderson, Information Specialist, Information Services

Barry Heyman, Assistant Director/Chief, Latin America & Caribbean Division
Gudrun Huden, Operations Officer, Environmental/Housing Specialist, Africa & Europe Division
Rita Hudson, Fiscal Officer, Operations Support Division
Dennis King, Information Specialist, Information Services (LAI)
Paul Krumpe, Technical Advisor, Asia & Pacific Division
Mary Little, Operations Officer, PVO Liaison, Asia & Pacific Division
Andrew Natsios, Director
Carole Siegel, Procurement Officer, Operations Support Division
Kimberly Vasconez, Information Specialist, Information Services (LAI)

DADE COUNTY FIRE DEPARTMENT

Lt. Carlos Castillo, Coordinator, Bureau of International Programs
Douglas Jewett, former Coordinator
Chief Montero, Fire Chief
Diane Rubin Wright, Assistant for Administration

EAST-WEST CENTER, UNIVERSITY OF HAWAII

Richard Carpenter, Executive Secretary, Pacific Basin Consortium for Hazardous Waste Research
Michael Hamnett, former Director, Pacific Islands Development Program
Seiji Naya, Director, Resource Systems Institute

ENVIRONMENTAL PROTECTION AGENCY

Christian Holmes, Principal Deputy Assistant Administrator, Office of Solid Waste and Emergency Response

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

Vernon Adler, Technological Hazards
Jane A. Bullock, National Earthquake Hazards Reduction Program
Leonard Oberlander, Office of Program Analysis & Evaluation
Lynn Smith, Chief, Office of Program Analysis & Evaluation
Ralph B. Swisher, Policy Specialist, Emergency Management Planning Division

INDEPENDENT CONSULTANTS

Fred Cuny
Robert Gersony

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

James Dodge
Charles Vermillion, NASA Project Director, Goddard Space Flight Center

NATIONAL FIRE PROTECTION ASSOCIATION

David Gratz, Representative in charge of International Operations

ORGANIZATION OF AMERICAN STATES

Steven Bender, Director, Hazards Mitigation Program
Jan C. Vermeiren, Caribbean Program Coordinator

PAN-AMERICAN HEALTH ORGANIZATION

Claude de Ville de Goyet, Director, Emergency Preparedness Program, PED
Jose Luis Zeballos, Deputy Director, Emergency Preparedness Program, PED

PARTNERS OF THE AMERICAS

David Lurie, former Vice President for Finance
Marsha McKay, Assistant Director, Emergency Preparedness Program
William Reese, President
Howard Spiegleman, Director, Emergency Preparedness Program

UNITED STATES FOREST SERVICE

Thomas Frey, Disaster Management Specialist
Robert Mutch, Program Manager

UNITED STATES GEOLOGICAL SURVEY

Norman Banks, Director
Thomas Casadevall
Louis Steyart
Mary Ellen Williams, Project Administrator, Geologic Division, Office of International Geology

BANGLADESH

GOVERNMENT OF BANGLADESH

Md. Abdul Quddus, Assistant Secretary, Ministry of Relief & Rehabilitation
Staff of Space Research and Remote Sensing Organization (SPARRSO), Ministry of Defence:
Abu Abdullah Ziauddin Ahmed, Chairman
Nawab Ali, Senior Technician
A.M. Chowdhury, Director, Technology
S.T. Rahman, Senior Technician

USAID

Steven Bennett
Ray Morton, Agriculture Officer
Malcolm Purvis, Deputy Mission Director
W. Phillip Warren, Agriculture Officer
Frank Young, Program Officer

UNITED NATIONS DEVELOPMENT PROGRAMME

Erling Dessau, Resident Representative

UNIVERSITY

Ziaulhaq Mamun, Institute of Business Administration, Dhaka University

COSTA RICA

GOVERNMENT OF COSTA RICA

Herman Kruse, Former Director and now Consultant, National Emergency Commission
Manuel Obando, Sector Coordinator, National Emergency Commission
Roman Solera, Executive Director, Agricultural Development Corporation
Liliana Solis, Atomic Energy Commission
Xinia Soto, Ministry of Natural Resources

OFFICE OF FOREIGN DISASTER ASSISTANCE

Paul Bell, Regional Disaster Advisor
Alejandro James, Jr., Regional Disaster Expert
Ricardo Bermudez Peralta, Emergency Management Specialist

ORGANIZATION OF AMERICAN STATES

Juan Jose Castro, Project Chief and Director of Natural Hazards Program

PAN-AMERICAN HEALTH ORGANIZATION

Hugo Prado Monje, Regional Coordinator, PED
Pierre Perrin, Field Team Member, PED

PARTNERS OF THE AMERICAS

Jose Antonio Calderon Sulano, President
Teresita de Wheeler, Executive Director
Juan Maria Tercero Zuniga, Emergency Preparedness Program Coordinator

UNIVERSITY

Jorge Barquero, Volcanologist, University National
Luis Morales, Coordinating Geologist, University of Costa Rica
Engineer Rodolfo Van de Latt V., Investigator, University National
Rodrigo Saenz, Seismologist, University National
Guillermo Santana, Inverstigator, University of Costa Rica

USAID

DOMINICAN REPUBLIC

GOVERNMENT OF DOMINICAN REPUBLIC

Martin Acosta, National Health Program for Disasters, SESPAS, Ministry of Health
Osiris Madera, Director of National Health Program for Disaster, Ministry of Health
Ricardo J. Puello Brenes, National Health Program for Disasters, SESPAS, Ministry of Health

USAID

Thomas Cornell, Mission Disaster Response Officer

ORGANIZATION OF AMERICAN STATES

Oscar Pretell, Project Chief

PAN-AMERICAN HEALTH ORGANIZATION

Pedro L. Castellanos, Disaster Program Coordinator
Raimundo Hederra, Sanitary Engineer

PARTNERS OF THE AMERICAS

Esperanza Santos de Gonzalez, President Fundacion Jose Vincente and Vice President of Partner's of the Americas
Hector Herrera, President

UNIVERSITY

Luis Odonel Gomez, Director, Instituto Seismologico Universitario

FIJI

GOVERNMENT OF FIJI

Nelson H. Delailomaloma, Permanent Secretary, Ministry of Rural Development and Rural Housing
Joeli B. Rokovada, Assistant Secretary (EMSEC), Ministry of Home Affairs
Tom Tuiloma, Principal Assistant Secretary, Ministry of Home Affairs

USAID

Joseph Chung, Regional Disaster Adviser
Kirk Dahlgren, Program Officer
John Woods, Mission Director

FIJI METEOROLOGICAL SERVICE

Ram Krishna, Director
Rajendra Prasad, Principal Scientific Officer
M. Manoj Singh, Senior Meteorologist

RED CROSS

Susan Douglas, Director General

RESIDENTS OF VILLAGE VOTUA, DISTRICT SIGATOKA

Suliana Buruvatu, Nurse
Kinivilame Ravonoloa, Mayor

SALVATION ARMY

Capt. Rex Johnson, Western District Officer, Lautoka
Major Lance M. Rive, Regional Commander, New Zealand and Fiji Territory
Major Scadden, New Zealand and Fiji Territory

INDONESIA

GOVERNMENT OF INDONESIA

Aspan S. Danuatmodjo, National Project Coordinator, Strengthening Disaster Preparedness & Disaster Management
H. Imam Soepardi
Hanafiah H. Mustopa, Head, West Java Social Affairs Office, Department of Social Affairs
Nabiel Makarim, Assistant Minister, Coordinating Ministry for Population & Environment
R. E. Soeriaatmadja, Staff Expert, KLH

R. Suhud Pribadi, Secretary to the Director General (Social Assistance Development), Department of Social Affairs
Mrs. Sulianti SH, Special Staff to the Minister, Department of Social Affairs
Vice Rector Rusdibjono, Institute of Government Study, Ministry of Home Affairs

Institute of Meteorology and Geophysics (BMG)

Zacheus Indrawan, Assoc. Rector I, Universitas Kristen Indonesia
Mr. Karjoto, Director
R. P. Pasaribu, Seismologist
Mr. Soetardjo, Seismologist

Volcanological Survey of Indonesia, Ministry of Mines and Energy

W. Subroto Modjo, Director
Muziel Alzwar, Vulcanology
Liek Pardyanto, Chief, Observatory Division
Ramsi Ramelan, Chief, Volcano Analysis Division

USAID

David Nelson, Mission Disaster Response Officer
Abas Rozali, Program Assistant

US EMBASSY

Jeff Lutz, Science & Technology Attache, Economic Section

RED CROSS

Redjeki Budiningsih SH, Staff for International Humanitarian Law

UNITED NATIONS DEVELOPMENT PROGRAMME

Nurul Alam, Deputy Resident Representative
Rini Aziz, Sr. Program Assistant

VIDCODATA

J. Roy Saunders, Director of Consulting

JAMAICA

GOVERNMENT OF JAMAICA

Donovan Giles, Emergency Information System (EIS) Coordinator, ODP
Lloyd Miller, Deputy Director, Office of Disaster Preparedness (ODP)

USAID

George Deikun, Assistant Regional Housing Officer
Charlie Matthews, Mission Disaster Response Officer

ORGANIZATION OF AMERICAN STATES

Lorna Gordon, Lorna Gordon and Associates

PAN-AMERICAN HEALTH ORGANIZATION

David Taylor

PAN CARIBBEAN DISASTER PREPAREDNESS AND PREVENTION PROJECT

Franklin McDonald, Director

PARTNERS OF THE AMERICAS

Commissioner Ashtley Grant, St. Andrews Fire Department
Elanor Jones, Chairperson
Enid Lawrence, Program Coordinator

UNITED NATIONS DEVELOPMENT PROGRAMME

Hugh N. Cholmondley, Resident Representative

UNIVERSITY

Rafi Ahmad, Geology Department, University of the West Indies

PERU

GOVERNMENT OF PERU

Eusebio Bravo, Civil Defense
General Jorge Ferreyros, Director Civil Defense
Jaime Portado, Mayor of Callao

USAID

Edilberto Alarcron, Engineer
Bruce Blackman, Chief Development Resources
Craig Buck, Mission Director

OFFICE OF FOREIGN DISASTER ASSISTANCE

Rene Carillo, Regional Disaster Advisor

CERESIS

Alberto Giesecke, Director

GEOPHYSICAL INSTITUTE OF PERU

Mateo Casaverde, Director
Pablo Lagos, Department of Meteorology

INDEPENDENT CONSULTANT

Julio Kuroiwa, Director Project Tsunami

ORGANIZATION OF AMERICAN STATES

Enrique Castellanos Carillo, Ambassador

PAN-AMERICAN HEALTH ORGANIZATION

Luis Jorge Perez Calderon, Regional Coordinator, PED
Carlos Cordova, Member Partners Preparedness Subcommittee
Victor Lora, President

UNIVERSITY

Juan Barionla Bernales, Civil Engineer, Catholic University
Daniel Torrealva Davila, Civil Engineer, Catholic University
Gladys Villa Garcia, Civil Engineer, Catholic University

PHILIPPINES

GOVERNMENT OF PHILIPPINES

Lolita Garcia, Secretary of SEASEE and Seismologist at PAGASA
Roman Kintanar, Director of PAGASA and Vice President of SEASEE
Angeles Magbanua, Senior Training Officer, Office of Civil Defence, Dept. National Defence
Raymundo Punaongbayan, Director, Philippine Institute of Volcanology and Seismology
Rolando Valenzuela, Seismologist at PAGASA; member of SEASEE
Imelda Valeroso, Weather Specialist, PAGASA

USAID

Lino de La Cruz, PVO Specialist

PHILIPPINES BUSINESS FOR SOCIAL PROGRESS

Antonio Jegillos, Program Officer

TECHNIKS GROUP CORPORATION

Loretta V. Cortez, Sr. Structural Engineer

SWITZERLAND

UNITED NATIONS DISASTER RELIEF OFFICE

M'Hamed Essaafi, Under-Secretary-General and UNDRO Co-ordinator
Ferdinand Meyrhofer-Grunbuhel, Director and Deputy to the Co-ordinator
Robert Souria, Chief, Disaster Relief Co-ordination Branch
John Tomblin, Chief, Disaster Mitigation Branch
Wolfgang Wagner, Temporary Secretariat, International Decade for Natural Disaster Reduction
Giles Whitcomb, Disaster Mitigation Branch
Klaus Wiersing, Disaster Relief Co-ordination Branch
Dusan Zupka, Disaster Mitigation Branch

THAILAND

GOVERNMENT OF THAILAND

Apichat Todilokvech, Chief of Training Section, Dept. Local Administration, Ministry of Interior

USAID

Karl L. Mahler, MDRO

ASIAN DISASTER PREPAREDNESS CENTER/ASIAN INSTITUTE OF TECHNOLOGY

John W. Barrett, Program Coordinator
Lt. Col. Brian A.O. Ward, Director, AIT
Prinya Nutalaya, Professor of Engineering Geology, AIT
Nicholas Russell, UNDRO Consultant
Robert Southern, ADPC Consultant

RED CROSS

Surin Chaitachawong, Asst. Section Chief, Relief Section

THE LOGICAL FRAMEWORK

The Logical Framework Approach assumes that a development project is an instrument of change, and that it was selected from among alternative instruments as the most potentially cost-effective approach to achieving a desired result. It is a way to organize information and activities so that a number of different analytic perspectives can be brought to bear on a problem simultaneously. These perspectives include:

- Program Management
- Basic Scientific Method
- Systems Analysis

Program Management To simplify programs, three basic levels of program responsibility are designated:

- **INPUTS**: resources consumed and activities undertaken.

- OUTPUTS: the things managers are committed to produce. These must be stated as results. If those results fail to be produced, then the manager should be able to show why expectations were not met.

- PURPOSE: the reason for producing the **OUTPUTS**, that is, the higher-level objective expected to result from producing the **OUTPUTS**. For example, if the **OUTPUTS** are products, then the **PURPOSE** may be profit. If the **OUTPUTS** are social services, then the **PURPOSE** might be that these services be used effectively by a particular target population.

The Basic Scientific Method can be stated as follows: All human activities are uncertain. Therefore, a project should be viewed as a set of interlocking hypotheses: if **INPUTS**, then **OUTPUTS**; if **OUTPUTS**, then **PURPOSE**. Note that what varies between these two levels is the **probability of success**. It is within the ability of a responsible manager to ensure that **INPUTS** result in **OUTPUTS**; and he/she should be held accountable. On the other hand, the hypothesis-if **OUTPUTS**, then **PURPOSE**-is problematic. The project manager must do what a reasonable person would do to realize the **PURPOSE**, but he/she is not held **accountable** for that result.

Systems Analysis The third viewpoint important to the Logical Framework is too often neglected in both conventional management and operations research approaches. Systems analysis requires that a system should not be specified until the relationship the system bears to some larger system has been specified.

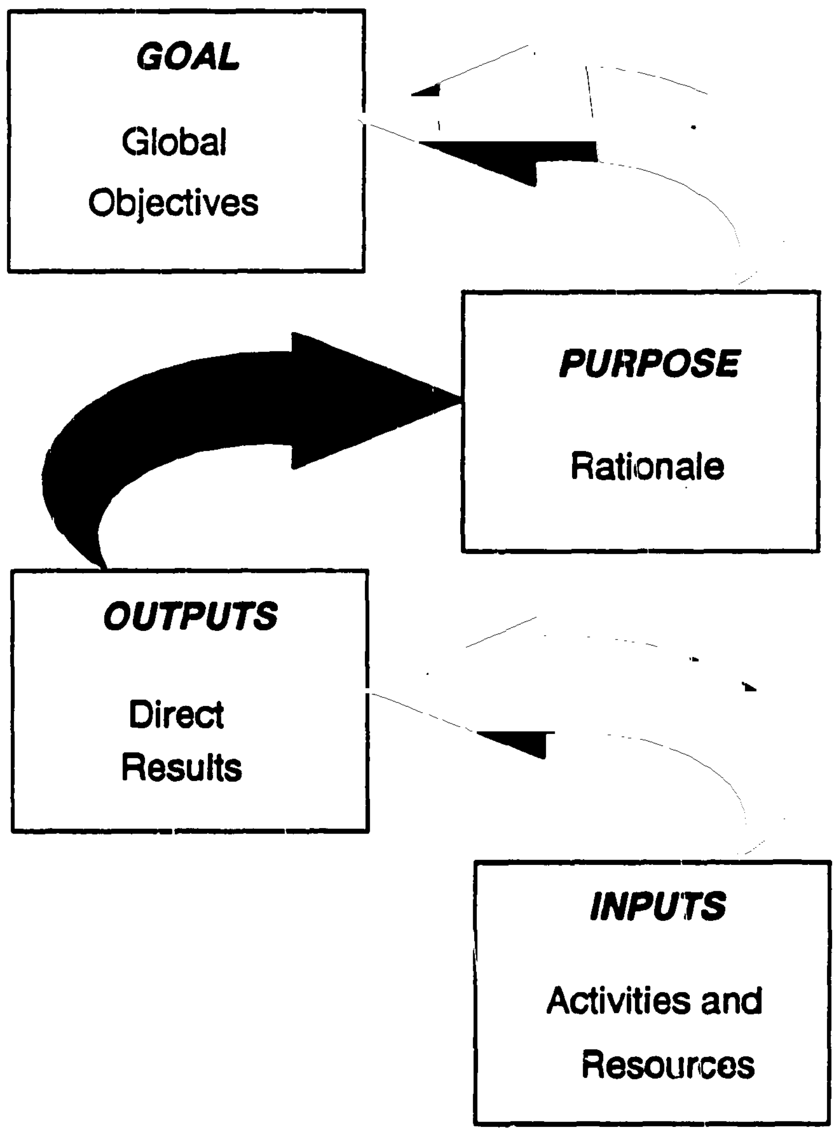
To do this, a fourth, superior level called **GOAL** is added to the three-level management hierarchy. The **GOAL** is defined as the higher-level objective immediately above project **PURPOSE**. **GOAL** thus relates the project to the aspirations of those for whom the project's activities have no intrinsic interest. If the **PURPOSES** are agency-level, then the projects' **GOAL** transcends the agency and relates the program to larger-scale objectives-objectives that may be common to multiple agencies. Given the many uncertainties in the connection between **PURPOSE** and **GOAL**, the final element of the project/program logic is viewed as a testable hypothesis (if **PURPOSE**, then **GOAL**).

Hierarchy and Linkage In sum, the Logical Framework breaks a project down into four separate and distinct levels of objectives, with a definite hierarchical order. At the lowest levels are the project **INPUTS**. These are the activities to be undertaken that will in turn result in the second level of objectives called **OUTPUTS**. **OUTPUTS** are the results that are directly accomplished by management of the **INPUTS**. For example, an education project can produce trained teachers, a constructed and equipped school building and trained administrators by managing a specific set of **INPUTS**. Yet the **OUTPUTS** are not valuable for their own sake and are not the justification for the project. What is really sought is an improvement in education. This then, represents a higher level of objective called PURPOSE. The **PURPOSE** is what is expected to result from having achieved the **OUTPUTS**.

The fourth level in the Logical Framework is a higher-order objective called the **GOAL**. The project is one of the necessary conditions for achieving this **GOAL**, but typically will not be sufficient by itself to achieve the **GOAL**. Using the same example of an education project, if the specific project **PURPOSE** is improved education, the **GOAL** might be that certain manpower needs of local industry are met. In order to achieve this **GOAL**, other projects also may have to be undertaken. Just as it is essential to identify all the **OUTPUTS** necessary to achieve the **PURPOSE**, so must all the **PURPOSES** (projects) be identified which are necessary to achieve the **GOAL**.

The hierarchy of objectives as discussed above may be shown as follows:

HIERARCHY OF OBJECTIVES



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Assumptions Each time a hypothesis is made, i.e.:

- If the **INPUTS** are managed properly, then the **OUTPUTS** will be produced.

- If the **OUTPUTS** are produced, then the **PURPOSE** will be achieved.

- If the **PURPOSE** is achieved, then this will contribute to achievement of the **GOAL**.

it is necessary to accept a degree of uncertainty. The amount of uncertainty increases as one reaches higher up the project hierarchy of objectives. It therefore becomes very important to clarify the nature of this uncertainty so that a design that has the highest probability of success can be selected. This is done by including in the project design those factors necessary for achieving success that are beyond the control of the project manager. These additional factors are called assumptions.

The important aspect about assumptions is that, at any one level, all the necessary and sufficient conditions must be defined. Those elements within the project manager's control constitute the project's central hypothesis; those outside his/her control are the assumptions that need to be in place in order to achieve the next level objective. The Logical Framework requires that at each "level" the activities or results planned plus assumptions at that level constitute sufficient conditions to achieve the next higher level.

Managing Change Assumptions are useful not only during the design stage of the project but also during the course of the project and its evaluation. To develop assumption statements it is useful to ask the question: "What could happen to make this assumption invalid?" Once the project begins, a good project manager monitors assumptions regularly so that corrective action can be taken in a timely manner. Assumptions are also important during an evaluation because their examination can provide insight as to why the project has or has not succeeded in achieving its objectives.

Targets and Indicators The statements of **GOAL**, **PURPOSE**, **OUTPUTS** and **INPUTS** frequently are subject to misunderstanding or open to different interpretations by those involved with the project. **GOAL** and **PURPOSE** level statements, in particular, tend to be ambiguous and are frequently interpreted to mean as many different things as there are people involved in the project.

Visualizing and articulating exactly how to recognize "success" at each project level enables the project manager to sharpen his/her focus on the project objectives and have confidence that all those concerned with the project share the same picture. Targets and indicators are the means for establishing what conditions will signal successful achievement of the project objectives. In this way indicators can be used to clarify exactly what is meant by the narrative statement of objectives at each of the project levels.

Indicators demonstrate results. They are not the conditions necessary to achieve those results. The number of indicators necessary to measure success is that minimum number that gives the project manager confidence that their existence will in fact demonstrate achievement of the project objectives and, in addition, give the him/her a clear target to aim at achieving. Only when the objectives are clearly targeted in terms of quantity, quality and time (QQT) can the project manager judge whether or not the conditions at one level in the project are sufficient to achieve the next higher level objective.

EOPS Because the project **PURPOSE** is of major concern, the set of indicators at that level has been given a special name: End of Project Status (EOPS). This is because the **PURPOSE** is the main thrust of the project, and because the **PURPOSE** is frequently extremely complex involving such factors as organizational viability, net improvement in complex (e.g., human) systems, and so forth. For complex objectives, it is frequently the case that no single indicator suffices.

The Logical Framework encourages the project designer to define clearly and explicitly what will indicate that the project can be considered a success. Included directly in the project design is the set of conditions that will signal successful achievement of the project **PURPOSE**.

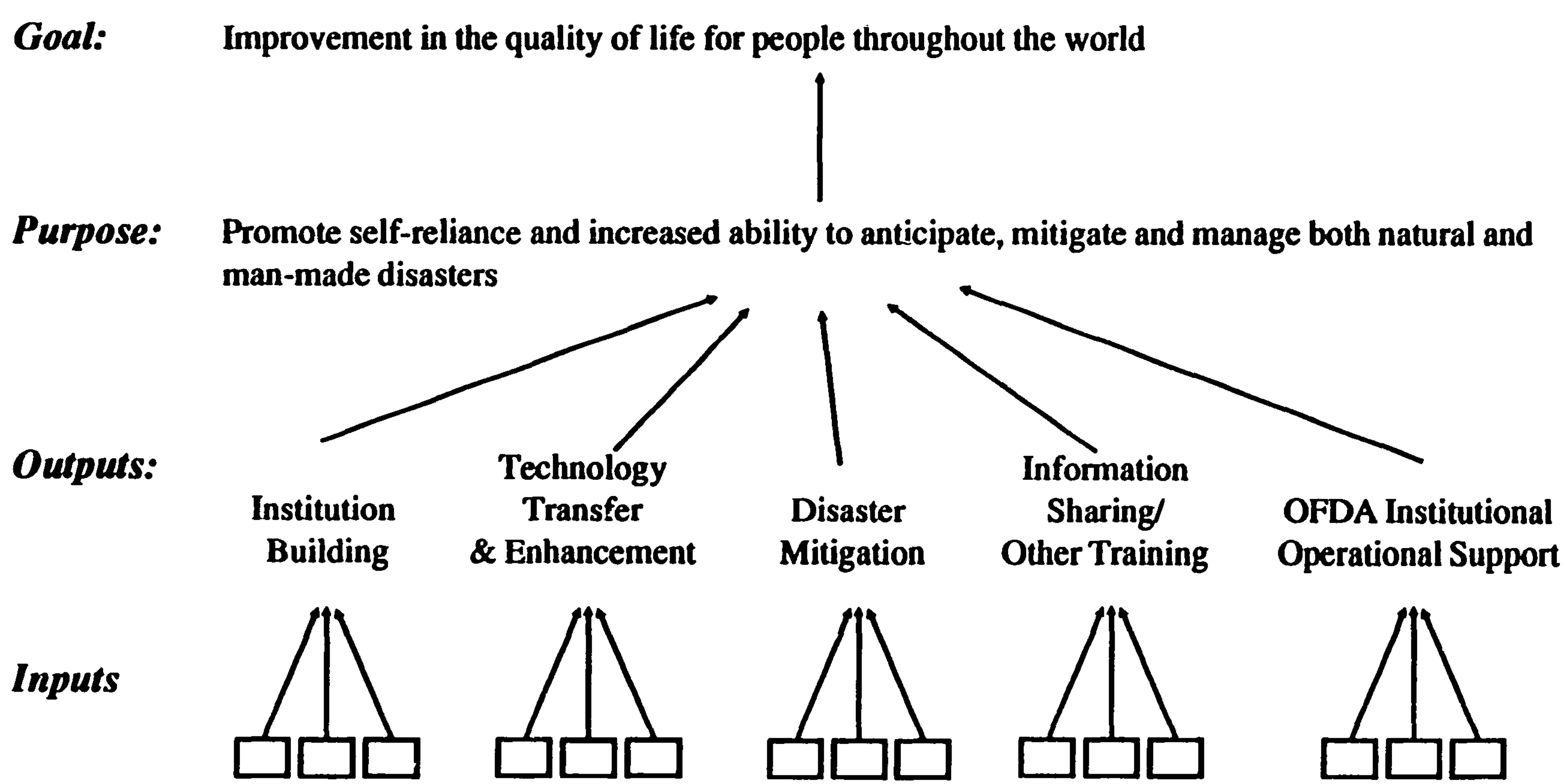
In general, operationally useful targets and indicators: (1) measure what is important, (2) are plausible, (3) are targeted, (4) are independent. However, the value of an indicator is limited by the means available to verify it. Finding data for some indicators may require just a quick review of project records whereas other indicators require sophisticated data collection and analysis for verification, which should then be planned for and included in the project **INPUTS**. To clarify such issues, the Logical Framework adds a column called Means of Verification forcing designers to indicate how date will be found and analyzed for each key indicator.

Ease of Evaluation The discipline of using the Logical Framework in the design process facilitates the production of an evaluable design in which objectives are clearly stated, the development hypotheses are understood and indicators of success at each level of the project hierarchy have been established. Calling in the evaluators during the design phase to ascertain if the needed data can be collected, at a reasonable cost, helps clarify the project design still further. Most importantly, the indicators express what the designers are willing to call success; thus the evaluation task is simply to collect the data for those key indicators and "evaluate" the project against its own pre-set standards of success.

Finally, it is important to note that project designers and managers should expect to change the Logical Framework frequently during design and implementation. The Logical Framework should be expected to change during the design process as use of the concepts constantly raise important questions and force the manager to continually refine the design until a high confidence in its validity can be ensured. It is much better to make mistakes on paper than in practice.

The basic form used for preparing a Logical Framework is shown on the following page, followed by a Schematic Logical Framework for OFDA's Non-Relief Activities.

SCHEMATIC LOGICAL FRAMEWORK
NON-RELIEF ACTIVITIES — OFDA



Individual Projects/Activities in OFDA Non-Relief Portfolio

LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Date of this Summary ____________

Project Title: ______________________________

	NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
	Program Goal: The broader objective to which this project contributes:	Measures of Goal Achievement:		Concerning long term value of program/project:
If Purpose, Then Goal	Project Purpose:	Conditions that will indicate purpose has been achieved: End of project status.		Affecting purpose-to-goal link:
If Outputs, Then Purpose	Outputs:	Magnitude of Outputs necessary and sufficient to achieve purpose.		Affecting output-to-purpose link:
If Inputs, Then Outputs	Inputs: Activities and Types of Resources	Level of Effort/Expenditure for each activity.		Affecting input-to-output link:

DEVELOPMENT HYPOTHESES

MANAGEABLE INTEREST

CONCEPTUAL ANALYSIS FRAMEWORK

RETROSPECTIVE STUDY

I. Policy Considerations

- OFDA's role in international disaster preparedness
- Determining the degree to which investments in preparedness have been useful/effective
- Identifying generalizable lessons learned
- Building upon success/lessons learned

II. Methodology

- Trend analysis
- Interviews
- Document review
- Case studies
- Analysis

III. Areas of Examination

- Planning processes
- Resource allocation
- Operations
- General working environment

CONCEPTUAL ANALYSIS FRAMEWORK

PROSPECTIVE STUDY

I. Policy Considerations

- Improvement of performance in each area of examination listed above
- Changes in organizational relationships
- Trends in disaster preparedness

II. Methodology

- Synthesize findings from retrospective study

III. Areas of Examination

- Planning processes
- Operations
- Resource allocation
- General working environment

CASE SELECTION CRITERIA

A key aspect of this study is the conduct of in depth case studies of OFDA funded non-relief activities. All activities were considered to be either field activities or worldwide activities. Within each category criteria were established to provide the basis for an objective and operationally useful selection of cases. The criteria used for each category are outlined below. In addition, two special case studies were undertaken: Training adn Field Office Management.

FIELD ACTIVITIES

1. Place all field activities under one of the following categories:

    - LAC
    - EUR/AFR
    - Asia & Pacific
    - Regional

2. Identify subregions which historically have received most of the disaster preparedness/mitigation budget. List all activities (either bilateral or regional) which assisted countries within that subregion. Consider only those activities further.

3. Delete all activities which: (a) have a life of project cost of less than $50,000; (b) have not reached a sufficient stage of completion to warrant analysis or (c) have not been in place long enough to permit measurement of impact.

4. Identify one or two major threats most prevalent in the subregions identified in 2.

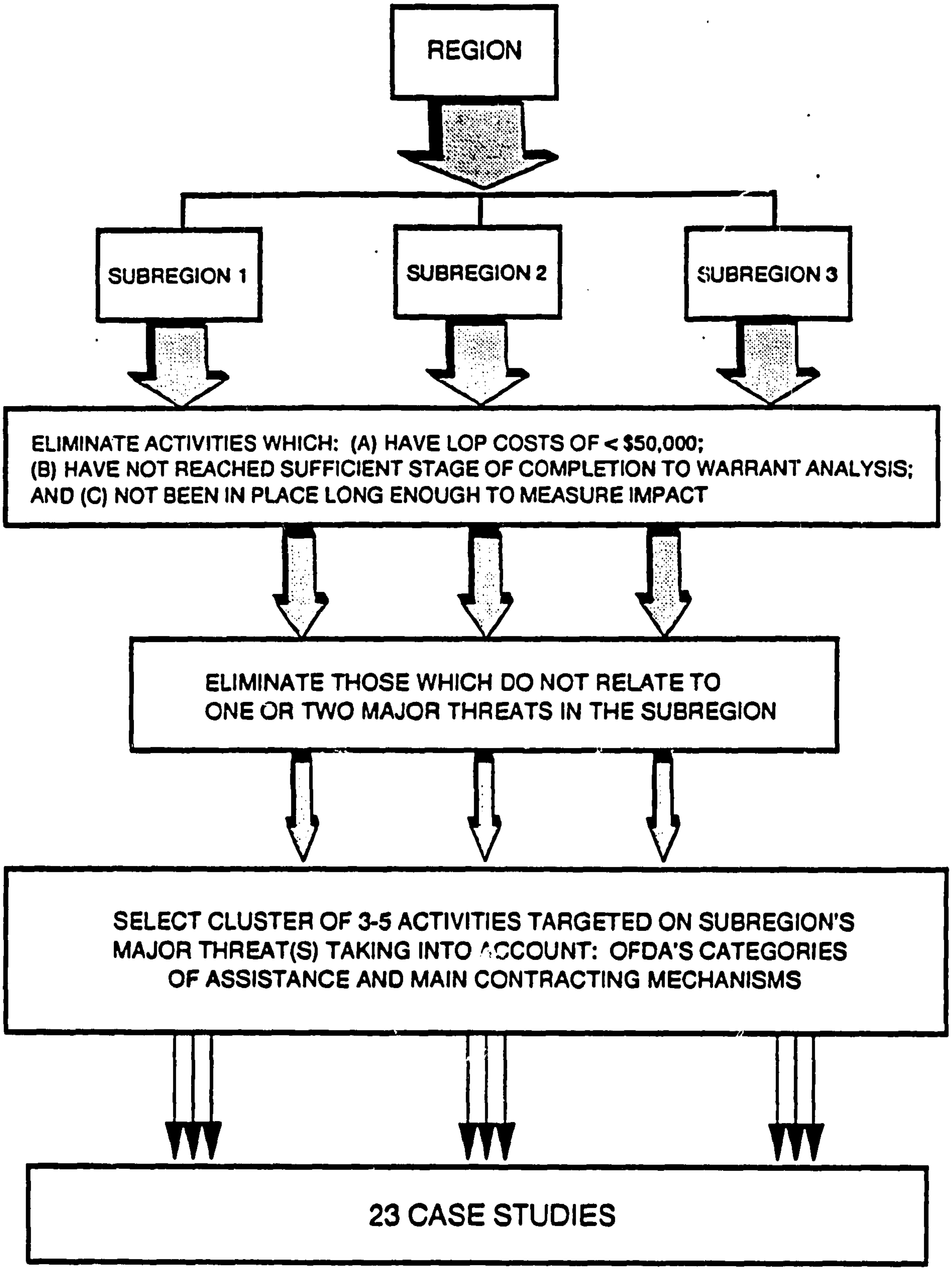
5. List all of the activities remaining which are targeted to the major threat(s) identified in 4.

6. Select a cluster of 3-5 activities per subregion from the universe remaining in 5.

7. In selecting each cluster of activities, consider the categorization of OFDA assistance as shown on page 3 of OFDA's Activity Profiles and Chronologies and assure, to the greatest extent possible, that all categories and subcategories are represented in the final matrix.

8. Consider also, OFDA's main contracting mechanisms (contract, grant, PASA and NGO) and assume, to the greatest extent possible, that all categories are represented in the final matrix.

The following chart describes the process and criteria for final selection.



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WORLDWIDE ACTIVITIES

1. Place all worldwide activities into one of two subcategories: (a) research or (b) operational.

2. Identify all activities which: (a) have not been in operation for at least 50% of the planned LOP and (b) have life of projects costs of less than $100,000. Delete those activities.

3. Select up to 5 activities based upon following the considerations: (a) regional distribution, (b) OFDA's categories of assistance, and (c) OFDA's main contracting activities.

   The following chart describes the process:

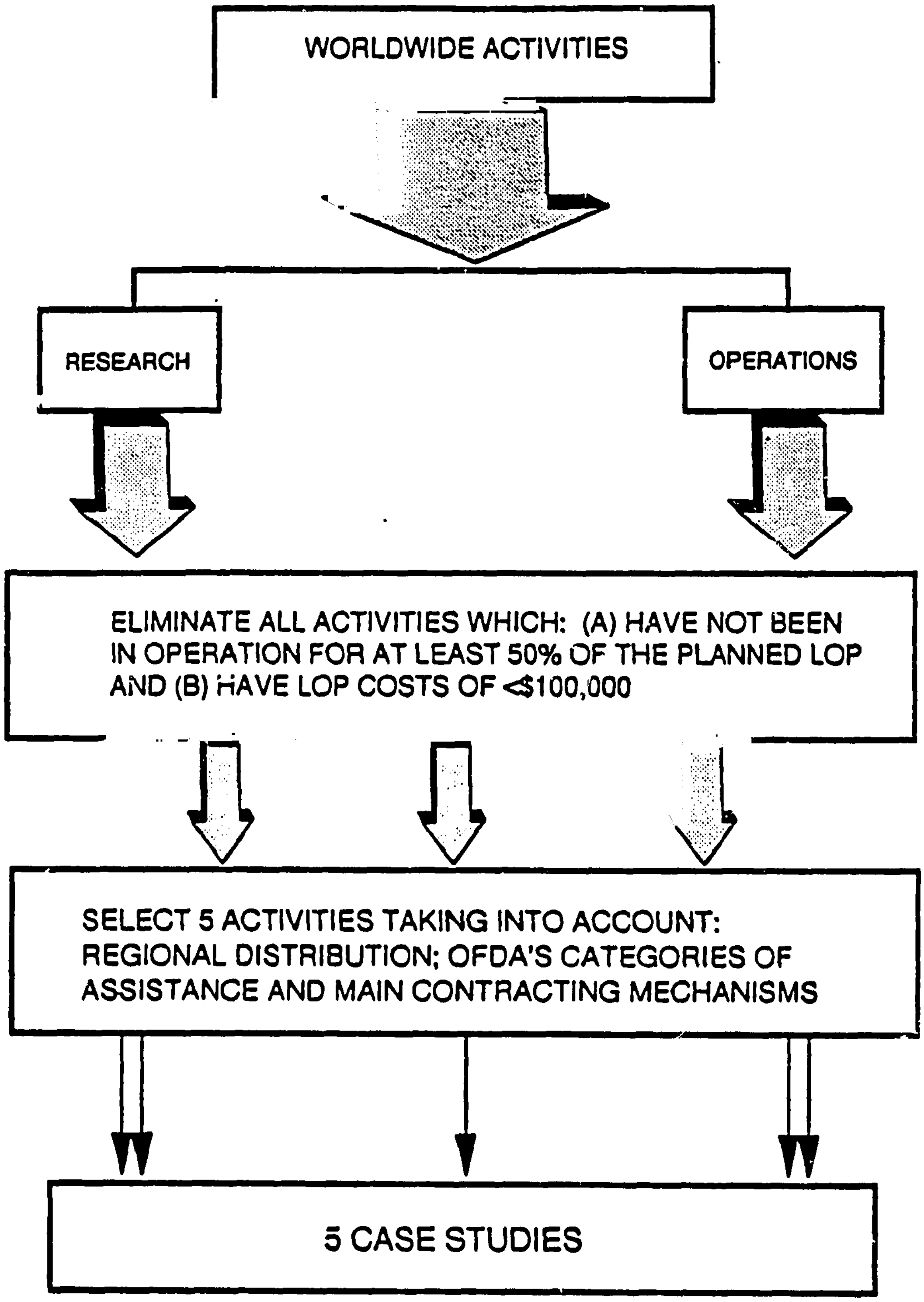
MANAGEMENT FUNCTIONS

1. Consider the district management functions of OFDA/W and its regional offices.

2. Identify all activities delegated to the regional offices by OFDA/W and all those managed by OFDA/W.

3. Conduct interviews with selected individuals in both Washington and the regional offices identifying management policies and procedures, Interviews can be both general in nature and specific, drawing upon the management aspects of case studies already under consideration.

   The following chart describes the process:



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Management Systems International

OFDA Strategic Planning Evaluation Study

Case Study Data Sheet

I. GENERAL INFORMATION

Case study number ________

Activity Name ____

Location (check): ____ Country ______________________________

_____ Region _____________________________ _____ Worldwide

Name of MSI team member with lead responsibility for this case study

(1) ______________________________

Other MSI team members who have worked on this study

(2) _________________________ (3) ______________________________

Field visit? Yes No If yes, where? ________________________

Dates ____

Is this activity directed to a specific threat? (1) _____ Yes, one threat exclusively. (2) _______ Yes, one threat primarily (3) ____ No, generic to several/all threats.

Characterization of the threat to which this activity is directed (check and circle all that apply)

_____ Rapid-onset "elemental" ("natural") disaster (circle)

EQ	earthquake	FL	flood
LS	land slide	VO	volcano
TS	tsunami	WS	wind storm
FI	fire		

____ Rapid-onset biological disaster (circle)

EP epidemic IS insect infestation

____ Rapid-onset man-made disaster (circle)

AC accident

GENERAL INFORMATION, CONTINUED

____ Slow-onset "natural disaster"

DR drought

____ Slow-onset "man-made" disaster

DP displaced persons

Year in which the activity was conceived ________

Start of implementation date ____month _____year

End of implementation date ____month _____year

Ongoing ____

II. DETAILED ANALYSIS

Listed below are 13 factors which will be the basis for analysis of all case studies. Recording the data in the following format will facilitate our ability to examine questions and establish inferences within the entire sample.

FACTOR 1: PERCENT OF POPULATION VULNERABLE

To what extent are people vulnerable to the disaster which the activity addresses?

Total national/ regional population as of ______(year) is ____________

Total national/regional population vulnerable to this/these disaster(s) is ________________________

Percent of population vulnerable ____________

Factor 1 Score

1 Zero to 5 percent

2 6 to 15 percent

3 16 to 30 percent

4 31 to 50 percent

5 51 to 100 percent

FACTOR 2: FREQUENCY OF DISASTERS

History of this/these disasters in the country/region, since 1960, except earthquakes, tsunamis, and volcanoes since 1900

Disaster No. 1: Year ______ Disaster type _________
Location __________ Comment _________________________

Disaster No. 2: Year_____ Disaster type _____
Location _______________ Comment ______________________

Disaster No. 3: Year ______ Disaster type _________
Location __________ Comment _________________________

Disaster No. 4: Year ______ Disaster type _________
Location __________ Comment _________________________

Disaster No. 5: Year ______ Disaster type _________
Location __________ Comment _________________________

Disaster No. 6: Year ______ Disaster type _________
Location __________ Comment _________________________

Disaster No. 7: Year ______ Disaster type _________
Location __________ Comment _________________________

Disaster No. 8: Year ______ Disaster type _________
Location __________ Comment _________________________

Factor 2 Score

1 Very infrequent, once in more than 50 years

2 Infrequent, once in 21 to 50 years

3 Moderately frequent, once in 11 to 20 years

4 Very frequent, once in 2 to 10 years

5 Extremely frequent, once in 2 years

FACTOR 3: IMPACT OF DISASTERS

Historically, what has been the impact of the disaster on deaths, injuries, property and infrastructure, and socio- economic development?

Disaster No. 1: No. of people killed ______________

No of people injured ______________________________

$ infrastructure damage ______________ Socio- economic development

impact ____

Disaster No. 2: No. of people killed ______________

No. of people injured ____________________

$ infrastructure damage ______________ Socio- economic development

impact ____

Disaster No. 3: No. of people killed ______________

No of people injured ______________________________

$ infrastructure damage ______________ Socio- economic development

impact ____

Disaster No. 4: No. of people killed ______________

No. of people injured ____________________

$ infrastructure damage ______________ Socio- economic development

impact ____

Disaster No. 5: No. of people killed ______________

No of people injured ______________________________

$ infrastructure damage ______________ Socio- economic development

impact ____

FACTOR 3: IMPACT, CONTINUED

Disaster No. 6: No. of people killed ______________

No. of people injured ____________________

$ infrastructure damage _______________ Socio- economic development impact ____

Disaster No. 7: No. of people killed ______________

No of people injured ______________________________

$ infrastructure damage _______________ Socio- economic development impact ____

Disaster No. 8: No. of people killed ______________

No. of people injured ____________________

$ infrastructure damage _______________ Socio- economic development impact ____

Summarize the historical impact of the threat on:

	Low		Medium		High
Deaths	1	2	3	4	5
Injuries	1	2	3	4	5
Property	1	2	3	4	5
Socio -econ. Dev.	1	2	3	4	5

Total of circled scores: ____________

Factor 3 Score

1 Total score of 4 to 6

2 Total score of 7 to 10

3 Total score of 11 to 13

4 Total score of 14 to 16

5 Total score of 17 to 20

FACTOR 4: DISASTER POTENTIAL

What is the probability, established through hazards vulnerability mapping and interviews with experts, that the disaster might occur in the next 10 - 20 years?

Source of data:

Factor 4 Score

1 Low

3 Medium

5 High

GUIDANCE FOR FACTORS 5 AND 6: Prior to completing the factor scores for 5 and 6, identify from existing OFDA documentation a Logical Framework for the activity. If none exists, construct one as completely as possible based upon review of existing documentation and interviews.

FACTOR 5: RELATIONSHIP BETWEEN INPUTS AND OUTPUTS

Drawing upon the Logical Framework, complete a matrix comparing planned/actual inputs and outputs:

Input	Planned	Actual
Equipment:		
Supplies:		
Personnel:		
Training:		
Other:		

Output	Planned	Actual
Trainees		
Institutional Strengthening		
Research		
Communic./Monitoring Systems		
Information Shared		
Other		

____

Factor 5 Score

1 Poor

2 Below average

3 Average

4 Above average

5 Outstanding

FACTOR 6: RELATIONSHIP BETWEEN OUTPUTS AND PURPOSE

Did the documentation contain a clear statement of the activity's Purpose, or were you able to formulate one?

Yes No

If no, score this factor as 1.

If yes, is the relationship between Output(s) and Purpose clear?

Yes No

If no, score this factor as a 2.

If yes, to what degree has this relationship actually happened?

Poor relationship between planned and actual achievement of Purpose, score 3

Moderate relationship between planned and actual achievement of Purpose, score 4

High relationship between planned and actual achievement of Purpose, score 5

Factor 6 score

1 Unclear statement of objectives

2 Unclear relationship

3 Low relationship

4 Moderate relationship

5 High relationship

FACTOR 7: TRAINING

If training is a feature of the activity, complete the following:

Were specific training needs identified at the time of activity design?

No, not at all   Yes, minimal   Yes, moderate

Yes, thoroughly

Were people trained? Yes No If yes how many...

Overseas, individually _____

Overseas, in a group ________

In-country, in a group_______

Total _______________

What was the subject matter? ______________________________________

Range of person- days/months of training

Shortest _____ days months Longest ______ days months

Average duration of training _____ days months

Total training delivered ________ days months

If possible, calculate the costs per person-month of training by major categories:

Long term, individual $ __________/ month

Long term, group $ __________/ month

Short-term, individual $ __________/ month

Short-term, group $ __________/ month

FACTOR 7: TRAINING, CONTINUED

Did the training meet the identified needs?

Not relevant, no training

Not relevant, no needs identified

Yes, slightly because ______________________________

Yes, moderately because ______________________________

Yes, fully because ______________________________

How, if at all, did the activity training affect emergency management in the host country?

No training affects can be specified

Affects in the following ways:

1. ______________________________

2. ______________________________

3. ______________________________

<u>Factor 7 Score</u>

1 Poor

2 Below average

3 Average

4 Excellent

5 Outstanding

FACTOR 8: FINANCIAL SUSTAINABILITY

Did the activity design calculate recurring costs?

Yes No

If yes, how were they to be initially met?

Host government budget________

Within OFDA activity funding________

PVO________

Other donor________

Other________

Is there a record of decreasing external dependency on recurring costs?

Yes No

What percent of recurring costs needs is being financed by the implementing agency?

< 25%________

25-50%________

50-75%________

75-90%________

> 90%________

Factor 8 Score

How would you rate the implementing agency's past performance and future prospects for financial sustainability?

1 Poor

2 Below average

3 Average

4 Excellent

5 Outstanding

FACTOR 9: INSTITUTIONAL SUSTAINABILITY

If the activity was intended to improve institutional capacity/sustainability, what aspects were emphasized?

Technical capacity____

Administrative____

Managerial____

Planning____

Other____

What type of assistance was provided?

Training

Long term (> 6 months)__________

Short term (up to 6 months)_________

Technical Assistance

Long term advisor (> 6 months)__________

Short term advisor (up to 6 months)_________

Conference/Workshop_____________

Other_________________

Was the activity based upon a needs assessment or an institutional development plan?

Yes No

What is the relationship between the activity activities and desired institutional improvements?

Realistic________ Overambitious________

Poor _______ Good ________ Excellent ________

Has the organization shown its ability to operate with reduced dependency on expatriate technical assistance?

Yes No

FACTOR 9: INSTITUTIONAL SUSTAINABILITY, CONTINUED

If yes, cite examples____

____

____

What is the probability that the organization(s) will become increasingly sustainable?

0-25%______

25-50%_____

50-75%_____

75-100%_____

What is the organization's record in moving toward institutional sustainability?

Factor 9 Score

1 Poor

2 Below average

3 Average

4 Excellent

5 Outstanding

FACTOR 10: ACTIVITY MANAGEMENT

Was the activity, whether solicited or not, considered because it was in accord with a generally agreed upon theme or priority of OFDA?

Yes No

Was the proposed activity compared by some organized means with other activity opportunities?

Yes No

Was the proposal reviewed by an appropriate range of staff and other persons with specialized knowledge or expertise?

Yes No

In the process of review and approval, was it ensured that the proposal indicated clearly the rationale for the activity, and expectations regarding objectives, budgets, timeliness, and implementation actions?

Yes No

Were approval of the activity and subsequent contract actions done expeditiously?

Yes No

Did OFDA ensure that the implementing agency regularly provided information and reports concerning the status of the activities?

Yes No

Is there evidence that OFDA regularly read and circulated information concerning activity implementation and routinely provided feedback to the implementing agency?

Yes No

Were funds made available on a regular and timely basis, and expenditures tracked?

Yes No

FACTOR 10: ACTIVITY MANAGEMENT, CONTINUED

During the implementation period, was the activity visited by an OFDA staff member?

Yes No

During implementation, was a formal evaluation or mid-course review conducted?

Yes No

Factor 10 Score

1 Poor activity management (1- 2 Yes)

2 Inadequate activity management (3- 4 Yes)

3 Adequate activity management (5- 6 Yes)

4 Excellent activity management (7- 8 Yes)

5 Outstanding activity management (9- 10 Yes)

FACTOR 11: ACCEPTABILITY

Is the activity financed by entities other than OFDA?

Yes No

If yes, by who and what percentage?

______ Host Government

______ USAID Mission

_____ Other

Was the Host Government aware of the activity prior to its implementation?

Yes No

If Yes, did the host government have the opportunity to review and comment on the activity's design and purpose prior to its implementation?

Yes No

Was the USAID mission aware of the activity prior to its implementation?

Yes No

If yes, did the mission have the opportunity to review and comment on the activity's design and purpose prior to its implementation?

Yes No

Have any of the implementing agencies expressed hesitation concerning the utility or design of the activity?

Yes No

If yes, please describe? ______________________________

Was this communicated to OFDA? ______________________________

FACTOR 11: ACCEPTABILITY, CONTINUED

Rate the acceptability of the activity to the key organizations using the following standards:

1 = Opposed
2 = Skeptical/ unenthusiastic
3 = Ambivalent to mildly supportive
4 = Generally supportive
5 = Fully and actively supportive

OFDA/Regional Advisor	N/A	1	2	3	4	5
USAID Mission	N/A	1	2	3	4	5
Host Government	N/A	1	2	3	4	5
NGO __________	N/A	1	2	3	4	5
Other _______	N/A	1	2	3	4	5

Total of above scores ________________

<u>Factor 11 score</u>: Average of the above scores, rounded to nearest whole number

1 2 3 4 5

FACTOR 12: FOLLOW-ON ACTIVITIES

Did the initial activity design envisage follow-on activities?

Yes No

If No, do not complete this section.

Has a follow-on activity been initiated?

Yes No

If Yes, how is it funded? ______________________________

If funded with non-OFDA funds, did the activity play a pivotal role in encouraging the investment of non-OFDA funds?

Yes No

Is the follow-on activity successfully building upon the successes and lessons learned in the initial activity?

Yes No

Factor 12 Score

How would you rate the relationship (programatic and financial) between the initial and the follow-on activity?

1 No discernable relationship

2 Some minor relationship

3 Moderate relationship

4 Strong relationship

5 Obvious clear relationship

FACTOR 13: COST- EFFECTIVENESS

I. Costs

For single-donor activity:

A. OFDA contribution $ __________

B. Host Govt. contribution $ __________

C. Recurrent costs funded by OFDA $ __________

TOTAL OFDA ACTIVITY COST, (A+C) $ __________

For multi-donor activity:

A. OFDA contribution $ __________

B. Other donors' contributions $ __________

C. Host Govt. contribution $ __________

D. Recurrent costs $ __________

E. Percentage of total project costs funded by OFDA X total recurrent cost $ __________

TOTAL OFDA ACTIVITY COST (A+E) $ __________

II. Comparative Cost

This activity is in threat class __________

Average cost of comparable activities in this threat class financed by OFDA is

$__________ (An Annex contains comparative cost data by threat)

OFDA cost in this activity $ __________

FACTOR 13: COST-EFFECTIVENESS, CONTINUED

Compared to comparable activities, this one is:

1 Greater than 20% below the average OFDA cost

2 5% to 20% less than the average OFDA cost

3 5% less than to 5% more than the average OFDA cost

4 5% to 20% greater than the average OFDA cost

5 Greater than 20% above the average OFDA cost

This number is the denominator in the Cost-Effectiveness Ratio.

III. Aggregate Effectiveness

Enter the total of all other factor scores (from the tabulation sheet)

____

Calculate the average of these scores (to one decimal place)

____

This number is the numerator in the Cost-Effectiveness Ratio.

IV. Cost- Effectiveness ratio

AGGREGATE EFFECTIVENESS
----------------------- = ----------
COMPARATIVE COST

Note: C-E ratios of >1 will indicate relative degrees of comparative cost-effectiveness.

C-E ratios of <1 will indicate relative degrees of lack of comparative cost-effectiveness

FACTOR 13: COST-EFFECTIVENESS, CONTINUED

V. Possible adjustments to C-E Ratio

For activities which have incurred a threat since their completion, consider the following:

Deaths: can it be said that any deaths were avoided (or lives were saved) as a result of this activity?

Yes No If yes, how many?________________________

Comment ____

Deaths adjustment score

1 Very unlikely that this activity saved lives as a result of disaster

2 Might have had some indirect contribution to saving lives

3 Probably saved a few lives

4 Probably contributed to saving hundreds of lives

5 Clearly contributed directly to saving thousands of lives

Injuries: can it be said that any injuries were avoided as a result of this activity?

Yes No If yes, how many?________________________

Comment ____

Injuries adjustment score

1 Very unlikely that this activity avoided injuries as a result of disaster

2 Might have had some indirect contribution to avoiding injuries

3 Probably avoided a few injuries

4 Probably contributed to avoiding hundreds of injuries

5 Clearly contributed directly to avoiding thousands of injuries

FACTOR 13: COST-EFFECTIVENESS, CONTINUED

Property: can it be said that property was saved as a result of this activity?

Yes No If yes, $ value ______________________

Comment ______________________

Property adjustment score

1 Very unlikely that this activity saved property a result of disaster
2 Might have had some indirect contribution to saving property
3 Probably saved some property
4 Probably contributed to saving substantial property
5 Clearly contributed directly to saving a great deal of property

Development: Can it be said economic development was fostered (or negative impacts avoided) as a result of this activity?

Yes No If yes, how?______________________

Comment ______________________

Development adjustment score

1 Very unlikely that this activity avoided negative developmental impacts from disasters
2 Might have had some indirect contribution to avoiding negative impacts of disasters
3 Probably avoided some negative impacts of disasters
4 Probably contributed to development and avoided negative impacts of disasters
5 Clearly contributed directly to a great deal of development and avoided negative impacts of disasters

TOTAL OF ABOVE 4 ADJUSTMENT SCORES __________

<u>Overall adjustment score</u> (based on total of 4 scores)

1	4- 6
2	7- 9
3	10- 14
4	15- 17
5	18- 20

CASE STUDY SCORE SHEET

Case Study Number _______

Activity Name ____

Country ____

Factor 1: Percent of population vulnerable _______

Factor 2: Frequency of disasters _______

Factor 3: Impact of disasters _______

Factor 4: Disaster probability _______

Factor 5: Inputs-Outputs _______

Factor 6: Outputs - Purpose _______

Factor 7: Training _______

Factor 8: Financial Sustainability _______

Factor 9: Institutional Sustainability _______

Factor 10: Activity Management _______

Factor 11: Acceptability _______

Factor 12: Follow-On Activities _______

SUB-TOTAL (For C-E calculation) _______

Factor 13: Cost-Effectiveness _______

SUMMARY OF INTERVIEWS

Name 1 ______________________________

Title ____________________ Date ____________

Location ____________________ Duration ________

Interviewer ____________________

Name 2 ______________________________

Title ____________________ Date ____________

Location ____________________ Duration ________

Interviewer ____________________

Name 3 ______________________________

Title ____________________ Date ____________

Location ____________________ Duration ________

Interviewer ____________________

Name 4 ______________________________

Title ____________________ Date ____________

Location ____________________ Duration ________

Interviewer ____________________

Name 5 ______________________________

Title ____________________ Date ____________

Location ____________________ Duration ________

Interviewer ____________________

ANNEX 8

CASE STUDY OUTLINE

I. Introduction

Contextual framework of study: country; what study encompasses; done by whom; major international actors.

II. OFDA Activity or Intervention

A. Project Context

- Profile of Study Area: demography, geography, economy
- Threat and Risk to People: history of disasters, type and impact
- Related Activities Prior to OFDA Project: host country, USG, other donors

B. Project Description

- Planning Process - rationale for project; historically and politically
- Project components and objectives using Logical Framework methodology
- Implementation Events
- Present Status

C. Analysis of Effectiveness

- Planning and project design
- Resource Allocation
- Implementation/operations
- Sustainability; financial and institutional

III. Case Study Conclusions

IV. Considerations for Future

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OFDA DISASTER RESPONSES DURING THIS STUDY

Country	Disaster	Declaration Date
Korea, Rep	Floods	07/31/89
Angola	Displaced Persons	07/31/89
Burma	Fire	08/03/89
Indonesia	Earthquake	08/07/89
China, Peoples Rep.	Floods	08/10/89
Philippines	Floods	08/11/89
Mali	Floods	08/25/89
Ghana	Floods	09/01/89
Antigua/Barbuda, Montserrat,	Hurricane Hugo	09/19/89
St. Kits/Nevis/ Anguilla Dominica	Hurricane Hugo	09/27/89
Philippines	Typhoon (Dan/Saling)	10/12/89
South Africa	Food Shortage	10/13/89
Angloa	Displaced Persons	10/13/89
Ethiopia	Drought	10/14/89
Sudan	Civil Strife	10/19/89
Mozambique	Civil Strife	10/27/89
Thailand	Typhoon (Gay)	11/06/89
Algeria	Earthquake	11/16/89
El Salvador	Displaced Persons	11/17/89
Yugoslavia	Mine Accident	11/21/89
Philippines	Emergency	12/04/89
Colombia	Civil Strife	12/15/89
Rwanda	Food Shortage	12/15/89
Panama	Emergency	12/21/89
Romania	Civil Strife	12/26/89
Liberia	Displaced Persons	01/16/90
Cote D'Ivoire	Displaced Persons	01/17/90
Somalia	Civil Strife	01/22/90
Madagascar	Cyclone	01/24/90
Tunisia	Floods	01/26/90
Indonesia	Floods/Landslides	01/29/90
Paraguay	Floods	02/01/90
Guinea	Displaced Persons	02/05/90
Western Sarnoa	Cyclone Ofa	02/05/90
Uganda	Epidemic	02/06/90
Burma	Fires	02/08/90
Lebanon	Civil Strife	02/13/90
Tuvalu & Tonga	Cyclone Ofa	02/14/90
Turkey	Accident	02/16/90

STRATEGIC PLANNING EVALUATION STUDY
OFDA
NON-RELIEF ACTIVITIES
VOL. II
CASE STUDIES

February 26, 1990

Submitted to:

Mr. Barry Heyman, OFDA

MANAGEMENT SYSTEMS INTERNATIONAL

600 Water Street S.W., NBU 7-7
Washington, D.C. 20024

telephone (202) 484-7170
telex: 4990821MANSY fax (202) 488-0754

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7 Peru - Adobe Building Testing - Phase II
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CASE STUDY 1

JAMAICA: NATURAL HAZARDS MANAGEMENT PROGRAM

SUMMARY

Begun in 1981, this activity was implemented through three contracts to support the institutional development of the nascent Jamaican Office of Disaster Preparedness (ODP). Initially the effort included .... "designing damage assessment procedures, compiling existing information on essential material and personnel resources for emergency response, and setting forth interim emergency response procedures to guide government agencies in the event of an emergency." The final contract was to identify and survey areas of high vulnerability in Jamaica and to develop emergency action plans and mitigation strategies for those areas.

The series of contracts achieved their objectives and played a significant role in initially establishing the ODP which has shown itself to be an office capable of coordinating the resources of various government ministries involved in preparedness and relief.

$214,374 FY 1981-1983

INTRODUCTION

This case study examines the Jamaican Natural Hazards Management Program implemented in the early 1980s. The information upon which this case study is based comes from documentation produced by the program and from interviews with the chief of the program implementation team, Mr. Ralph Fields. A field visit to Jamaica was unable to uncover any information concerning the program.

OFDA ACTIVITY

Project Context

Jamaica has often been devastated by natural disasters. The island nation is situated in one of the world's most active hurricane regions. In 1988 Jamaica was struck by Hurricane Gilbert which resulted in 49 deaths and economic damages of approximately $1 billion. Prior to Gilbert, at least 14 major hurricanes have hit Jamaica in the past 100 years.

Jamaica is situated in an active seismic area. In modern history, Jamaica has twice been affected by major earthquakes. Earthquakes in 1692 and 1907 were responsible for over 3000 deaths. The 1692 earthquake triggered a massive submarine landslide and submerged nine-tenths of the city of Port Royal. Kingston is built on alluvium soil which would amplify seismic wave intensify should an earthquake occur.

Flooding is also a constant threat. Severe flooding occurred in 1979 and necessitated the relocation of the entire town of New Market. The town has since been rebuilt on higher ground after having nearly all of its livestock and crops destroyed due to being under water for nearly six months.

The Government of Jamaica (GOJ) recognized the detrimental impacts of disasters which have led to loss of life and have negated the progress of development efforts. Therefore, in 1980 the Office of Disaster Preparedness and Response Coordination (ODP) was created which reports directly to the Office of the Prime Minister.

PROJECT DESCRIPTION

Rationale

In 1979 Jamaica was devastated by a hurricane and severe flooding. In coordinating a response to these events, the GOJ realized that a full time office was necessary to coordinate disaster response. Once created, ODP's first task was to establish its own internal policies and procedures. This included designing a national disaster response structure that extended from the Prime Minister to the parish level coordinators.

Objectives and Components

GOAL: Reduce the impact of natural disasters in Jamaica on deaths, injuries, and property damage.

PURPOSE: Improve the GOJ's ability to respond to, prepare for, and mitigate the effects of disasters as measured by: a) response time, b) effectiveness of response.

OUTPUTS:

1. Strengthen the ODP by developing operational capabilities and proper operating procedures.

2. Identification and mapping of vulnerable areas of Kingston and Montego Bay metropolitan areas (Risk and Vulnerability Assessment and Institutional Analysis).

3. Development of a comprehensive natural hazards risk management program including a) documenting resources available within the GOJ and establishing formal responsibilities for government ministries, and b) developing emergency evacuation plans for high risk areas.

INPUTS: 1. Technical Assistance (Ralph M. Fields Associates)

2. GOJ staff time and office space.

3. Three OFDA contracts totaling $214,374.

Implementation Events

The project's initial focus was to establish procedures for the ODP to become operationally responsive. Once initial procedures were established, the second phase of the project was to establish linkages between the ODP and other government organizations so that an integrated disaster planning and response strategy could be developed and institutionalized. It was necessary for the ODP to work closely with other government ministries since the ODP itself had relatively few resources. The final phase -- and third contract -- was to identify and survey high disaster vulnerability areas of Jamaica and to develop mitigation strategies for those areas; this study focused on the areas of Kingston and Montego Bay.

Initially the program's effort included ..."designing damage assessment procedures, compiling existing information on essential material and personnel resources for emergency response, and setting forth interim emergency response procedures to guide government agencies in the event of an emergency." Standardized reporting formats were developed including damage assessment reports, mitigation reports, recovery needs, situation reports, and critical system damage reports. In addition, an organizational chart was developed and responsibilities defined.

In developing operational and planning procedures it was necessary for the ODP to coordinate with other government ministries. The ODP documented the resources available within each ministry and cooperatively established formal responsibilities for the various government ministries. To document the availability of resources, an information storage and retrieval system was developed.

The final contract identified and mapped high risk areas of Kingston and Montego Bay and then developed plans to mitigate future disasters in those areas. Specific policies and program measures followed the examination of three categories of hazard mitigation strategies. The three categories examined were:

"1. Nonstructural measures to reduce susceptibility to damage (e.g., regulation of building construction on flood plains and in landslip hazard areas)."

"2. Structural measures to reduce damage impact (e.g., construction of sea walls and hurricane barriers)."

"3. Interim measures to reduce disaster impacts (e.g., flood warning and temporary emergency evacuation)."

ANALYSIS OF EFFECTIVENESS

The project appears to have met its stated goals and objectives. Although operational procedures were established, most have since been revised. This is to be expected since the ODP is a dynamic office and contract implementation was begun in 1981.

The work of Ralph Fields and Associates is well documented and appears to have met all contractual obligations in a manner acceptable to all of the parties involved. An information system was set-up and reporting formats were established. A comprehensive reporting and emergency management system was designed. This detailed the responsibilities of all those having a role in the national disaster emergency plan, from the Office of the Prime Minister down to the parish disaster coordinators.

Part of the specific strategies identified to mitigate disasters were the development of emergency evacuation plans. In Montego Bay these emergency plans were activated twice during the early 1980s when the area was threatened by hurricanes. As specified in the plans, those at high risk were evacuated to designated hurricane shelters.

Likewise, the emergency evacuation plan developed for the Portmore area of Kingston was tested several times in simulations jointly managed by the army and the police. It could not be determined if the evacuation plan was ever activated in response to an actual threat.

Hazard mitigation recommendations were also made for rural areas near Montego Bay. These specific recommendations included redirecting roads and strengthening highway embankments to avoid landslide hazards. However, these studies were conducted at the parish level and the local government lacked the resources to implement the recommendations.

RECOMMENDED ACTIONS

None. The project terminated in 1983.

STRATEGIC IMPLICATIONS

- Use of highly qualified time-limited technical support such as that provided to the ODP serves as a model for nascent disaster response offices in other countries.
- Recommendations resulting from OFDA financed activities need systematic follow-up over both the short and long term.
- Host government commitment, including financial commitment, is crucial to having OFDA's technical support sustained over the longer term.

CASE STUDY 2

DOMINICAN REPUBLIC: SEISMIC NETWORK

SUMMARY

In mid-1984 OFDA approved a grant for Columbia University's Lamont-Doherty Geological Observatory (LDGO) to install a seismic network in the Dominican Republic. The network was to record and analyze data that could be used to produce hazard maps identifying the areas of the country most vulnerable to earthquakes. The LDGO was responsible for installing the necessary data gathering equipment, generating initial reports, and training the counterpart staff of the Autonomous University of Santo Domingo (UASD) to be capable of independently managing the activity after a three year period.

OFDA wisely discontinued funding of the project after only two years. The UASD unit dealing with the network was subsequently reorganized and provided new leadership. USAID/DR then agreed to provide modest additional assistance. The network is now operating effectively. Seismic information is available to policy makers and planners for use in designing infrastructure and development projects.

$755,072 FY 1984-1985

INTRODUCTION

In July, 1983 Columbia University's Lamont-Doherty Geological Observatory (LDGO) signed a two month grant with OFDA to conduct a feasibility study on the development of an earthquake monitoring system for the Seismological Institute of the Autonomous University of Santo Domingo (UASD). The LDGO was the natural choice to conduct the feasibility study because its staff had been installing, managing, and training others to manage seismic networks in the Caribbean since 1975.

Following the feasibility study, OFDA approved a grant for the LDGO to install a seismic network in the Dominican Republic in June, 1984. The justification for the installation was that the network would generate data to be used to produce hazard maps identifying the areas of the country most vulnerable to future earthquakes. This information could in turn influence the development of land use and zoning strategies and give development planners the information required to avoid promoting development projects in locations of potentially destructive seismic activity.

OFDA ACTIVITY

Project Context

The Dominican Republic comprises two-thirds of the Caribbean island of Hispaniola and has a population of approximately 6.2 million. The Dominican Republic is the second largest country in the Caribbean. Agriculture is the country's most important economic activity. However, the agricultural sector is highly vulnerable to outbreaks of pests and diseases, weather hazards (particularly hurricanes and floods), and fluctuations in world prices for sugar, coffee, cocoa, and tobacco, which account for about 90% of total agricultural exports. Recently tourism and the development of a free trade zone have made important contributions to economic growth.

The most common and consistent hazard facing the Dominican Republic is the annual threat of hurricanes. Over 130 hurricanes have hit the country in the past 100 years. In 1979 two strong hurricanes struck within five days causing over 2000 deaths and affecting about 23% of the population. Including damage from Hurricane Allen the following year, total damages of the three hurricanes equaled U.S. $945.8 million. This represented about 15.5% of the nation's gross domestic product.

The Dominican Republic is also at risk from earthquakes. The country lies within the Caribbean earthquake zone on the northern edge of the Caribbean Plateau. Two major faults run east to west across the country. The country's last major earthquake occurred in 1946 and registered over 8.1 on the Richter scale. Statistical data in the Dominican Republic indicates a 50 year cycle of seismic activity which means a major earthquake might occur again around 1996. Past earthquakes have caused significant structural damage but have not resulted in catastrophic loss of life.

The country also suffers nearly yearly damage from the less dramatic hazards of floods, forest fires, deforestation, and erosion.

> "The island of Hispaniola is extremely vulnerable to natural disasters due to its location and topography. There is a tendency in the Dominican Republic to blame all environmental problems on Hurricanes David and Frederick, yet these natural disasters exacerbated man-induced problems. The hurricanes did cause major flooding, but the Cordillera Central watersheds were already seriously degraded before 1979, and this long-term abuse of land and water resources amplified the consequences of the natural disasters."
>
> "Periodic natural disasters are unavoidable, but other factors can be changed. Rapid population growth and resultant pressures on scarce land resources, both in marginal urban areas and mountain slopes, have seriously damaged the natural resource base and have led to settlements on unsafe lands."[1]

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[1] Dominican Republic: A Country Profile, Office of U.S. Foreign Disaster Assistance, Washington, D.C., 1984, p. 41.

Prior to OFDA's funding no earthquake hazard assessment programs were active in the Dominican Republic. However, the LDGO had been installing equipment to collect seismic data in several other Caribbean islands. In past years, the USGS supported the LDGO in the operation of the N.E. Caribbean Seismic Network. That seismic network included Puerto Rico, Virgin Islands, British Virgin Islands, and the Northern Lesser Antilles.

PROJECT DESCRIPTION

The Dominican Republic Seismic Network activity intended to provide the country with an earthquake monitoring capability leading to future hazards mapping. The system was record seismic data that would allow earthquake hazard maps to be produced. These maps would then be used by development planners to influence the location and design of the country's development activities in order to mitigate the impact of future natural events. Although the project's intent was to establish an operational network and provide information to development planners, the mechanism to transfer analyses of the data (i.e., threat) depended entirely on government and university officials.

The grant was implemented by the LDGO in cooperation with the Seismological Institute of the UASD. The LDGO was responsible for installing the necessary data gathering equipment, generating initial reports, and training the counterpart staff of UASD to be capable of independently managing the activity after a three year period. OFDA provided funding for the LDGO to refurbish and install the needed seismic monitoring equipment. The original idea was to use older equipment and spare parts in order to insure it would be serviceable by host country engineers. Ultimately new equipment was also purchased. Expenses for the University staff's salaries, as well as operating expenses (administrative, electrical, and overhead), were the responsibility of UASD.

In addition to UASD, a Memorandum of Understanding was signed between the LDGO, the Secretariat of State for Public Works and Communications, the Civil Defense and the Dominican Electricity Corporation. The memorandum stipulated that the above organizations would provide office space and staff support; technical assistance and building renovations; and operational support throughout the life of the project. The host country organizations were to support the project's operation and maintenance as follows:

72% Autonomous University of Santo Domingo
25% Secretariat of State for Public Works
3% Civil Defense

This multi-party agreement was principally written and coordinated by Ms. Mila Brooks through a PSC agreement with OFDA. The original life of the activity was to be three years; however, follow-up issues were not addressed. Implementation was begun in June 1984. The project's main data synthesizing computers were located at the UASD, and a network of 12 seismic data collection units were dispersed throughout the country to feed data to these computers.

Objectives and Components

The following schematic Logical Framework shows how the activity was designed.

GOAL: Develop a body of scientific knowledge to serve as the basis for the development of reasonable land use plans and building codes for the Dominican Republic and to develop an institutional framework for continued hazard assessment.

PURPOSE: Improve host country understanding of their earthquake threat by establishing a central seismic data collection facility and network of instruments throughout the country to monitor and locate earthquakes.

OUTPUTS: 1) UASD staff ability to maintain daily operation of seismic network.

2) Computer system installed and generating basic seismic data on a regular basis.

3) Seismic data shared with several seismic network institutions operating in the Caribbean basin via a quarterly "Seismic Bulletin" produced by UASD staff.

INPUTS: 1) Central processing computer and 12 seismic stations delivered, installed, and functioning.

2) Donated building facilities and staff salaries provided by UASD.

3) $755,072 contribution by OFDA over 2 year period.

4) U.S. $40,000 (approximately/includes in-kind contributions) by Government of Dominican Republic and UASD annually since 1984.

5) Two U.S. expert technicians assigned to project from June, 1984 to September, 1986 to help install the seismic network and provide training to UASD staff.

Implementation Events

When reviewing the implementation events of this project a clear delineation was made between OFDA's management of the grant and the project's internal management by the LDGO.

Project implementation began in June, 1984. Problems were encountered even before the U.S. experts arrived in Santo Domingo. The expatriate staff members who were to live in Santo Domingo for the three year life of the project delayed their arrival because the installation of electrical outlets and bathroom renovations in the host facility were incomplete. The delay prompted numerous communications requesting that the process be expedited.

Once these initial problems were solved and the LDGO staff were resident in Santo Domingo, a new and continuing atmosphere of non-cooperation began to flourish. Shortly after arriving in Santo Domingo, the expatriate director wrote "the UASD has provided a vehicle for use in the program. The van we have been provided is not safe because of its age and obvious signs of disrepair. The breakdown of the van led to only three days work in three weeks... We have borrowed office equipment from LDGO so that we have usable offices. Although a telephone has been provided, the $RD200/month budget for calls does not exist. The line is frequently out of order because of failure to pay bills."

As the project continued an increasingly hostile personality conflict between the LDGO project director and his Dominican counterpart developed. Accusatory letters were written by both the U.S. and Dominican project managers. These were directed to various government officials, both U.S. and Dominican. The project also suffered from technical difficulties (the main computer burned-out and securing a replacement delayed the project for several months). In many ways the host government was unable and unwilling to meet the terms of the agreement they had signed. There were difficulties in obtaining public works funds, the UASD was unable to provide managerial and administrative support at the level expected, and the civil defense never delivered a generator as agreed to (a generator was eventually delivered but shortly thereafter was confiscated by the Director of the Civil Defense).

In September, 1986 the LDGO Project Manager resigned. The following month, due to personality conflicts and the inability of UASD to uphold its commitments to the activity, OFDA discontinued funding for the project one year prior to its scheduled completion date. The total cost of the activity was reduced from U.S. $1,034,243 to $755,072. This series of events led to a change in the project's Dominican director as the University made a determined effort to continue with the project despite the termination of OFDA funding. Despite the project's management problems the necessary equipment was installed and functioning.

Present Status

After OFDA funding terminated, Mr. Luis Odonel Gomez assumed management of the institute following the change in administration at UASD. He has been its Director for nearly three years. The previous Director's behavior was largely responsible for OFDA's decision to discontinue support for the Institute. After one year of functioning without external support, Mr. Gomez obtained counterpart funds from the USAID/DR and set about rebuilding the badly deteriorated Institute. At present, the network of sensors and the computerized control system are working smoothly, and detailed seismographic reports are produced regularly. USAID agreed to support the Institute with a three year local currency grant of U.S.$190,000. USAID support will end in early 1990. Mr. Gomez estimates that for the project to continue US$ 15,000 - 20,000/year in external assistance will be required. This amount is in addition to the support currently provided by the University, funds which are largely used for periodic equipment maintenance and replacement.

USAID/DR's decision to continue funding the seismic network with U.S. owned local currency was based on two considerations: 1) the favorable change in management; and 2) the large investment by OFDA seemed to justify a relatively small infusion of money to keep the project alive. A USAID memorandum discussing the maintenance of the seismic network, dated May 24, 1988, stated:

> "AID invested over $1 million[2] in earthquake monitoring equipment through an OFDA project between 1984 and 1986. [There were] two long term technicians from Lamont-Doherty Geological Laboratory of Columbia University working at ISU for two years."
>
> "ISU sends us periodic reports of earthquake activities and generally keeps USAID informed of progress at ISU."
>
> "We should, therefore, concur in this activity and approve the RD$190,220 to maintain our investment."

The current MDRO in Santo Domingo, who has been in the position for one year, inherited the project and thus was initially obligated to continue management oversight. However, he has reached the conclusion that the project is not a continuing priority for USAID and has since made a decision to recommend that 1990 be the last year in which the project will receive USAID funding.

ANALYSIS OF EFFECTIVENESS

Project Planning and Design

Advance planning for the project was done with some care. A concerted effort was made to involve and solicit the consensus all the parties involved prior to the project's implementation. However, the project's management suffered from two major weaknesses: 1) difficulties between the expatriate manager and his Dominican counterpart, and 2) key government agencies were unable or unwilling to fulfill their commitments.

Implementation

The personality conflicts of the management team would have been difficult for OFDA management to predict. The expatriate manager had performed the project's feasibility study in the Dominican Republic and therefore was aware of the environment in which he would be working. However, part of the problem was clearly the inability of a detail oriented expatriate to make the adjustments necessary to function productively in an unfamiliar environment of limited resources. The Dominican Republic is a country with public sector financial resources stretched to their limit.

In retrospect, relying on several government institutions to supply resources to the project simply assumed too much. The Memorandum of

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[2] The sum quoted was in error. THe actual investment was $755,000.

Understanding proved to be an insufficient mechanism to assure that Dominican government organizations part with scarce resources. In addition, the expatriate director's rigid and demanding attitude did little to elicit cooperation among the project's multiple actors.

OFDA/Washington, fully aware of the problems, terminated the project after two years.

Sustainability

Although OFDA support of the project was abruptly terminated a year before its scheduled completion, a key earlier decision allowed the activity to continue. In its original design, the host institution was made responsible for covering administrative costs, local salaries and providing office space. Thus, under its capable Dominican manager, the activity continued for almost a year without external assistance, and then the local USAID Mission was convinced to provide modest additional support.

In fact, neither OFDA nor USAID/DR have addressed the issue of the project's financial sustainability. Nevertheless, because of the competence shown by the project's current director, the possibility of the project attracting future external funding seems extremely likely. Mr. Gomez is well connected in the international scientific community. Because of the need to routinely replace high technology equipment, the project will always require a reserve of hard currency. Mr. Gomez estimates that approximately U.S. $20,000/year will be required. The UASD has committed to continue to provide operating costs and salaries for those involved. Although no specific support has been promised following the termination of USAID/DR's funding, Mr. Gomez is optimistic that external funding can be secured and is actively planning an expansion of activities, including a post graduate program in geoscience, and a faculty exchange program. Because of his solid management, the system is producing regular data reports and requires a relatively small amount of funding in order to maintain a rather sophisticated and expensive seismic network, a situation potential donors may find attractive.

In conclusion, the project first supported by OFDA and subsequently by USAID/D.R. has clearly achieved its stated purpose of developing an earthquake monitoring and seismic hazard analysis capability in the Dominican Republic. Seismic data now exists upon which land use planning and building codes can be based. In addition, an institution has been developed that can, with continued donor support, continue to collect and analyze such data, and make it available to others in a position to use it in planning. However, in terms of use of the information for disaster mitigation, the network seems thus far to be having only a modest impact. The OAS is managing an OFDA funded hazards reduction program in the Dominican Republic and reports an active relationship with the UASD's Seismological Institute (see OAS case study #15). This relationship involves the integration of data generated by the Institute, as well as the collection of hazards data from other sources, to influence decisions concerning where development activities should be sited.

RECOMMENDED ACTIONS

- OFDA should re-establish contact with USAID/DR and Dominican officials to keep itself apprised of the networks technical accomplishments.

STRATEGIC IMPLICATIONS

- Seismic and other networks with technological components in which OFDA has invested face two common challenges which designers of similar future activities must grapple: 1) how to meet recurring costs and maintain or upgrade key equipment after OFDA support terminates, and 2) how to insure information generated is disseminated beyond the scientific community for use by both private and public policymakers and planners.

CASE STUDY 3

COSTA RICA: EARTHQUAKE AND HAZARDS MITIGATION PROGRAM

SUMMARY

The case study summarizes work done from September 1983 to the present to install a national seismographic network and establish an earthquake and volcano hazards mitigation program in Costa Rica. The objective of the project was to limit the impact of seismic events and volcanic eruptions through the installation of early warning equipment. The project was also intended to facilitate a speedy recovery from such events by emphasizing the preparation of the public, government agencies, and institutions in providing relief.

While designing the activity, neither OFDA nor its grantee sufficiently analyzed the relationships and activities of the numerous Costa Rican organizations operating in the volcano and earthquake sector. Thus, the critical need to support institutional development was considered of secondary importance since the project mainly focussed on technology transfer. Although a better appreciation of institutional relationships could have avoided implementation delays, the project nevertheless somewhat increased the grantee's capacity to monitor volcanic threats and assess seismic vulnerabilities.

$1,453,228 FY 1983-85, 1987-88

INTRODUCTION

The following case study summarizes work done from September 1983 to present to install a permanent national seismographic network and to begin to establish an earthquake and volcano hazards mitigation program in Costa Rica. This activity, plagued by difficulties, was one of a half dozen or so which were part of OFDA's strategy to increase earthquake hazards information and host country Seismic threat monitoring during the 1980's.

The project was initially managed by the University of California, Santa Cruz (UCSC) and later taken over by the RET Corporation (named after Raul E. Truffat, the Corporation's Founder and President). It was intended to limit impacts resulting from seismic events and volcanic eruptions through the installation of equipment that provides early warning of such events. The operations of the project were also supposed to provide assistance to facilitate a speedy recovery from such events by emphasizing the preparation of the public, government agencies, and institutions in providing relief.

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OFDA ACTIVITY OR INTERVENTION

Project Context

The relatively tiny country of Costa Rica had a population of 2,500,000 in 1987. Costa Rica is important as one the longest lived democratic regimes in the midst of the many troubled and troubling countries in Central and South America.

Costa Rica's economy depends on private enterprise and the practice of open-market policies with more than a touch of government regulation and ownership of industries such as airlines, banks, public utilities and other businesses. Agro-pastoral activities are the main basis of the economy. Thirty-one percent of the national work force and 20% of the GDP remain tied to agricultural. In the 1980's, this has been supplemented by manufacturing which has begun to contribute to employment, export earnings and a more diversified industrial base.

Costa Rica can be divided into three geographically diverse regions--the interior cordilleras, the Caribbean lowlands, and the Pacific littoral. The Republic's most notable topographical feature is its rocky central region, the series of mountain ranges traversing the country running northwest to southeast.

Five historically active volcanoes are interspersed throughout the northern Cordillera. Five more are located in the central range, where most of the population is located. Two of these--Irazu and Poas--are active. Volcanoes frequently have caused of death, displacement and economic disruption in the country.

In Costa Rica, volcanoes have historically been unjustly blamed for seismic incidents. In fact, both seismic activity and volcanic eruptions are related to the movement of two mobile crustal plates. The country lies at the juncture of the western Cocos and the eastern Caribbean plates. The Caribbean-Cocos boundary is one of the more active seismic regions in the world. Based on the high rate of slippage of these plates, Costa Rica has a very significant long-term potential for earthquakes. In addition to this threat of plate edge type temblors, Costa Rica is susceptible to large subduction quakes as well. These subduction temblors in fact are the main risk to livelihood and life, along with the volcano threat in the Central valley area around the capital. With the population heavily concentrated there, even a small temblor could cost many lives and devastate the economy by destroying crucial infrastructure and industry. For example, water and power supplies that service the area are particularly vulnerable to seismic occurrences. Only a few major aqueducts provide water for the area, and these cross fault lines. A strong earthquake could cut power and water to San Jose and four other densely settled cities nearby.

Since 1950 Costa Rica has suffered damaging quakes in 1952, 1955, 1973, twice in 1983, and in 1987. Larger earthquakes hit the country in 1841, 1910 and 1924. The consequences of these episodes would have been much more catastrophic had the towns been as heavily populated as they are today.

The volcanic mountain chains owe their existence to the same plate movements. Seven historically active volcanoes dot the mountain ranges of Costa Rica. Unlike earthquake incidents which inflict immediate destruction, the effects of a volcanic eruption can last for years after the occurrence. The eruption of Mount Irazu from March 1963 until 1965 seriously affected the Costa Rican economy. Enormous ash falls disrupted agricultural production over vast areas, and also caused significant flooding, caved in a natural dam produced through earlier accumulations of ash, and destroyed part of the town of Cartago.

In 1968, Mount Arenal erupted and has continued ever since. Serious side-effects are illustrated by that explosion. It produced lava, gas and ash and a heat wave of 800 degrees centergrade that destroyed everything and caused 100 deaths in its seven kilometer path. Arenal continues to threaten today.

For many years, Costa Rica has attracted the interest of volcanologists and seismologists. As a result, some seismic research and volcano monitoring had begun under separate, modest programs of the Costa Rican Institute of Electricity, and local universities, principally the Autonomous National University (UNA) and the University of Costa Rica (UCR). These efforts were not well equipped, staffed or operated in a coordinated manner.

In 1981, Frederick Guendal of The University of Costa Rica predicted a major seismic event in the central valley region of Costa Rica. Officials in and out of Costa Rica were skeptical of the prediction and OFDA responded to a request that U.S. experts go to Costa Rica to assess the predicted threat and sent Dr. Karen McNally of UCSC to do so. She confirmed that the threat was serious and following consultations with the USGS, OFDA established the initial UCSC project which is part of this case study.

PROJECT DESCRIPTION

Rationale

As was the case in Peru, another of the seismic networks in which OFDA invested in the early 1980's (see Case Study #4), the decision to forge ahead with installation of a modern seismic network was influenced by a forecast of incipient events. Twelve months after her visit to assess the Guendal prediction, Dr. McNally's institution, (UCSC) received an OFDA grant to install a national seismic network and train Costa Ricans in network operations and procedures.

Important to the future operations of the project, the original grant agreement stated that part of the network would refurbish equipment at the Costa Rican Institute of Electricity, and would build upon the five station network already operated by that organization. The other part of the National Network (new equipment) would be located at UNA. The grant indicated that the University of Costa Rica's (UCR) School of Engineering, the Autonomous National University (UNA) and Civil Defense Organization would be collaborating institutions.

Objectives and Components

The initial design of the project was relatively straightforward. However, no formal design framework was included in the proposal or subsequent documents.

The overall goal of the project was to "limit impacts and reduce results from seismic and volcanic eruptions through the installation of equipment that provides an early warning of such events." Also explicitly mentioned as an objective was ". . . reduction of human mortality."

A separate but related objective was "providing assistance toward a speedy recovery from the occurrence of any damage caused by an earthquake or volcano by emphasizing the preparation of the public, government agencies, and institutions providing relief."

The final objectives included: "secondary benefits" from research which would "provide Costa Rica a firm base from which to predict future events" and "enable appropriate planning . . . with regard to the location, size, and types of development throughout the country"; "reduce economic expenditures by changes in building requirements"; and "provide an important source of information for mineral exploration, water supply and power line location."

The project's purpose was ". . . the installation of a Permanent National Seismograph Network in Costa Rica and to establish a hazards reduction program in cooperation with the Government of Costa Rica."

Project outputs were:

1. Obtain and install eight new seismographic stations (to expand and upgrade existing network of seven stations to fifteen stations);

2. Install ten strong motion accelerographs to expand the existing network to twenty sites;

3. Purchase age dating laboratory equipment for volcanic risk analysis;

4. Train Costa Rican personnel to operate and maintain the networks of instruments;

5. Publish national catalogues of earthquake data and analyses;

6. Systematically develop fundamental knowledge of quakes and their relation to geological features in order to locate regions of potential hazards;

7. Assist in earthquake planning at the neighborhood, working center, and elementary and high school levels, emphasizing the self-help aspects of earthquake planning;

8. Provide tectonic maps for oil exploration, mineral exploration and analysis of vulnerability of lifelines (water, power, transportation);

9. Prepare seismic zoning maps for the national insurance company;

10. Provide travel expenses to Costa Ricans for short-term traineeships at technical conferences; and

11. Provide scholarships for Ph.D training for Costa Ricans.

Project inputs for what ultimately became known as Phase I of the project, operated by the UCSC in FY1983-FY1985, included funds totalling $1,021,181.

The project was originally designed to last three years. When OFDA and USAID/CR provided the last tranche of funds to UCSC in December 1984, however, both became aware that serious problems had arisen between UCSC and certain counterpart institutions in Costa Rica, the project was, as a result, put on hold.

Under intense criticism, the UCSC withdrew from the project in early 1985. The universities involved in Costa Rica continued the project on their own, USAID/CR contributed $20,000 to continue Ph.D scholarships in the U.S. through UCSC, and a new contractor was located. Paul Bell, on behalf of USAID/CR and OFDA; John Tomblin of UNDRO; Engineer Michael Cline, a geologist, all submitted reports during the time the project was in its transitional phase before and after the withdrawal of the UCSC. Their main task was to figure out how to better coordinate host-country participation in the project, whether or not to continue, what outputs had been produced at that time, (including what equipment had been delivered) and how a Phase II project be designed.

In August 1986, a sole source contract was awarded to the RET Corporation to continue the project. All activities to be undertaken by RET were to begin only after the signing of a Memorandum of Understanding between the counterpart institutions in Costa Rica, AID and RET. The contract with RET was to provide up to $542,000. USAID/CR, now deeply involved in the project, agreed to provide $120,000 in local currency for the program.

In October 1987, the Memorandum of Understanding was signed and project activities began anew. The new list of end of project accomplishments included:

1. Establishment of an executive committee;

2. Fully operating set of twenty telemetered seismic stations;

3. Full installation of 30 accelerographs in the central valley;

4. Permanent monitoring of eight volcanoes using tiltometers and lasers;

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5. Completion of historic compilation of volcanic sediments; a complete volcanic hazards map plotting airfall, lava and pyroclastic and lahar flows, and gas emissions; and

6. Fault maps of the central valley including zoning recommendations.

In addition to OFDA funding, USAID/CR has provided $140,000 and an estimated $500,000 was made available by the Government of Costa Rica.

Implementation Events

The projected five-year project began in September 1983. Implementation was delayed as indicated above, and the project continues as of 1989.

Dr. Guendal's 1981 prediction of an impending event of major proportions proved incorrect, as did a second prediction made in 1983 by Dr. Karen McNally, which precipitated meetings by McNally with the U.S. Ambassador, Costa Rica's President and later OFDA, and also led to several hysterical articles in Costa Rican periodicals. Second year funding was expedited by OFDA as a result.

A special task force was established in Costa Rica in September 1983 to decide what to do about the potential problem. Among other things, the committee asked Paul Bell to assess tha emergency preparedness situation. He was joined by a geophysicist from the USGS. The general conclusion was that while the possibility for an earthquake always existed, no practical short-term action was required except to strengthen all aspects of preparedness.

In December 1983, OFDA approved additional funding to McNally and the following month Bell was asked by the Costa Ricans to come as a permanent advisor. That was not possible, but Bell did visit the country five times between January and September to assist in the development of a national disaster plan, training and communications. All of Bell's work initially and during these follow-on visits was funded by OFDA.

In December 1984, UCSC submitted a proposal for an additional amount which would bring the grant to the University up to approximately $1,580,000. OFDA only added $105,000, bringing the total granted to the UCSC to its final sum of $1,021,000. This was the beginning of the end of UCSC involvement in the project. The UCSC withdrew in December 1985, and gave OFDA a final report. In May of that same year, Cline gave his assessment of the project's status and his recommendations. A contract was signed with RET in October 1985.

Present Status

Some time elapsed before full agreement was reached on the Memorandum of Understanding. It was eventually signed in October 1987. The RET contract was amended to allow for continuation during the period the Memorandum was under discussion, and beyond. By January 1989, most of the required activities were back on track and well on their way to completion.

ANALYSIS OF EFFECTIVENESS

Planning and Project Design

A potential emergency of sorts presented itself as Costa Rica and OFDA responded without full, first hand knowledge of how to get the job done other than in the purely technical sense. Certainly there was little forethought given to the complexities of local institutions that would be involved in the project. Nor did OFDA, as far as evidence indicates, use the review process to prioritize the project's objectives presented by the UCSC in its proposal. In sum, the UCSC team was left without any effective critique by the granting agency. The earthquake and volcano threat was enough to bring everybody aboard, for a project that essentially was seen as a quick technological fix that would nonetheless last for the long run.

Implementation

Once the activity was underway, essentially nobody other than the competing institutions was aware of the contentiousness between organizations that plagued it. This was due mainly to a lack of clarity in the design of the activity. For example, which institutions in Costa Rica were to do what, in what sequence, and with what relative priorities was not clear to all participants. OFDA did not monitor the project closely enough to be of use or even aware of the tremendous amount of ill will between and among the multiple parties involved in the project. USAID/CR, until later in the project, was not expected and did not wish to become involved. How could McNally satisfy the Autonomous University, the University of Costa Rica, the Institute of Electricity, the College of Engineers, and the Civil Defense Organization all at once? She could not. She and her team made choices, of course, and proceeded with implementation accordingly. She seemed to favor, in the eyes of some counterparts, one institution above others.

A memorandum written by USAID/CR staff put it this way in October 1985, as everyone was scrambling to salvage the project in which a considerable investment had already been made:

> "In the early months of 1984, the Government of Costa Rica (GOCR) became concerned about the management of the project. The Chief scientist, Dr. Karen McNally, was managing the project of UCSC, and the Costa Rican universities had little say in any of the decisions. OFDA approved a short-term grant of $102,000 to carry the project through January 31, 1985 but insisted that any new grant to UCSC be contingent upon participation by Costa Rican universities in drafting the new proposal, and in the management of the project."
>
> "At the last moment, in late January 1985, UCSC notified OFDA that they would not be submitting a new grant proposal. That decision left USAID with an incomplete project, and a myriad of problems."

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The memo went on to make the point that, "during the period when the Seismic Program was managed by the University of California, under the OFDA grant, the emphasis was on research, with little possibility for practical application to Costa Rica's needs for hazards identification, management, and mitigation." The memo argues that everybody will behave nicely under a new arrangement with RET, and the new project "assures that the appropriate agencies and authorities will be able to apply the data to real problems."

This implies that the original design was not clear or that the design was misunderstood by the UCSC group. In retrospect, both seem to be true. But the whole critical discussion of what went wrong seems to downplay the fact that the activity was inadequately designed, analyzed and monitored on the part of an absentee donor.

When this case study was being prepared, meetings with seven officials involved in the project, indicated that much of the early contentiousness that the UCSC group must have experienced years ago was still manifest. However, this time, it is directed toward RET. RET's qualifications were questioned, the fact RET had not established a full time presence was noted, that "experts" sent were not really the best in their field and sometimes had little to contribute, that finances of the project were not a matter of record, that RET did not give notice sufficiently in advance of visits. The only positive aspect was that the various institutions represented in these meetings seemed to be of one mind on such matters, and more importantly, seemed to be working together rather well to accomplish the project's overall objectives. The main concern expressed by all present was the inability to finance the system's recurring costs when RET and AID pull out.

Sustainability

On the sustainability question one unexpectedly positive outcome of the earlier difficulties was that during the hiatus of support as AID sought an alternative contractor, the institutions involved in Costa Rica made arrangements to keep the project going. University budgets were changed to support staff and some recurring expenses.

That, of course, does not guarantee the long-term sustainability of the institutions involved, or their ability to cover the costs of the equipment in the future. No one was able to respond with actual figures about what it will cost to keep the system up and running. This needs to be calculated and discussed. But, despite these concerns, the Costa Ricans are likely to keep things going for some years.

RECOMMENDED ACTIONS

- The project's recurring costs should be calculated and an understanding should be reached specifying when and by whom these costs will be met.

STRATEGIC IMPLICATIONS

- Project design should incorporate a full analysis of the relationships between institutions involved in related activities.

CASE STUDY 4

PERU SEISMIC NETWORK

SUMMARY

This seven year grant was begun in 1981 to upgrade the seismic monitoring capabilities of the Geophysics Institute of Peru (GIP). The grant was implemented by the Carnegie Institute of Washington (CI). By installing expanded or modernized networks, OFDA and scientists in the recipient country hoped to develop data indicating the state of stress and the seismic potential in order to contribute to better understanding of earthquakes. Early warning of impending events through proper location of microseisms was also an explicit hope.

The activity was not completed as designed because of political and economic circumstances. Once the overall political situations clears, the full network can be re-established and continue to provide valuable data.

$1,072,508 FY 1981-83, 1986-1987

INTRODUCTION

In the early 1980's OFDA began a series of activities related to earthquakes. Many of these had to do with upgrading the capacity of countries to monitor and document seismic activity. Peru was one such country.

By installing expanded or modernized networks, OFDA and scientists within the recipient country and elsewhere hoped to record data indicating the state of stress and the seismic potential in order to contribute to better understanding of the earthquakes, and to better prepare for future earthquakes. Early warning of impending events through proper location of microseisms was also an explicit hope in some cases such as this one.

This case study discusses the context, background and experience of OFDA in assisting the GIP, by means of a grant to the Carnegie Institution (CI) to upgrade Peru's outdated seismic network.

OFDA ACTIVITY

Project Context

Peru has a population estimated at 21,000,000 in 1988. The country lies on the central part of the Pacific Coast of South America. The country's most important legal economic activities are mining, petroleum, fishing and agriculture. In the 1980's the trade in illegal drugs began in earnest.

Peru is divided into three roughly horizontal zones:

- The coast, a semi-arid littoral of the Andes, 10 to 100 miles wide, in which 40% of Peru's people live on eleven percent of the coastal territory, mostly in shoreline cities. These cities contain most of Peru's industry and capital. Most of the coast, especially from Lima north is subject to serious earthquakes.

- The Sierra or highlands, which is 26% of Peru's land area and consists of three interconnected ranges of mountains from 60 to 200 miles wide. About 50% of Peru's population resides in this region; it contains major deposits of minerals, although most of its inhabitants are engaged in subsistence agriculture. Almost the entire region is highly seismic.

- The Selva or jungle, of tropical rain forests on undulating plains and including an extensive network of rivers. This is a vast and sparsely populated area and the only part of the country not subject to earthquakes.

Since 1900 an estimated 75,000 Peruvians have perished in natural disasters. The country experiences on the average one or two disasters annually. Although flooding, drought and mud slides do considerable damage to life and property, by far the major killer has been earthquakes. Twenty of the 56 disasters this century have been earthquakes, which killed over 69,000 people. The vast majority of these, an estimated 66,000, died in a single earthquake in May 1970. Experts estimate that about 1/3 of Peru's citizens face the risks of earthquakes.

The potential for more such deaths is high. As the Nazca plate under the Pacific moves against and sinks beneath the plate on which the continent of South America sits, earthquakes will inevitably continue to occur. The impact of these on in terms of lives, injuries and damage to the economy will depend on the Peruvians ability to understand the earthquake process and make preparations in accord with seismic probabilities, both regionally and within specific local areas.

In September 1980 OFDA began its support for the Center of Regional Seismology for South America (CERESIS). CERESIS was founded in 1965 and initially supported by UNESCO. Headquartered in Peru, with scientists and engineers from seven Andean countries as members, the purpose of CERESIS was to promote technical cooperation and scientific research of a coordinated sort among the seven member countries. OFDA's 1980 contribution was for a project titled SISRA, Seismic Risk in the Andean Region. The program's primary purpose was to compile existing data on historical seismicity and neotectonics to assess hazards in the Andean region, and to develop a model to estimate casualty and economic losses from future earthquakes. The original SISRA budget was $500,000, and was funded by means of a PASA to the USGS with major subcontracts to CERESIS for travel costs and computer software. Funding was augmented four times bringing the total cost to $1,235,000.

PROJECT DESCRIPTION

Rationale

In 1976 Chinese scientists predicted with unparalleled accuracy that the city of Haicheng was going to be hit by an earthquake. The city was evacuated and the deaths of many people were averted. It has since been determined that the prediction was more a matter of good luck than based on scientific processes that could be repeated, since during that period the Chinese made continual predictions and most were in error.

The Chinese prediction episode, and the general atmosphere surrounding the state of earthquake prediction constitute an important backdrop to the decision by OFDA to invest in the projects mentioned above and the Peruvian seismic network. Scientists thought more accurate earthquake forecasting might be possible in the near future.

A proposal submitted by the CI to OFDA of May 1981 noted in its introduction "...there has been an increasing emphasis in prediction during the last decade. There have been some successful predictions but prediction is certainly still in the research stage. Two approaches have been promising -- recognizing changing patterns of earthquake occurrence in a potential earthquake region, and observing strain changes in the earth's crust in earthquake regions. The instrumentation suitable for these approaches is presently operating in countries... which have a serious commitment to earthquake prediction and associated disaster prevention."

CI was a logical choice to implement the proposed activity since it had a wealth of experience in Peru and with the IGP. The relationship went all the way back to 1922 when a magnetic observatory was built by Carnegie. Peru's first seismic equipment was installed by Carnegie in the 1930's. This early and apparently successful scientific collaboration between the agencies had continued, in fact, right up to the point that Carnegie was commissioned by OFDA in 1981 to install the new network.

The proposal went on to discuss the technical requirements of such a modern system for Peru, arguing that equipment allowing accurate earthquake location determination, telemetric devices to bring all seismic signals to a central processing laboratory in Lima, a real-time computerized seismic analysis system and the installation of strainmeters would be the nucleus of "...an interactive system Peruvian seismologists and Civil Defense experts can effectively implement [for] an early warning program and save thousands of lives." The proposal continues, "Such a system is currently operational in California. This system could be operational in Peru within 4-5 months.

This proposal is cost-effective indeed, given the magnitude of possible disaster now threatening Peru."

Not specifically mentioned in the Carnegie document was that the feeling of a need for immediate action and that "the possible disaster now threatening Peru" were tied, in part, to a prediction of a "great" earthquake near Lima by Dr. Brian T. Brady, a research physicist for the U.S. Bureau of Mines.

Dr. Brady, with the collaboration of, and at least initially the support of, Dr. William Spence, a geophysicist with the USGS, had, between 1974 and 1976, published a series of articles on earthquake mechanics. In essence, Brady argued that he had discovered a "structure" to rock failure in mines which was equally applicable, when modified to control for scale, to earthquakes. The mathematics of Brady's theory of prediction of such failures, combined with micro- and geophysics left traditional seismologists hard pressed to understand what he was talking about.

Eventually, Brady's thesis left scientists in and out of Peru, along with officials at A.I.D., the State Department and the GOP arguing about what actions to take about his prediction. This was particularly true because of the precise nature of the prediction. Brady had written in 1978: "I believe the occurrence time of the forthcoming event will be in late October to November 1981 and that the magnitude of the main shock will be in the range of 9.2. This earthquake will be comparable to...the largest earthquake to have occurred since the beginning of instrumental seismology (ca. 1900)."

By the time OFDA first became involved in mid-1979, Dr. Brady had reiterated his prediction and given new specifics. He revised the date for the mainshock (which he now said would be of magnitude 9.8) to July 1981, rupturing from offshore Lima south to Chile, and possibly generating a twenty meter high tsunami that could jeopardize populated areas around the Pacific basin all the way to Japan.

The Brady prediction, the general history of serious earthquakes in Peru and the idea of logically continuing the work of the CERESIS and SISRA activities were the context of the CI-IGP seismic network activity. That includes several other projects which were the subject of other case studies undertaken in the present series.

One of OFDA's earlier investments, the SISRA project also bore on the decision to invest in the Peru network. SISRA was to analyze seismicity patterns along coastal South America to determine theoretical levels of vulnerability to population and industrial centers, a task dependent on historical research (the project even included visits to church archives in Europe) as well as up-to-date seismic monitoring. Once underway it became apparent that Peru's network was not equipped to provide sufficient information for SISRA. Also troubling was that Brady's prediction called for a nine month series of foreshocks which the existing Peruvian net was ill-equipped to detect.

The solution, whatever the scientific community and bureaucrats were then thinking about the Brady prediction, was to do something about the risk of disaster to Peru, whether immediate or longer term, among other things to install a better seismic network. The Carnegie grant for this purpose was signed in August 1981.

Objective and Components

The design of the Carnegie-IGP project was relatively simple if somewhat ambiguous as to the hierarchy of objectives of the activity. No overall statement of objectives was developed for the activities described above. However, based on interviews and review of documents, a schematic logical framework was developed as follows:

GOAL: Saving lives through implementation of an early warning system.

PURPOSE: "Allow real-time knowledge of locations and magnitudes of all earthquakes in central Peru" and "monitor the strain changes in the region caused by future or past earthquakes or other tectonic processes."

OUTPUTS: Installation of: (a) a Kinemetrics AutoSeis real-time data analysis system; (b) fifteen Teledyne seismic stations, all with telemetry and repeaters of which eight were to have single component seisometers and seven were to have three component seisometers, and; (c) seven borehold strainmeters.

In addition, Carnegie was to provide technical assistance and training for Peruvian seismologists and technicians, the number of whom remained unstated.

INPUTS: Originally included $784,635 as follows:

Salaries	$33,600
Fringe	10,080
Travel	76,000
Equipment	140,000
Subcontracts	494,000
Shipping	6,000
Overhead	24,955

Implementation Events

Implementation was to take place in the period between August 1981 and June 1983. Implementation milestones were spelled out in the proposal, which indicated that within the first six months the real-time system would be functioning and enough training would be completed so that "...sufficient stations are operating that earthquakes in the Lima area are reliably located." After twelve months, fifteen stations were to be operating, and routine bulletins issued showing earthquake location, magnitude and focal mechanism. At nineteen months the borehold strainmeters were to be installed and functioning. The only assumption about what might delay the project was stated in the proposal as follows: "Note: Changes in seismicity, occurrence of large earthquakes, may modify this timetable."

For a variety of technical and administrative reasons, the timelines indicated were not met. The grant to CI was amended in May 1983 to allow for an additional year of activities, again in August of 1984 to extend the completion date until December 1985, and again in April 1986, February 1987 and July 1987 to allow for the purchase and installation of a new, faster and more accurate computer.

During these extensions of time, many implementation problems arose. Construction of a building to house the equipment, the responsibility of the IGP, caused one delay, and difficulties in locating drilling equipment of the proper size for the boreholes another. Installing equipment in the rainforest region on the East side of the Andes proved more challenging than first expected. It was not until 1985 that enough of the system was operating to warrant going forward with the technical assistance and training on how to operate it. Finally, the need to replace the original computer, which the manufacturer took out of production during implementation, further delayed the project.

In November 1987 Carnegie delivered its final report to OFDA. It indicated that all outputs had been attained with final project expenditures of $1,074,108. The duration of the project was six years and three months.

Present Status

In October 1989, Dr. Alberto Gieseke, Director of CERESIS and Dr. Mateo Casaverde, Director of the IGP, both of whom were interviewed for this case study, indicated that very few of the installations placed with the technical assistance of the CI were still operating. Dr. Casaverde said that only four of the fifteen stations installed were operating today, and of the seven planned strainmeters installed, only three were operating.

Dr. Casaverde explained that the reasons for the poor performance did not necessarily reflect adversely on OFDA or Carnegie. As the project began, conditions in Peru began to deteriorate precipitously. The insurgency threat mounted by the "Sendero Luminosa" or "Shining Path" guerrillas beginning in 1980 grew more serious with each passing year. The Peruvian economy meanwhile spun out of control starting in 1984; inflation and unemployment skyrocketed. None of this could have been foreseen during the design phase of the activity. Dr. Casaverde observed that due to the continuing insurgency in Peru it has been difficult to maintain the equipment, some of which is in isolated regions in which travel is dangerous. Some have as a result been stolen or simply fallen into disrepair. He added that due to budget shortages and low salaries for technicians and scientists alike, a number of the persons trained to operate and maintain the system have left the IGP for other employment. In general he reported the productivity of the IGP declined dramatically throughout the years that Carnegie was installing the system. Morale and productivity at the IGP plummeted as the Peru's economic situation worsened and politicians forced the IGP to accept ever more numbers of unqualified personnel.

ANALYSIS OF EFFECTIVENESS

Planning and Project Design

The rush to action on the project perhaps precluded the completion of a well thought out design. The record shows that there was a fair amount of debate about whether or not to undertake the activity given the uproar about Dr. Brady, but little discussion about just what, if the project was to go forward, should be included in the way of equipment, training and technical assistance. Little or no attention was given to managerial or financial issues.

Implementation

Circumstances exogenous to the project such as those mentioned above definitely affected implementation. As the activity drew further and further away from its emergency inception, and Peru went ever more deeply into its own steep economic and social decline, however, there is little evidence, that OFDA or USAID/P did much to assist Carnegie and the IGP to grapple with the difficult conditions facing the project. OFDA was kept informed through reports from Carnegie and episodic discussions at times when the grant needed to be amended, but the record shows that no special meeting involving all the major actors were held to consider implementation challenges. OFDA staff did not visit Peru during project implementation. And USAID/P busy with other more pressing matters, including a massive flood relief effort in 1983 and 1984, apparently paid little attention to or was provided scant information about the status of implementation. For example, in October 1982, when trouble with construction of the building to house equipment occurred, USAID/P was requested to inspect the structure. The extent to which the USAID had not been involved was evident when it said: "Would appreciate receiving information related to the project including copies of project agreements, project description and progress reports."

Sustainability

In the best of times institutions like the IGP often suffer from financial or institutional instability. This, of course, often impairs their ability to maintain relatively sophisticated instrumentation. The IGP, however, had for many decades been blessed with a steady and fairly substantial annual allocation for its programs from the GOP. This was due in great part to the fine reputation and connections of its Director. He and other of IGP's key staff also had an enviable reputation for building up a fine technical staff, and able administrative cadre, although more the former than the latter. Thus as the project got underway, nobody could necessarily have foreseen the sad state of affairs which would eventually mean that the IGP would fall on hard times. At least as this case study was written, it has. For want of funds, among other things, the network installed by Carnegie is functioning at less than one-third its capacity.

RECOMMENDED ACTIONS

- As political and economic conditions permit, OFDA should itself or in coordination with other donors assist the IGP to re-establish its basic national seismic network.

STRATEGIC IMPLICATIONS

- Political and economic conditions can seriously endanger the success of an activity. They need to be integrated into design and implementation considerations producing mid-course corrections if necessary.
- Through monitoring and periodic reviews, OFDA and USAID monitoring should assist or encourage intermediaries to make adjustments in activities to overcome political and other external problems.

CASE STUDY 5

LIMA PREPAREDNESS PLAN

SUMMARY

Begun in 1981, this grant was to assist the Government of Peru (GOP) in developing short- and medium-term disaster response capabilities. This resulted in a comprehensive seventeen volume report assessing hazards and recommending loss reduction strategies.

The study significantly contributed to an increase in disaster preparedness measures in Lima. The planning effort was well conceived, and did an extraordinarily complete job of assessing the disaster vulnerability of the Lima area. AID staff members to this day use the study as a reference for preparedness work in Peru, and government officials continue to refer to the exercise and many of its key findings.

$59,408 FY 1981

INTRODUCTION

During the period of July through November 1981, a three person OFDA sponsored team researched and wrote an unusually detailed 2,400 page, fifteen volume report concerning earthquake preparedness for the city of Lima.

This case study attempts to document the reason for this extraordinary effort and the degree to which this preparedness plan for Lima has been the basis for subsequent USAID/P activities and GOP actions.

OFDA ACTIVITY

Project Context

Metropolitan Lima in 1988 contains 6 million of Peru's 21 million inhabitants; greater Lima, including the port city of Callao, is by far the most densely populated area of Peru. Lima, Peru's capital, likewise has the heaviest concentration of industry and capital in the country. The vast majority of Peru's manufacturing plants and export-import enterprises are located in Lima, accentuating the geographical distortion of the economy which favors Lima, and acts as a powerful magnet for the rural population. Recent improvements in transport links and rural education also contribute to the tidal wave of migration to the economic center of Peruvian life.

Today Lima has huge shantytowns on the desert surrounding the old city. There and in older two- or three-story inner city buildings from the 1930's and 40's, live well over half of Lima's residents. Only a minority of these migrants find permanent work. Most find themselves in a growing army of street vendors, servants and casual workers. This impoverished mass of urban settlers rings the exclusive residential districts of the elite, poses new challenges of social control, and places new demands on the city's infrastructure, services and social welfare system.

The West Coast of South America is one of the most seismically active areas in the world. Many of its major population centers have been severely damaged by earthquakes and associated phenomena--landslides and tsunamis. In 1970 in the province of Ancash, 170 miles north of Lima, over 65,000 people perished in an earthquake. In 1940 an earthquake of magnitude 8.4 on the Richter scale hit Lima, then a city of 400,000, killing 300 and injuring 3500.

In 1986, Peruvian seismologists estimated a probability of 71% that Lima would suffer a magnitude 8.0 earthquake within twenty years (and in the same time-frame, a 58% probability of a larger 8.4 earthquake and a 48% probability of an 8.6 earthquake). In a fifty year time frame, the probabilities rise to 95%, 88% and 80%, respectively.

Peru's civil defense authorities have projected that in Lima today an earthquake of the 8.4 magnitude (as in 1940), could kill up to 60,000 and injure up to 700,000 people. The majority of the casualties would occur in the crowded central city slums in which buildings are of three or four stories and built of adobe, cane and mud. Most have been structurally weakened through deterioration over time, lack of maintenance and previous milder earth tremors. Authorities also estimate that 20% of Lima's schools in these same neighborhoods would collapse in such an earthquake.

A second principal cause of casualties would be the collapse of houses in the relatively newer settlements on steep hillsides on the desert fringes around Lima. Of course, the number of deaths and injuries would depend on when the earthquake struck, the worst hours obviously during the late night when Lima's substandard housing was full.

PROJECT DESCRIPTION

The rationale for the preparation in 1981 of the "Lima Disaster Preparedness Report" was clear. It is well known that Lima continually faces the threat of a major earthquake, and such plans are routinely encouraged by host governments and/or concerned donors in countries like Peru.

The 1981 study was different only in that it was done with a sense of tremendous urgency. This was because of the prediction, troubling to the scientific establishment and sensationalized by the Peruvian press, of a great earthquake near Lima by Dr. Brian T. Brady, a theoretical physicist with the U.S. Department of Mines. Dr. Brady predicted that during mid-1981 several earthquakes of unprecedented magnitude, events with a recurrence interval of about 800,000 years, would take place off the coast near Lima.

The Embassy, USAID/P, OFDA and many in the scientific establishment in Peru and the U.S agreed that given Dr. Brady's precise forecast it would be prudent to take a quick and detailed look at preparedness in Lima. A team to do so was quickly put together and dispatched to Lima. Its work was contemporaneous with the time-frame set forth by Dr. Brady for the great earthquake.

Objectives and Components

The study had two objectives. First, to help initiate discussions on concrete approaches to disaster mitigation and preparedness among appropriate officials. Second, to assist USAID/P in initiating a systematic and continuing dialogue with the GOP and identifying actions it might take to support government and private efforts.

The design of the study was straightforward. A team of three consultants with previous responsibility for management of USAID and other post-disaster programs were asked to:

- analyze eleven key services ranging from water and sewerage to shelter and food supply, which would be crucial if a large-scale disaster hit Lima;
- report on processes of completing a post disaster needs assessment, how donor efforts could be coordinated and distribution networks set up;
- and finally, suggest ways for USAID to manage its part of the relief effort and further preparedness and mitigation steps.

The cost of the study and associated activities, including a special food study and attendance by some team members at a disaster simulation in San Diego, California, was approximately $84,000. The direct contract with the team represented $59,408 of that amount.

Implementation Events

The team spent a total of 38 person-weeks researching and writing the report. During that time, they interviewed 277 individuals with city-wide responsibilities and perspectives, such as managers of utilities, policymakers and officials of donor agencies. Over 150 local residents and community workers were also interviewed. Questionnaires were sent to field workers and other officials who could not be interviewed personally. The team reviewed over 100 volumes of materials, about half of which were summarized and included in the final report. A group of agro-industrial consultants were commissioned to study the flow of food from rural areas and outside Peru to Lima. The final report of 15 volumes and 2,400 pages, including a 66 page summary volume, was published in June 1982.

Present Status

Following the Reports's 1982 publication, USAID/P continued to discuss aspects of its contents and specific recommendations with the GOP. Aside from a workshop of Lima educators on the subject of school preparedness and another on general preparedness for Civil Defense specialists, not much happened for several years as a result of this dialogue. Meanwhile, OFDA continued to concentrate its resources in Peru on the technical challenge of monitoring seismic activity.

The report was specifically taken up again when OFDA and USAID/P agreed that former Ambassador Robert Yost should visit Peru in January-March, 1986 with that purpose specifically in mind. Particular proposals from the report were brought once again to the attention of Peruvian authorities. Recommendations concerning the electric grid, water supply and the Port of Callao, of particular concern to OFDA and USAID officials and engineering staff, were reiterated. During meetings on those subjects it was discovered that following one of the earlier study's recommendations, a 350 KVA standby generator had been installed at Lima's principal water treatment plant. However, the study's other recommendations had not been acted upon.

The Yost visit and report, which cost $15,462, also confirmed that the National Civil Defense Network, the body to which the earlier study was mainly addressed, should remain (or become again) the focus of AID support. Furthermore, in meetings with high level Peruvian authorities, Yost suggested that the Civil Defense agency be given more authority and be removed from the Interior Ministry. Finally Yost recommended that USAID/P and OFDA contract a disaster specialist to serve as Andean regional advisor on preparedness. Yost argued that the advisor should be domiciled in Lima in order to provide assistance to the Peruvian Civil Defense Agency. Yost felt USAID/P was not suited for this role because of its *ad hoc* and part-time arrangements for delegating disaster preparedness work.

In November, 1987 a regional advisor was hired and took up residence in Lima. The civil defense agency was moved from Interior and given autonomous status and increased authority as an Institute of Civil Defense (INDECI). In September 1988, USAID Lima began a 39 month, $273,000 project emphasizing training to improve INDECI's capacity.

Another priority cited in the 1981 study was a concentrated preparedness effort in the port city of Callao. In 1987 OFDA allotted $123,400 to USAID/P for this purpose. USAID/P in turn granted the funds to INDECI to manage the preparation on comprehensive disaster mitigation plans for earthquakes and tsunamis in that city (see Case Study #6).

ANALYSIS OF EFFECTIVENESS

Planning and Project Design

Planning was done expeditiously and the team fielded without undue delay. The scope-of-work for the study was clear, and was vetted thoroughly by OFDA, USAID and the Embassy in Lima.

Implementation

Implementation proceeded on a tight schedule, and with an extraordinary degree of cooperation and even camaraderie among the staff of USAID/P, the GOP and the study team. The situation faced was considered of urgent importance. Unfortunately, the report was not immediately translated in its entirety into Spanish. It was not until 1985 that the study's summary volume was made available to Peruvian officials in Spanish. This was the only significant oversight in the activity's implementation.

In conclusion, the study has significantly contributed to increasing the level of disaster preparedness and mitigation in the Lima area, and its impact is still being registered. The study prompted the implementation of specific activities to reduce vulnerabilities, including a USAID/P grant to INDECI and the La Punta Tsunami Study (see Case Study # 6). The planning effort was well conceived, and Robert Gersony, the report's principal author, along with his two colleagues, did an extraordinarily complete job of studying the situation in the Lima area. AID staff members to this day use the study as a reference for their preparedness work in Peru, and government officials remember and refer to the exercise and many of its key findings as well.

The expenditure of $83,000 in 1981 for the study and activities related to it, and the later $15,000 for the Yost follow-up, appear to have yielded a much more conscious national organization concerned with Lima and Peru-wide preparedness, and a USAID Mission approaching the subject in a consistent and capable way. Over time the study is likely to have some appreciable effect, although indirectly, on reducing the impact of disasters in Peru.

RECOMMENDED ACTION

- None. The project was completed in 1981.

STRATEGIC IMPLICATIONS

- Integrated, multi-sectoral approaches to disaster mitigation are valuable for their ability to garner the support of key government planners.

- Recommendations resulting from OFDA financed studies should be the subject of systematic follow-up.

- The use of task forces may be advantageous; politicians, policymakers and administrative personnel are receptive to reports like the Lima Preparedness plan. Such special arrangements, once completed, should be carefully followed to insure that maximum use is made of findings and recommendations.

CASE STUDY 6

PERU: LA PUNTA TSUNAMI STUDY

SUMMARY

This 1987 project developed a tsunami early warning system for Peru's main port of La Punta, located just outside the boundaries of the country's capital city, Lima. In addition to the application of early warning technology, the program also developed comprehensive public education and evacuation plans. The Peruvian Civil Defense implemented the program.

The La Punta study might well be a model case for successful implementation of disaster preparedness and mitigation plans. The work is practical and was done with a great deal of participation at many levels and is an exceptionally comprehensive piece of work. The study also suggested zoning restrictions, and recommended that some homes for the elderly be relocated. The project was well designed and managed, and is likely to result in concrete actions to lessen the risk of people to disaster.

$123,400 FY 1987

INTRODUCTION

Tsunamis are long ocean waves that are usually generated by a sudden displacement in the sea floor by large, shallow-focus submarine earthquakes. Initial damage to coastal structures is caused directly by the enormous forces of the waves themselves (there are usually several in succession). Destruction continues as high water floats houses and other objects, turns debris into projectiles, erodes foundations, collapses sea walls and bridges, and causes fires from the combustion of oil spilled from damaged ships or storage facilities.

Over 51,000 coastal residents around the Pacific have been killed by 94 destructive tsunamis in the past one hundred years. None of these deaths have been in Peru.

OFDA has invested in several projects to provide early warning of impending tsunamis, and assist communities to prepare for large waves.

This case study discusses the experience of OFDA and USAID/P in mounting one such project in the port city of Callao, Peru.

OFDA ACTIVITY

Project Context

Although administratively separate from the rest of the City of Lima, the Port of Callao is an integral and vital part of metropolitan Lima. As 75% of Peru's industry is based in the Lima area, the port is crucial to the overall economy of Peru. The port contains oil, gas, coal and chemical storage areas; warehouses; railroad switching yards; and dozens of assembly plants and factories. Twenty-five percent of Peru's population depends on the port for basic foods such as wheat, whose flour provides two of the country's main staples: bread and noodles.

Over half a million people reside within the Callao city limits; it is Peru's most densely populated area. Over 100,000 people live within the zone that would be inundated were tsunamis of the size that hit Callao in past centuries to reoccur. Tens of thousands live in substandard old or poorly built new structures. The soils upon which Callao is built are of the type which tend to magnify seismic waves. At least 40,000 people live in buildings almost certain to collapse in the case of a great tsunami.

In the strong earthquake of 1940, 140 people were killed in the greater Lima area. Over 100 of these deaths were in Callao. The port is also at risk from fires and explosions in its gas and chemical facilities or propane pipelines. A "worst case" scenario for the city would be a combination of a strong undersea earthquake causing widespread building collapses and explosions and fires, followed twenty minutes later by the first of a series of giant tsunamis.

The city was last struck by a damaging tsunami 243 years ago. On October 28, 1746 two waves killed all but 200 of the city's 5000 residents and major ships in port were destroyed. A Spanish frigate was carried a kilometer and a half inland. Its bow had remained enshrined on a street corner where it came to rest until it was stolen the week before this case study was written.

In recent times, Callao suffered earthquake damage in 1940 and other more recent earthquakes, although not as damaging, have dramatically demonstrated the city's high vulnerability. In 1974 an earthquake precipitated a panicked and largely unsuccessful evacuation of the area. In 1980 a mistaken warning from the Pacific Tsunami Warning Center in Hawaii, which located the earthquake at sea rather than inland, as was actually the case, lead once again to panic, an incomplete evacuation and looting of shops and houses from which owners had fled.

OFDA had made several investments in tsunami prediction and warning prior to financing the La Punta project in Peru. In 1982 OFDA commissioned NOAA's Pacific Marine Environmental Laboratory to develop and evaluate a low-cost pilot warning system off the coast of Valparaiso, Chile. This local system, known as THRUST (Tsunami Hazards Reduction Utilizing Systems Technology) is designed to give at least three minutes warning of tsunamis occurring just offshore. The THRUST system is designed to supplement other regional and Pacific-wide warning systems already in place. The Pacific-wide system warns populations of more than 750 kilometers from the source of the earthquake producing the waves in about one hour. Regional systems are capable of warning local populations living between 100 and 750 kilometers from the source within ten minutes.

THRUST was successfully installed and tested at the cost of $682,860. The THRUST system off Valparaiso, Chile, provides only a local warning. It does not cover Peru. A similar system could, however, be installed near Lima at a cost considerably less than that of the Chilean pilot program.

The second major tsunami related investment of OFDA was in a PASA with the USGS to develop and implement analytical techniques to determine comparative earthquake and tsunami potentials for zones in the Circum-Pacific region, and to conduct regional vulnerability and hazards analysis for disaster planning in developing countries. (See Case Study #24) Peruvian scientists interviewed for this and other case studies in Peru were familiar with the published results of this work by the USGS done under this $450,000 project.

In Peru, prior to the La Punta study, authorities had long pointed to Callao as an area of unusual risk but had not taken concentrated preparedness or preventive actions. Although the area's risk had been studied academically, the area was allowed to grow haphazardly, without zoning restrictions, changes in traffic patterns or clearing of blocked beach accesses or evacuation routes. Public education efforts were similarly inconsistent.

Local authorities, civil defense and military officials --Callao houses major Peruvian Army and Navy bases--showed renewed interest in the challenges from natural disaster facing the city as a result of a widely publicized prediction in 1980 of a great earthquake around Lima. A disaster study of Lima, commissioned by USAID/P and OFDA in 1981 (See Case Study #5), further highlighted the risks facing Callao by devoting one of its fifteen volumes specifically to that city.

As a result of this heightened interest, and particularly the tenacity of Julio Kuriowa, a professor of civil engineering at Peru's National University of Engineering who had long been advocating further study and action concerning preparedness in Callao, a proposal was presented to USAID/P in 1984.

PROJECT DESCRIPTION

Rationale

The rationale for the project was clear. Proper planning for dealing with a potentially massive tsunami catastrophe in Callao, combined with the port's other earthquake and fire risks, had been on the minds of U.S. and Peruvian officials since the Brady prediction episode in the early 1980's (See Case Study #4) for more complete information).

The Brady prediction and knowledge of what faced Callao from an OFDA-sponsored disaster planning exercise led to the constellation of investments by OFDA in tsunami related projects, mentioned earlier, and the Peru Callao study, known at OFDA as the La Punta Tsunami study funded in FY 87 at the cost of $123,400.

The relatively inexpensive tsunami study included inputs from many sources. Professor Kuriowa had long experience in microzonation and multidisciplinary approaches to natural disasters and mitigation planning for human settlements. Jane and Rolf Preuss, an urban planner and architect respectively, had considerable experience in tsunami hazard planning in Alaska and Hawaii. OFDA's Paul Krumpe also played a key role.

The project proposal went through various iterations between 1985 and final funding in 1987. During an OFDA funded trip to Lima, former Ambassador Robert L. Yost recommended that USAID Lima work as much as possible through civil defense authorities in any disaster preparedness activities and that it include fire threats in Callao. Michael Hirsh of USAID/P suggested that local authorities be involved in the study and that it be funded through Peru's civil defense structure. Allan Swan of OFDA insisted that the project benefit Callao inhabitants as directly as possible by recommending concrete actions they and local officials could take immediately. Peruvian Rear Admiral Jorge del Aguila recommended that the public education program be undertaken jointly with the Peruvian Navy unit in charge of tsunami warning. Other USAID staff suggested that the project include actual evacuation drills, at least for school children. These and other changes were included in the project as finally approved.

Objectives and Components

The project's design was straightforward:

GOAL: Save lives and reduce injuries and damage to property and infrastructure.

PURPOSES:

1. Enhance long term mitigation efforts to minimize damage to people and property by tsunamis;
2. Integrate long range planning with requirements of the immediate emergency period, e.g. evacuation routes and transportation, open space staging areas and location of temporary shelter;
3. Develop a planning methodology which can be applied to other coastal communities in Peru.

The grant of $123,400 was from OFDA to USAID/P, which, by Mission Allotment, provided funds to INDECI, Peru's national civil defense organization. INDECI retained $10,000 to design and operate its own immediate tsunami public education program, and used the remaining funds to contract the National University group led by Professor Kuriowa ($65,000) and the Preuss' firm in Seattle, Urban Regional Research Inc., to do the actual field work.

Implementation Event

The study consisted of three phases and a total of fifteen tasks which were to require fifteen months to complete. The three phases:

1) Routine planning assumptions and study existing conditions;
2) Develop and evaluate alternative subplans;
3) Develop final designs.

Present Status

The work proceeded on schedule although the final report was delivered several months late. The three volume report was delivered to INDECI and USAID officials in October 1989.

ANALYSIS OF EFFECTIVENESS

Planning and Project Design

The activity had a long gestation period. There were those who, in the early 1980's, wanted to push forward with such a study rapidly because of the sense of urgency resulting from the Brady prediction. Others argued that the study was not needed because what should be done in Callao was a matter of common sense. They pointed out that the OFDA sponsored preparedness plan of 1981 recommended actions such as the installation of an automated cutoff of electricity in the port area in the case on an earthquake of over 3.0 on the Richter scale, as well as concentrated work on evacuation planning, things that need not wait until the completion of a study.

As it turned out, those close to the study, Professor Kuriowa and others at A.I.D. and INDECI, now believe that much was gained by the delay in implementation. Although many, including Professor Kuriowa, were concerned about the many changes in the study's original design, they now believe that the resulting product was much improved.

The main benefits of the careful review of the study's design were twofold -- first, some things originally left out, such as planning for fire hazards in Callao, are now crucial parts of the plan and, second, the degree of participation in the study by INDECI and officials and the inhabitants of Callao alike, appear to have vastly increased the possibility of action being taken to minimize risks in the area. People crucial to implementation of the study's recommendation have been "brought aboard." In fact a visit to the Callao area showed that not only was this the case, but that many concrete actions had been taken even before the study was complete: cooking kiosks abutting the walls of refineries have been moved, various clogged alleys which can serve as escape routes have been cleared, and fire and police stations in the inundation zone have been given orders to immediately flee to safer ground as designated by the study team if any ground motion occurs. The public education program also proceeded as the study was underway.

Implementation

Implementation moved ahead efficiently. USAID/P staff and the OFDA Regional Disaster Advisor, assigned to Lima in 1987, took an active role in monitoring the work. The study team regularly reported on progress at monthly meetings at INDECI with A.I.D. staff in attendance, and A.I.D. staff regularly visited Callao as work was underway.

Sustainability

The study itself was completed by U.S. and Peruvian private firms under contract to INDECI. INDECI is a Government institution with its own staff and modest budget. INDECI depends in good measure upon the good will of other government departments for implementation of its mandate. The City of Callao, in turn, has its own municipal resources. The entities involved have only limited resources to take the next steps toward implementation of many of the studies principal recommendations. For example, it is probably presently beyond the means of any of the agencies involved to construct a new road on landfill along the isthmus on which Callao sits, in order to give people a better evacuation route. Much of what needs to be done now is not costly, however. Traffic patterns can easily be changed and labor mobilized to clear clogged alleys in order to facilitate evacuation; instructions can be given to utilities about actions to take and people can be told specifically where to go in case of a tsunami warning, all without any great expenditure. In that sense what has begun with the study can be sustained.

Institutional sustainability is also quite probable. USAID/P is working with INDECI on a steady basis; in 1988; a grant of $273,000 was made by USAID/P for the purpose of improving INDECI's capacity. Public officials in Callao, including the Callao Port Development Corporation and military officers heading the large military installations there, appear willing to consider implementing some of the study's recommendations. Plans to present the final study report to these officials and civic and other groups have been made.

This activity was practical and done with a great deal of participation at many levels. It also represents an exceptionally comprehensive piece of work. For example, the study includes details on: (1) soil types throughout Callao (important because the condition of underlying earth dictates the degree of seismic risk to structure); (b) each building in the city and including an assessment of the vulnerability of most to earthquake and tsunamis; (c) information on where individual families should go, vertically or horizontally, (that is, flee the area or go up in a building), in case of a tsunami. It also includes suggestions regarding zoning restrictions, homes for the elderly that should eventually be relocated and myriad other detailed suggestions.

The project was well designed and managed, and is likely to result in concrete actions to lessen the risk of people to disaster.

RECOMMENDED ACTION

- Continuing attention should be focussed on the practical applications of this information, as this activity has begun to do.

STRATEGIC IMPLICATIONS

- The La Punta study might well be a model case for successful implementation of disaster preparedness and mitigation plans.

CASE STUDY 7

PERU: ADOBE BUILDING TESTING - Phase II

SUMMARY

In Peru many of the deaths caused by natural events have resulted from failed adobe housing. In 1983, OFDA provided funding to the Structures Laboratory of Peru's Catholic University to demonstrate improved adobe construction techniques by using the method to replace houses that were destroyed by a flood.

The activity suffered numerous implementation difficulties which resulted in only 114 of the planned 340 replacement houses being completed. The implementing agency's lack of field experience played a critical role in the project being poorly planned and in its failure to produce the expected results. An unresolved design question was whether the activity was meant to be research or rehabilitation. At the time, it was promoted as both.

$144,750 FY 1984

INTRODUCTION

OFDA has long invested its resources in programs to replace housing after disaster and to improve it to better withstand earthquakes and floods. Adobe housing construction is one of the most common in rural areas around the world. Starting in 1961, by means of workshops, research grants and grants for practical field applications of newly developed techniques, OFDA has taken up the subject of the vulnerability of adobe construction and how it might be improved. One such activity was undertaken in FY 1984 and titled "Adobe Building Testing and Implementation Project: Phase II."

OFDA ACTIVITY

Project Context

Peru is a country prone to disasters. Earthquakes, floods, drought and famine are frequent in its rough and geographically varied territory. The seismically active Andes bisect the country and divide it into three completely different regions. The coastal strip is arid and has a mild climate due to the effect of the cold Humbolt sea current. During the first of the year, however, this condition is sometimes reversed by the "El NINO" current, which creates periods of tropic-like conditions in Peru's northern coast, with rains of catastrophic proportions. The north coast happens to be one of Peru's most populous and productive regions.

A considerable number of Peru's 21 million people live in earthen houses. It is estimated that 65% of the rural houses in Peru, and half of all houses, are built with adobe or rammed soil. The percentage of adobe houses in the project area, three communities with a total population of 1,800 people, where fishing and subsistence farming are the main economic activities, is higher than the national average. All but two percent of the homes there had been of adobe before the heavy rains in 1983 destroyed them all.

Literature on disasters notes that the collapse of unreinforced masonry and adobe low cost housing has caused more than 80% of earthquake fatalities in this century. Indeed earthquakes have been the major killers in Peru, although in the worst case, the magnitude 7.8 earthquake of 1970, which killed over 65,000, a giant landslide completely burying several communities caused over 70% of the deaths. The country has experienced significant earthquakes in 1584, 1586, 1687, 1725, 1746, 1806, 1904, 1913, 1932, 1940, 1942, 1966, 1970, and 1974. The average magnitude of these earthquakes is estimated at 7.8.

Floods have been the major disrupting force in Peru's economy and the lives of the country's subsistence farmers, the occupation of the majority of rural inhabitants. Often floods and landslides caused by heavy rain ruin crops, disrupt communications and destroy homes and infrastructure. Once or twice a decade such floods are caused by the "El Nino" phenomena mentioned earlier.

In 1983 Peru suffered a climatic disaster of epic proportions. In the North, floods from the heaviest rains in centuries devastated the economic and social infrastructure in one of Peru's most populous and productive regions. Over 160 inches of rain fall in the area which normally receives five inches. The floods cost relatively few lives -- approximately 380 perished in flood waters -- but over 1,300,000 people had their lives severely and directly disrupted. Tens of thousands lost their homes. The country at large suffered from an estimated 6% decline in gross domestic budget. The disaster itself was estimated to have cost well in excess of a billion dollars in property and production losses.

OFDA had been involved in research and networking concerning the improvement of the disaster resistance of earthen buildings for several years prior to the disaster in northern Peru. This had included, in Peru, a workshop with ninety-five participants from around the world in 1981, and other activities and projects in which the Peruvians had been included.

Other donors such as the Dutch have provided assistance to Peru's Catholic University by installing modern research equipment, including a computerized "shake table," and providing technical assistance on structures research. UNESCO had become involved as well by sponsoring research on the durable earthen building techniques developed by the Chimus, Incas, and Spanish (all of which are apparently superior to modern day practices) and by sponsoring a joint Peruvian and Mexican low cost housing project.

The same university also received a grant from A.I.D.'s Office of the Science Advisor for $150,000 to research the moisture resistance of adobe structures and the seismic strength of adobe masonry. This mainly laboratory work resulted in several important technical reports and published papers, which became Phase I of A.I.D.'s work in adobe in Peru.

As a result of the 1983 "El Nino" damage in Peru, OFDA led with nearly $1 million in immediate relief. Soon thereafter USAID/P provided a total of $180 million in the form of a $60 million program loan, a project grant of the same amount, a $12 million housing guarantee loan and the remainder in food assistance. A number of agencies such as CARE received grants for housing construction in the affected areas.

PROJECT DESCRIPTION

Rationale

In the wake of the 1983 floods, the staff of the Structures Laboratory of the Peruvian Catholic University, which had done considerable research on adobe construction since the mid-1970's, considered what contribution they could make to the reconstruction effort. As primarily teachers and researchers, they had no plan of action for practical application of their knowledge in the field of earthen construction to emergency conditions such as those then facing Peru. This changed when they received a letter from OFDA suggesting that the floods might provide an opportunity to do a pilot project which would demonstrate the application of new adobe techniques in the flood zone, while contributing to the relief of immediate needs of people who had lost their homes.

University staff approached USAID/P and subsequently submitted a proposal. USAID/P was at the time financing a program to level land and design blocks for new houses, pave streets, and install water systems in several areas in the flood affected region. People living in temporary shelter or who had left the area for cities, were allowed into the newly prepared areas to build new homes. Catholic University proposed to use three such sites to study the viability of earthquake and flood resistant houses developed and tested over the years by their researchers.

Objectives and Components

GOAL: Demonstrate to Peruvian officials and rural inhabitants alike the benefits of low-cost earthquake and flood resistant housing.

PURPOSE: Provide housing for flood victims and "study whether the flood and earthquake resistant model developed in the laboratory...could be reproduced in the field and constructed by users and workers using traditional building systems."

OUTPUTS: Construct 340 homes in three rural towns -- Nuevo Tupac Amaru, Chochope and Canasloche, at an average $300 per unit. The project team was to provide construction plans, train local builders, provide technical assistance during construction, prepare brochures and audiovisual materials, lecture to local, regional and national authorities, and disseminate project plans results to the media.

INPUTS: A grant of $144,750 from OFDA to USAID/P for Catholic University to provide a project manager and a field team of three engineers, plus one technician specialized in adobe construction. An automobile was also provided. Later in the project an anthropologist joined the field team to conduct socio-economical surveys of the communities involved in the project.

Implementation Events

The program lasted from June 1984 to May 1985. Technical plans for the project were elaborated in July, first contact was made with the villagers in August, funds were transferred to the local authorities who were to provide building materials in September and construction and other dissemination activities were begun in November 1984. Efforts to complete homes for and with people who agreed to use the new construction techniques continued until April 1985.

Present Status

Only 114 of the 340 homes the Catholic University hoped to construct were actually completed. The University has published complete reports on the reasons for the shortfall, and continues to try to demonstrate through various means the superiority of the building techniques it has developed over the years. It provided technical assistance to Ecuador after the earthquake in that country in 1986, and has built further models in the northern Peruvian city of Trujillo and the Andean city of Puno.

ANALYSIS OF EFFECTIVENESS

Planning and Project Design

In interviews for this case study, members of the original project team were quite forthright about what had gone wrong during the design and implementation of the project.

One of the first points mentioned was "that we were engineers and teachers, with plenty of research experience in the laboratory, but without experience in the field."

Limited experience on the part of the implementing agency, along with a lack of thoughtful design ideas from OFDA and USAID/P and/or any OFDA contractors experienced in field implementation, virtually guaranteed less than optimum project implementation. USAID/P was busy handling a large scale flood rehabilitation effort, and an interested but distant OFDA office was not able to assist the Catholic University to foresee the flaws in project design which ultimately plagued implementation.

A question left unresolved during the design phase was whether the activity to provide was research data, or to rehabilitate housing for people in need. It was claimed at the time it was both. But the question remains: where people are in need, having suffered from disaster and disruption of lives and livelihood, is it fair to subject them to experimental technology in the hands of a group with little field experience?

Implementation

Among the implementation deficiencies mentioned by the Catholic University team were the following:

- The project was devised quite late in the flood relief effort. By the time the University team got out into the three villages, the local population was already completely settled in temporary housing and preoccupied more with re-establishment of their livelihoods than with reconstruction of their homes, especially reconstruction using "new techniques" of the sort offered by the project.

- The team was made up principally of engineers and technicians without experience in matters of rural culture, the same types of specialists who had done badly in the eyes of local people in repairing roads, drainage and irrigation systems earlier in the relief effort. Like their predecessors working in other sectors, the Catholic University team "went to work without knowing local sensitivities, socio-economic conditions, and local attitudes toward communal action. Until a local anthropologist was added to the team, we had no clear idea why people were so resistant to our work."

- The team had a very inflexible approach. Houses were to be of a certain size and style and built of standardized materials. "Some people had already begun reconstruction and wanted our improved design superimposed over what they already had completed. We resisted. Many did not like the fact we insisted that cane be used in the wall and specially imported timber be used in the roof to bolster seismic resistance. They did not think the seismic risk was a major factor since they had lost their homes in floods, and the region had not had an earthquake for many years."

- The team found that the people had a deep underlying belief that adobe housing could not be improved and were unconvinced by lectures about results of shake table and tilt table tests, or experiments to improve moisture resistance with different mud plasters and stuccos. "We should have built full sized models and lectured less, and shown none of our films and photos of technical lab tests."

- The team tried to force all villagers to participate in communal action. "But we discovered that willingness to participate depended on where each family stood in terms of pursuing their agricultural interests, or whether they were an extended family with 'free' family members, or widows or elderly."

- Working with government agencies is an art of which the team had little knowledge. Materials and funds were to be made available only after the participating villages agreed to follow the protocol for construction devised by the team. In several instances the government went ahead with deliveries before all preparations were completed by the team. Adobe requires water for construction. In some areas water was to be delivered weekly by a government agency. The deliveries were made but on a haphazard basis and people built wood homes instead of adobe or chose not to rebuild in the area at all. The team felt that such waterless villages should not have been selected for the program in the first place.

Sustainability

The Catholic University remains a solid research institution and a useful source of information and experience in building design and testing. It remains ready as well to continue trying to practically apply what is being learned through research. It is likely the experience the University Staff gained as it operated under the modest A.I.D. grant in 1985, its baptism under fire, is having or will have a positive effect on insuring more realistic application of research in a field setting.

Of course, neither the GOP nor the Catholic University can for long subsidize rural housing construction at a unit cost of $300, a level which may be justified in an experimental application but not over the long term.

Nor is the GOP at present in a position to mount meaningful housing loan or guarantee programs. Nor it seems does the private sector have any significant interest in such programs in the rural areas. This could change, of course, since the wisdom of trying to insure that new housing construction use seismic and flood resistant techniques in flood and earthquake prone Peru remains obvious.

The Catholic University itself has published the following conclusions from its work on the A.I.D. project (paraphrased from the Spanish):

- Modern adobe construction must be seen for what it is, a "noble" and sound alternative to the present primitive adobe construction in rural areas. It must not be forced on the poor but demonstrated to show its actual attributes.

- Mitigation measures represent an increase in the cost of housing which many low income people cannot afford. The use of such techniques should be built into long term development programs wherever possible, covering increased costs.

- Socio-economic studies and housing surveys are needed to adequately plan any program of improved housing. The actual demand and prospects of family participation must be known in advance.

- The technological solution and the administrative system should be flexible enough to make possible the wide participation of the community in the program.

- Permanent and massive actions toward mitigation in rural housing needs governmental support and participation. This requires the dissemination of improved technologies to governmental housing institutions, and the initiation of official regulations for this type of construction.

- Finally, field experience must be linked to laboratory research in order to diminish the gap between the two disciplines.

RECOMMENDED ACTIONS

- As a demonstration of improved building techniques, OFDA should consider constructing some improved adobe housing in an area likely to experience an earthquake. Such an effort would need to be accompanied by a comprehensive program concerned with appropriate public education and which addresses issues of financial sustainability. Perhaps this could best be accomplished in association with a grass roots Peruvian P.V.O.

STRATEGIC IMPLICATIONS

- Because relief offers an opportunity to apply newly developed mitigation techniques, OFDA should plan for such a situation prior to the occurrence of the event.

CASE STUDY 8

BANGLADESH: DISASTER ALERT SYSTEM

SUMMARY

Bangladesh, a low-lying country on the shores of the Bay of Bengal, is extremely vulnerable to tropical cyclones. One of the greatest disasters to modern times occurred when a cyclone struck the southern coastline in November 1970, killing perhaps 300,000 people.

A satellite ground station with Automatic Picture Transmission (APT) capability was established in Dhaka during the 1970s. In 1978, the USAID financed an improvement of the system through installation of a Low Resolution Picture Transmission (LRPT) capability. In 1980, OFDA funded a further improvement of the ground station by installing a High Resolution Picture Transmission (HRPT) facility which is the subject of this case study. Subsequently, the USAID provided continuous support to Bangladeshi Space Research and Remote Sensing Organization (SPARRSO). Although the HRPT unquestionably gives better resolution pictures than the LRPT it replaced, it is not clear that the technical improvement had any appreciable impact on early warning or disaster preparedness.

$546,000 FY 1980

INTRODUCTION

Bangladesh is a low-lying country at the head of the Bay of Bengal and is extremely vulnerable to the tropical cyclones that form there during October to March each year. One of the greatest disasters in modern times occurred when a huge cyclone struck the southern coastline in November 1970, killing perhaps 300,000 people. The failure of the Government of East Pakistan to warn people about the storm, to mount a mass evacuation, or to provide adequate relief was the straw that broke the camel's back and led to the civil war that resulted in the "liberation" of Bangladesh in December 1971.

U.S. assistance to Bangladesh, which began shortly after liberation, from the outset was sensitive to the essential political and humanitarian need to forecast major storms. A satellite ground station with Automatic Picture Transmission (APT) capability was established in Dhaka during the 1970s. In 1978, the USAID mission provided funds to upgrade the system to have Low Resolution Picture Transmission (LRPT) capability. In 1980, OFDA funded a further upgrade of the ground station to a High Resolution Picture

Transmission (HRPT) facility, and the host government institution, the Space Research and Remote Sensing Organization (SPARRSO) built a new headquarters building.

OFDA funding has been followed by nearly continuous USAID-financed assistance to receive and interpret satellite imagery. With the support of other donors, including the USAID's Office of Food and Nutrition, the UNDP and the Government of France (GOF), Bangladesh has modestly increased its capacity to receive and interpret remote sensing imagery, but corruption and incompetent leadership in SPARRSO have severely limited the utilization of satellite data for disaster preparedness or development purposes.

Preparation of this case study report included interviews with NASA officials and, during a visit to Dhaka in October 1989, officials at USAID and SPARRSO. The ground station facility was inspected.

OFDA ACTIVITY

Project Context

Bangladesh is located at the top of the Bay of Bengal, which nearly every year spawns one or more severe tropical cyclones. The country is densely populated, with 114 million people in an area the size of Wisconsin, 60 percent of which is less than 33 feet above sea level. The rate of population growth, at least 2.6 percent annually, is high by Asian standards, and population pressure is creating perceptible disruption of virtually all of the ecosystems in the country, the Bay of Bengal, and the Himalayan drainage basin.

Bangladesh is probably the most disaster-prone country in the world. Scarcely a year goes by without a serious flood, drought, cyclone, epidemic, civil strife, mass accident or earthquake striking the country, and it is not rare for two separate disasters to be underway simultaneously. The frequency and severity of disasters constrains the ability or willingness of Bangladeshis to make infrastructural investments and therefore contributes both directly and indirectly to the pervasive destitution of the people.

In both historic and modern times, cyclones have been the major killers. The very independence of the country is frequently attributed to the failure of the Government of Pakistan to adequately warn people of the cyclone of November 1970 which is estimated to have killed some 300,000 people, or to have responded with sufficient disaster relief. Although there were few major cyclones during the late 1970s, the years immediately preceding this project, the storm of 17 August 1979 killed 50 people along the southern coast. Since then, the biggest killer cyclone was that of 25 May 1985, in which about 10,000 people died from a cyclone-caused storm surge. The cyclone that struck the Sunderbans mangrove jungle on the western coast of Bangladesh on 29 November 1988 was the second strongest storm recorded during the 20th Century in the Bay of Bengal, but "only" about 6,500 people died because the area was relatively unpopulated.

The institutional framework of this project, the Bangladesh Space Research and Remote Sensing Organization (SPARRSO), is a unit under the supervision of the Ministry of Defence. SPARRSO's predecessor organization was started in 1968 at the then East Pakistan Atomic Energy Station. Bangladesh acquired Automatic Picture Transmission (APT) capability during the 1970s for three separate satellite systems: the U.S. Tiros, the Russian Meteor, and the Japanese GMS.

In 1978, NASA announced a major change in its satellite system that was interpreted by GOBD officials to be a threat to their continued capacity to receive and interpret satellite images. That year, the GOBD sought assistance from several sources to install a new satellite receiving station. The President requested assistance from the U.S. Ambassador, and the U.S. Government financed a $100,000 Low Resolution Picture Transmission (LRPT) interim ground station which was installed on a crash basis in three months in mid-1978. On the day the interim ground station was inaugurated, 1 October, it transmitted pictures of a previously undetected cyclone in the Bay of Bengal which subsequently came ashore in the Indian state of West Bengal.

Simultaneously with this U.S. assistance, the Food and Agriculture Organization (FAO) was implementing a UNDP-financed project the Chief Technical Adviser of which was Dr. Ian MacLeod, a former NASA staff member.

PROJECT DESCRIPTION

Rationale

The rationale for the project was the need to be able to identify devastating tropical cyclones in time for coastal areas to be evacuated or for people to move to cyclone shelters.

Now, many years after the fact, it is unclear exactly who first suggested that the LRPT be upgraded; the idea is attributed variously to officials in the GOBD, USAID, and OFDA. Since the previous upgrade, from APT to LRPT, was so successful, the proposal for yet another enhancement, from a LRPT to a HRPT ground station, seems to have been favorably received by all parties.

Project Components and Objectives

This project was seen by all concerned as being quite straightforward in its design. A Logical Framework was not prepared at the time of project formulation, approval or implementation. However, it is not difficult to describe retroactively.

GOAL: Minimizing deaths and injuries due to severe storms.

PURPOSE: Improving the disaster alert and cyclone early warning system for Bangladesh.

OUTPUTS: The major outputs of the project (described in project documentation as "elements") were to design, develop, configure, transport and install a TIROS High-Resolution Picture Transmission (HRPT) satellite-based cyclone tracking system, and a GMS-based high resolution "WEFAX" system. A training component was also included with outputs for:

- Installation and final acceptance test with contractor;
- Completion of on-site operations and maintenance training; and
- Completion of meteorological data training.

INPUTS: GOBD contributions to the project were in kind, in the form of both staff and a building to house SPARRSO. The building was started in 1979-80 and was completed in 1981-82.

The USG contribution was in the form of advisory services, equipment and training. The project was implemented through a PASA between OFDA and the Department of Commerce, NOAA/NWS and $546,000 was obligated during FY 1980.

Implementation Events

The HRPT Ground Station appears to have been installed as planned, on budget and more or less on time, in 1982. The ground station included equipment to receive signals from two completely separate satellite systems: TIROS, an American satellite, and the GMS (Geostationary Meteorological Satellite), which is Japanese. The project was implemented by a PASA between OFDA and NOAA, which turned the technical supervision over to NASA. NASA in turn contracted for the services of P&P Industries, Inc, of College Park, Maryland, which carried out the hardware installation and the training.

The project's original plan was to train four people for four months each, a total of 16 person-months of training. As implemented, the project provided only four person-months of training, one month each to four people. All four trainees remained at SPARRSO for the next decade, and one of them, Dr. Pramanik, became a Director. Mr. S.T. Rahman and Mr. Nawab Ali, both SPARRSO technicians, spent one week in Denver, Colorado, in training to operate and maintain the Honeywell tape drive, and they also visited the headquarters of P&P Industries in College Park. They estimated that actual training took place on only 15 days of the "month" of training and that it was not enough. They never received any training on the Muirhead printer. Neither Mr. Nawab Ali nor Mr. S.T. Rahman have subsequently been sent to the U.S. for training again, but the fourth trainee, Mr. Omar Hayat, was sent to the U.S. under the Agro-Climatic Environmental Monitoring Project (ACEMP).

Present Status

During the roughly eight years since it was installed, the HRPT equipment generally operated well about 360 days a year, allowing five days a year for maintenance. There were two exceptions to this generalization:

- The Muirhead printer installed was already obsolete when procured, and the company that made it has since gone out of business. The printer never gave satisfactory performance.

- The antenna motor for the receiver caused almost continual trouble. The first motor jammed during installation, and succeeding motors burned out due to water entering the motor housing and other problems.

In late 1988 or early 1989 three major components of the HRPT system failed: the PCM Bit Synthesizer, the HRPT Format Synthesizer, and the Servo Amplifier. By October 1989 the HRPT Ground Station was no longer operational, and in need of either spare parts or the installation of a whole new system. However, SPARRSO was still receiving TIROS Low-Resolution pictures, the same level of quality that was considered to be unacceptable in 1978. The old 1978 LRPT equipment was still working fairly well.

Quite apart from the eventual failure of the HRPT equipment for TIROS reception, the Japanese changed the mode of transmission of the GMS, and Bangladesh is now able to receive only low resolution GMS pictures.

Low resolution TIROS and GMS pictures are received every three hours. Up to 30-35 copies of the pictures may be printed, depending on the storm threat, for distribution to the Meteorological Department, the Air Force, Water Development Board, Ministry of Agriculture, Civil Aviation, and USAID. The pictures, on electrostatic paper, are of very poor quality and lack grids or highlights showing land borders.

During the flood of September 1988, SPARRSO was knocked out of commission for seven or eight days, primarily because its generator was under water. Since then, almost nothing has been done to "waterproof" the facility. Asked what would happen if another major flood occurred, the top managers replied that, after all, such a severe flood is a rare occurrence and that anyway, the Greater Dhaka Protection Scheme of embankments around the city would probably save them. The generator has not been raised.

USAID assistance to SPARRSO has continued since 1980 through the Ago-Climate Monitoring Project (ACEMP), which begin in 1980 and ran in its first phase to 1985 and was evaluated, by NASA, in 1986. A main reason for the follow-up project was to provide a resident adviser to assist in using data. Since it was seen as an "agriculture" rather than a "disaster alert" project, the severe storm forecasting component declined in importance. The second phase of ACEMP was implemented during 1986-1988. The project is expected to start a two-year third phase in late 1989. All of the phases of the ACEMP have been financed through the USAID Mission's regular program.

The NASA Project Manager noted that the technical aspects of these remote sensing projects was the easy part and that the politics eventually went sour. He noted that he had counseled the Bangladesh government that the proposed French SPOT satellite would never work, and that the country could not afford the foreign exchange to operate two completely different satellite systems. The competition introduced between the U.S. and the French system mirrored bitter in-fighting within SPARRSO over control of the organization.

ANALYSIS OF EFFECTIVENESS

This activity has many features in common with the South Pacific Severe Storm Detection and Warning System project, known by the acronym SPSSD/WS (Case Study #13). Both activities were OFDA-financed enhancements of existing satellite ground stations to increase the resolution of satellite images and to improve the capacity to interpret the data. Both have been carried out through PASAs with NOAA and NASA. Both were essentially feats of fairly successful transfer of sophisticated technology for which the United States is seen as being the world leader. However, while the relatively free standing activity may have succeeded in its own terms, it was not fully integrated into a larger set of objectives.

Planning and Project Design

The Logical Framework was reconstructed long after the project was completed and assumes a linkage between the satellite ground station and disaster preparedness that was at best only implied at the time of implementation. As was noted, SPARRSO distributes copies of meteorological satellite pictures to the Meteorological Department, the Air Force, Water Development Board, Ministry of Agriculture, Civil Aviation, and USAID. SPARRSO has no control over and no particular interest in the use of these pictures for meteorological forecasting and storm warnings, the provenance of the Meteorological Department, or for evacuation of vulnerable areas, the responsibility of the Cyclone Protection Program (CPP), an inter-agency body. Nevertheless, on the whole, GOBD agencies have made fairly good use of severe storm warnings during the past eight or ten years, but the issue of who would actually use the outputs of this project (satellite images) does not appear to have been addressed when the project was designed and implemented.

The assumptions linking the Purpose of this project (Improving the disaster alert and cyclone early warning system for Bangladesh) with the Goal (Minimizing deaths and injuries due to severe storms) were that better forecasts would be used, and become better warnings. This assumption, implicit in the project, was fallacious. In any case, it was too important to be left outside the framework of the project. The creation and dissemination of warnings should have been addressed directly.

Resource allocation

This is by far the largest OFDA project in Bangladesh and is, indeed, the only one to have required substantial funding. Two other OFDA projects are, like this one, classified as technology transfer related to wind storms: the Typhoon Forecasting Program in the Philippines, which had a budget of about $560,000, and the South Pacific Severe Storm Detection and Warning System in Fiji, which had a total budget of about $610,000.

Implementation

The host government technicians reported that the training was only 25% of what was planned.

Obviously most of the equipment worked well, under very hostile conditions, for about eight years, which must be considered a very good record. But also obviously, some of the equipment was poorly specified or selected in the first place, particularly the printer and the antenna motor.

Sustainability

The importance that the GOBD attached to the project is demonstrated by their support for the construction and subsequent maintenance of the new SPARRSO building. But this project presents a classical case study of the difficulty of technology transfers especially when more than one donor is involved. For example, it is absurd to install two separate and competing systems, the U.S. and the French, in order for two Bangladeshi bureaucrats, long-time rivals, each to have a technological power base from which to influence the organization. This rivalry managed to continue for several years because the Ministry of Defence did not have anyone with both the scientific and the managerial capability to bring rationality to the organization. As a consequence virtually no foreign exchange has ever been available for either system, both of which are almost entirely dependent on their respective donor governments for even the smallest spare part. Both the U.S. and the GOF believe sincerely in the superiority of their system, thus neither is willing to abandon its system. The appointment of a new Chairman of SPARRSO in late 1989 is a sign of continued commitment by the GOBD to sustaining the institution, which had deteriorated so badly that foreign donors were very reluctant, or unwilling, to provide funds.

Technological systems will not be financially sustainable in Bangladesh in the foreseeable future. More than 90 percent of the development budget, and a majority of all GOBD revenues, comes in the form of foreign aid grants. This was well recognized by all parties at the outset. Thus, the HRPT system was very nice as a gift which required very little from GOBD. It was technically sustainable because of almost continuous presence in SPARRSO of U.S. technical advisers during most of the 1980s. Although HRPT unquestionably gives better resolution pictures than the LRPT system it replaced, it is not clear that the technical improvement had any appreciable impact on disaster preparedness. SPARRSO itself has not been assigned, and does not wish for, any responsibilities for forecasting storms or warning vulnerable populations. Other agencies of Government, including the Meteorology Department and the Ministry of Relief and Rehabilitation, do this. In Bangladesh, as in most countries of the world, the constraints in the linkage between forecasting and warning are fundamentally bureaucratic and political, not technical. Although this activity may have made a marginal contribution to improved forecasts of severe storms, it did not attempt to translate this improved capability into actual preparedness.

RECOMMENDED ACTION

- Insure that under the third phase of A.I.D. support to SPARRSO (beyond August 1989), spare parts and technical assistance required to get the HRPT back in operation are provided.

STRATEGIC IMPLICATIONS

- Constraints in linking forecasts to warnings are often bureaucratic and political, not technical.
- Activities should be designed to bridge the gap between technological accomplishments and governmental and community based action.
- Donor coordination is required to assure scarce foreign exchange is not expended to support the operation of competing or redundant satellite systems.

CASE STUDY 9

INDONESIA: VOLCANO MONITORING AND RESEARCH

SUMMARY

In 1984 OFDA began funding the Volcano Monitoring and Research Project, which was begun by the U.S. Geological Survey (USGS) in 1981. OFDA provided funding to the USGS to upgrade the Volcanological Survey of Indonesia's volcano monitoring networks, prepare a national volcanic assessment, recommend monitoring strategies for high-risk volcanoes, and assess existing linkages between volcano monitoring and disaster management.

The project produced valuable scientific data that provides a foundation for disaster preparedness work but did not improve linkages between volcano monitoring and disaster management.

$779,217 FY 1984-1985, 1987-1988

INTRODUCTION

Indonesia has 78 active volcanoes which threaten the welfare of perhaps 3.5 million people. The Volcanological Survey of Indonesia (VSI) maintains a chain of 49 volcano observatories staffed by scientists of many disciplines. From 1981 to 1988 the U.S. Geological Survey (USGS) provided technical advice, equipment, and training, financed first by USAID/I (from 1981-83) and subsequently by OFDA (from 1984-88).

Preparation of this case study report included a visit in October 1989 to the headquarters of the VSI, in Bandung, and interviews with the Director of VSI and other senior project counterparts as well as with concerned officials in the US Embassy and the USAID.

OFDA ACTIVITY

Project Context

Indonesia is an archipelago of 13,677 islands covering three time zones and stretching more than 3,000 miles off the southeastern coast of Asia, from the Bay of Bengal to Melanesia. The major land masses are the islands of Sumatra and Sulawesi and two islands, Borneo and New Guinea, which are split with neighboring countries. The major population center is the island of Java, which contains 100 million of the country's 170 million people, or about 60 percent of the population packed onto only six percent of the land area.

Indonesia has emerged during the past two decades as a stable secular democracy with a powerful central government and substantial local autonomy, reinforced by the geographic expanse and cultural diversity of the country. An OPEC member, Indonesia is well-endowed with petroleum and natural gas, minerals, tropical hardwoods, and fisheries. Per capita income of about $550 puts it far behind its ASEAN neighbors Brunei Darussalam, Singapore and Malaysia, but roughly on a par with Thailand and somewhat ahead of the Philippines.

Virtually every type of natural disaster occurs in Indonesia; the chief ones are earthquakes, volcanoes, landslides, floods, droughts storms, tsunami, fires, and agricultural diseases and pests. There are about 130 active volcanoes, meaning that they have erupted within the past several thousand years; about 78 of these have erupted within the past 400 years. The country has a total of 49 volcano observatories.

Fifteen years ago, the number of people who were vulnerable to volcanoes in Indonesia was estimated at 2.4 million. The Director of VSI is sure that the number in 1989 was substantially greater; if the population growth is taken as 2.2 percent annually, about 3.5 million people (or 2 percent of the total population) are vulnerable to volcanoes in Indonesia today.

Two considerations which put the threat of eruption of Indonesian volcanoes into perspective should be kept in mind. First, humans have continuously inhabited Java for more than 100,000 years and have built up a substantial conventional wisdom about eruptions. Second, although Java in particular is densely populated, people have for many years been prohibited from dwelling in areas vulnerable to lava or mud flows.

The OFDA Disaster History Report for Indonesia lists 14 volcanic eruptions between 1900 and early 1987. However, the temporal distribution of the events strongly suggests that the data are very incomplete and that the actual frequency is much higher, perhaps as high as one or more eruptions in a typical year. The Report lists eruptions in 1919, 1951, 1963, 1966 (two events), 1979, 1982, 1983 (three events) and 1984 (two events). The three earliest eruptions on the list were the most deadly, killing 5,000, 1,300 and 1,584 people respectively. Whether because of better warning systems or other reasons, the recent volcanic eruptions have not resulted in loss of life; no one in Indonesia has been killed by a volcano since Mt. Galunggung erupted in April 1982.

With the exception of the Mt. Galunggung eruption in 1982, which affected 300,000 people, recent volcanoes have been only a modest annoyance, affecting about 10,000 people in a typical eruption. Damage reports are very incomplete, but the order of magnitude of damage from a major volcanic disaster is suggested by the $160 million damage caused by Galunggung and the $150 million damage caused by Mt. Gamalama in September 1983. Most eruptions cause much less damage.

Assistance to Indonesia from the USGS started in March 1979 through a PASA between USGS and USAID Jakarta. The first phase ended in April 1984.

It provided technical assistance in a cooperative training program for the Directorate General of Mines. The program had 16 components dealing with topics ranging from coal to landslides.

One of the four geological agencies within the Directorate General of Mines is the Volcanological Survey of Indonesia (VSI); a sub-project entitled "Strengthening the VSI" endeavored to improve personnel capability at the VSI and mostly involved training. It also provided some equipment, particularly a seismograph which was intended as a model for the VSI staff to study. Coincidentally, the sub-project started shortly after a major eruption of gas on the Dieng plateau which brought quite a lot of publicity. The USGS Advisory Vulcanologist was Dr. Thomas H. Casadevall, who subsequently spent three years in Indonesia with the OFDA-funded project.

PROJECT DESCRIPTION

Rationale

In 1984, the rationale for volcano monitoring was obvious to everyone in the GOI and the US Mission, including the Ambassador and senior officials in USAID/I. Some parts (apparently not all) of the earlier USGS project were considered to have been particularly successful, and these included the strengthening of the VSI. This led to a request from the GOI for further USGS assistance in volcano research which was strongly supported by the U.S. Ambassador. However, both AID/S&T and USAID/I declined to provide further funding since, the project had been running for more than five years. OFDA was approached and agreed to finance an extension providing $78,300 to cover five and one-half months of short-term activities. The PASA was subsequently formally amended to provide for a longer term intervention and PASA ended up costing nearly $780,000 over four and one-half years.

Project components and objectives

It is difficult to construct a Logical Framework for this project. There is no evidence that it was ever subjected to anything other than an informal "formulation" or "design." In fact, there is considerable evidence that the project operated with a set of divergent understandings which could have been avoided if a Logical Framework were constructed during the design phase.

The project began in April 1984 when OFDA negotiated a $78,300 PASA with USGS to provide technical services on a short-term basis (15 April to 29 September 1984) to the VSI for the following tasks:

1. Provide consultant services of an advisory volcanologist and instrument specialist;

2. Prepare a national volcanic hazards assessment;

3. Develop mobile "rapid response" team at VSI to respond to volcanic crises;

4. Continue systematic monitoring and studies of Merapi volcano; and

5. Upgrade volcano monitoring networks, including use of satellite telemetry.

On 1 August 1984, the original PASA was amended to extend the completion date by three months, to 31 December 1984.

In March 1985, the PASA was again amended to provide an additional $465,000 and extend the completion date to 1 July 1987, provide 23 additional technical specialists, and add a sixth task:

6. To assess the existing linkages between volcano monitoring and the disaster management system of Indonesia.

Following an OFDA review of the project, the PASA was amended a third time in August 1987, adding $197,582 and extending the completion date for a year, until 1 July 1988. Four TDYs were funded and a seventh task added:

7. To prepare reports assessing hazards and recommending monitoring strategies for high risk volcanoes.

Finally, in July 1988 the PASA was amended a fourth time to extend the project two months, to 31 August 1988.

The major project inputs were the Advisory Volcanologist, who was resident in Indonesia for three years, and 15 USGS scientists who made a total of 20 visits to Indonesia. Some spare parts and new equipment were provided. OFDA obligations totalled $779,217.

Implementation

Periodic implementation reports -- eleven during the life of the project-- were prepared by the Advisory Volcanologist. Supplemented by interviews with most of the important actors in the project, they form the basis for the following account concerning the project's seven tasks:

Task 1: Provision of the consultant services -- an Advisory Volcanologist and up to 23 specialists on TDY, such as instrument specialists, volcanic hazards specialists, volcanic gas specialists, and tilt measurement specialists. The Advisory Volcanologist and Project Officer, Dr. Thomas J. Casadevall, arrived in Jakarta in May 1985 expecting to reside in Indonesia for two years, but stayed for a third year which was financed by unexpended funds for TDY specialists. In addition to providing full-time advice, he organized all of the short-term consultancies.

Fifteen USGS scientists had a total of 20 short-term assignments in Indonesia during project implementation. The final report on the project notes, "The principal change affecting USGS performance and their obligation was that OFDA reduced the level of funding by 13% from that originally approved in the PASA."

Task 2: Preparation of a national volcanic hazards assessment. The project was only partly successful in gathering and plotting hazard data on base maps due to the prolonged absence of the VSI scientist assigned to work on the map.

Task 3: Develop mobile "rapid response" team at VSI to respond to volcanic crises. There were a total of nine rapid responses by VSI to volcanic crises during the life of the project. Equipment used was largely drawn from the previous USAID-funded project. There were a total of ten eruptions which required the evacuation of 34,400 people.

Task 4: Continue systematic monitoring and field studies at Merapi volcano, providing the basis for a "high technology" volcano observatory. The key counterpart in VSI, the Merapi Volcano Observatory (MVO), was provided with spare parts to maintain previously-purchased equipment, with three new microcomputers, and with the consultancy services of 11 of the 20 USGS TDYs who visited Indonesia during the project.

Task 5: Upgrade volcano monitoring networks, including use of satellite telemetry, if feasible, at selected test sites. It did not prove feasible to use satellite communications for monitoring volcanoes, but some progress was made to improve communication among VSI observatory posts.

Task 6: Assess the existing linkages between volcano monitoring and the corresponding disaster management system of the GOI and coordinate/promote activities dedicated to improving and further institutionalizing this system with primary focus on how lives may be saved, injuries limited and appropriate evacuation and relief assistance provided in the event of volcanic crises. The Advisory Volcanologist made "considerable efforts" to link the VSI with agencies in Indonesia, such as the Ministry of Science and Technology on the falling water level in Lake Toba, and Asia, such as Quantas Airways for the Vulcan Airwatch rapid warnings for aircraft.

Task 7: On the basis of specific hazards associated with the highest risk volcanoes, and in cooperation with appropriate GOI agencies, prepare reports to assess hazards and recommend monitoring strategy for several of the high risk volcanoes including an example for a stratovolcano, eruptions involving crater lake volcanoes, and maar-forming eruptions.

<u>Present Status</u>

Advisory services continued after the OFDA project ended.

Starting in December 1987, for one year, the Asian Development Bank (ADB) sponsored the resident advisory services of Dr. Norman McLeod, who is a retired USGS staff member.

Although the operational budget of VSI has been severely cut, the routine budget, which covers the salaries of observers, is increasing slightly. In October 1989 the VSI appeared to be a healthy and capable institution.

ANALYSIS OF EFFECTIVENESS

Planning and project design

Objectively verifiable indicators of success, were not sufficiently clear to be able to judge the effectiveness of the professional advice and equipment that were delivered. However, the objectives of the project that OFDA initially funded were essentially scientific and only marginally focussed on linkages between volcano monitoring and the disaster management system of Indonesia.

Resource allocation

This is a somewhat unusual project because it is perhaps the only one among those selected for case studies that is both country-specific and provided a resident adviser. And the adviser was resident for more than three years.

Implementation

In October 1989, 14 months after the project ended, the Indonesian counterparts expressed warm personal regards for the Advisory Volcanologist. They noted, however, that his professional background is Geochemistry, which in their view is more important for field research than for forecasting eruptions, seismology is normally considered the key discipline for forecasting. (Since the Mount St. Helens eruption, there has been considerable debate about the value of gas detection methods for eruption forecasting.)

The Indonesian volcanologists likewise did not consider all of the short-term consultants to have been of the quality that was expected. The Director of VSI, Mr. Subroto Modjo, took up his present position in June 1988, shortly before the project ended. In a letter to OFDA he wrote, "Please send us experienced TDYs. Some from USGS were too specialized. We need experienced generalists. Some who were sent to us were Ph.D. students." "Please keep in mind," he added, "that we need to train capable volcano observer/scientists who are managers and have multi-disciplinary scientific backgrounds."

There were also problems with local funds for the USGS TDY specialists. According to the VSI Director, starting in 1986, the VSI budget was slashed to only one-ninth of its former level, and there were no counterpart funds for TDY travel. "It made no sense for people to come all the way from USGS to Indonesia and then not be able to travel around the country to see volcanoes," he said. "I saw that training was not as much as expected, but USGS did not have funds for training [in the USA]. Their training was in the right fields for us, though."

OFDA was aware of these very issues. Although the project was strongly supported from USAID Jakarta, particularly by the MDRO, OFDA did note that some key elements of the activity were not receiving sufficient emphasis. In July 1987, the OFDA Project Officer visited the project. His Trip Report indicates that "OFDA likely would not be able to support the same type of project in Indonesia in the future... because of the basically scientific nature of the initial project objectives." He noted that much had been done to give the project a more appropriate disaster management focus, specifically tasks 6 and 7, and that future proposals should ask "What does this have to do with disaster preparedness?"

Sustainability

This project focussed on the technical aspects and not on institution-building. This may be because the VSI, founded in 1920 and having a staff of over 400 people, had already been in existence for many years when the project started and was operating at a scale, in terms of facilities and manpower, that was far beyond OFDA's resources to affect greatly. Although draconian reductions in the VSI budget had a negative impact on implementation of the OFDA-assisted project, the existence of the VSI itself was never threatened and, indeed, the VSI staff has expanded slightly in the past two years.

Maintenance of equipment supplied by the project was a serious problem even before the project ended. There is some evidence that the shortage of funds has meant that VSI cannot hire enough technicians to keep all of its technical equipment working well and cannot get those technicians it does have into the field on a regular basis.

A decade of USG assistance to Indonesia in volcanology came to an end in 1988, and there do not seem to be any plans afoot to start a new phase of technical cooperation. For the moment, the Asian Development Bank (ADB) and the GOF are the major financiers of international assistance in volcanological research at VSI, which will continue at least into 1990. However, the Japanese also provide technical assistance now and are likely to play an even larger role in the future. Given the declining levels of U.S. aid to Indonesia and other priorities, both scientific and in disaster mitigation, significant additional OFDA-financed assistance in volcanology does not have ready justification.

In 1986, however, OFDA, along with UNDP, began a new project in Indonesia called "Strengthening Disaster Preparedness and Disaster Management" (See Case Study #10), which, in fact, provides the framework for using scientific information, including that from the VSI, for preparedness and hazards management. This "next generation" project was a logical step in OFDA's involvement in Indonesia.

RECOMMENDED ACTION

- Assess the need for additional USGS provided technical training of volcano observers, seismograph operators, and volcanic instrument technicians.

STRATEGIC IMPLICATIONS

- Technology activities can only achieve practical results if they are explicitly designed to bridge the gap between research and disaster mitigation/preparedness.

CASE STUDY 10

INDONESIA: STRENGTHENING DISASTER PREPAREDNESS AND DISASTER MANAGEMENT

SUMMARY

This activity was designed to strengthen key aspects of disaster management through an integrated multi-sectoral approach. Begun in 1986 with external funding provided by OFDA and UNDP, the activity was managed by staff seconded from various Indonesian Government ministries.

The activity has resulted in over 370 Indonesian trained in disaster management and has significantly improved the country's level of disaster preparedness. Although difficult to quantify, the project has almost certainly resulted in reducing deaths and property damage resulting from disasters.

$350,910 FY 1986-1987

INTRODUCTION

Strengthening Disaster Preparedness and Disaster Management in Indonesia is a technical assistance project jointly financed by OFDA and the United Nations Development Programme (UNDP) and implemented by the United Nations Disaster Relief Office (UNDRO) between April 1986 and April 1989 at a cost of $700,000 of foreign aid and $1 million in local currency from the Government of Indonesia (GOI). The case study report was based on a review of all relevant documents and interviews in Jakarta during October 1989 with nearly all key people involved in the project.

Simultaneously with the implementation of this project, OFDA was financing technical assistance for volcano monitoring and research in Indonesia (see Case Study #9), for earthquake hazard mitigation in four ASEAN countries (see Case Study #20), and was providing core support for the Asian Disaster Preparedness Center (see Case Study #23), which trained 28 disaster managers including several responsible for this project.

OFDA ACTIVITY

Project Context

Indonesia is an archipelago comprising 13,677 islands covering three time zones and stretching more than 3,000 miles off the southeastern coast of Asia from the Bay of Bengal to Melanesia. The major land masses are the islands of Sumatra and Sulawesi and two islands, Borneo and New Guinea, which are split with neighboring countries. The major population center is the island of Java, which contains 100 million of the country's 170 million people, or about 60 percent of the population packed onto only six percent of the land area.

Indonesia has emerged during the past two decades as a stable secular democracy with a powerful central government and substantial local autonomy reinforced by the geographic expanse and cultural diversity of the country. Indonesia is well-endowed with petroleum, natural gas, minerals, tropical hardwoods, and fisheries. Per capita income of about $550 puts it far behind its ASEAN neighbors Brunei Darussalam, Singapore and Malaysia but roughly on a par with Thailand and somewhat ahead of the Philippines.

Virtually every type of natural disaster occurs in Indonesia; the chief ones are earthquakes (three distinct belts), volcanoes (128 active), landslides, floods, droughts, storms, tsunami, fires, and agricultural diseases and pests.

Due in part to the successful data compilation by this project, the OFDA/USGS volcano monitoring and research project, and the earthquake hazard mitigation project, natural disasters are well documented. In the five-year period from April 1978 to March 1983, there was an annual average of 2,814 significantly destructive events in Indonesia. These caused an annual average of 1,000 deaths, 5,000 injured, 100,000 homeless, 1 million hectares of agricultural land destroyed, and total direct costs equivalent to approximately $125 million. The threat to both human lives and economic development is increasing with a growing population and expanding infrastructure.

The GOI's current practices in disaster management were defined in Presidential Decree No. 28 of 1979, which established a non-structural coordination system at the national, provincial and regency levels.

Collaboration between the GOI and multilateral donors in disaster mitigation began in 1975 when UNDRO undertook a survey of the machinery for pre-disaster planning and disaster relief coordination. External technical cooperation intensified and broadened to include the UNDP, UNICEF, ILO and OFDA following the eruption of Mt. Galunggung in 1982.

PROJECT DESCRIPTION

Rationale

The rationale for the project was twofold. First, Indonesia is subject to potentially destructive natural phenomena that are more frequent and varied than in most countries, and disaster management is complicated by the large physical expanse and varied geographical character of the country.

Second, the GOI recognized the importance of cross-sectoral coordination in disaster mitigation and response. In June 1984, a feasibility study of a disaster management institute in Indonesia recommended that it should be a national focal point for disaster-related activity. For budgetary and policy reasons, the GOI decided not to create a new separate institution but to set up a center that would operate under joint efforts of ministries through seconded staff.

It was agreed by all parties that the project would be jointly funded by the UNDP and OFDA, since both organizations had been actively cooperating with the GOI for several years.

Objectives and components

The project is described clearly and at length in the UNDP Project Document, INS/82/020. Although UNDP terminology is somewhat different from that of the Logical Framework, both descriptive systems share a four-tier hierarchy of objectives.

The **Goal** of the project was to:

> Strengthen key aspects of national cross-sectoral disaster management in the next decade by profiting from the experience and expertise which exist in Indonesia and from new effective methods and technology emerging in disaster management in Indonesia and other countries worldwide.

As designed, the project had five "immediate objectives" which correspond to the **Purpose**. These were:

1. To improve the disaster management capabilities of key inter-departmental staff in Indonesia's natural disaster emergency organization... at the national, provincial and regency levels by means of an integrated disaster management training program...;

2. To develop optimum use and coordination of disaster-related resources and activities... by making available... a cross-sectoral.. Organization and Procedures Handbook...;

3. To identify, and to a limited extent to implement, resources and procedures that will make it possible to communicate to all interested parties... according to respective needs, all necessary disaster-related operational information as rapidly, accurately and completely as possible;

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4. To foster integrated cross-sectoral risk-specific, pre-disaster planning for populations, property and development programmes at risk, and;

5. To provide the basis for further developing national disaster management capability over the medium-term... by means of an inter-departmental resources and procedures study on future options for disaster management in Indonesia.

In line with the Government's intention to integrate departmental disaster operations, the project was conceived as a framework for implementing five mutually supportive groups of activities, termed outputs, headed respectively by representatives of five different ministries designated as activity leaders. The **Outputs** were:

Output 1: Integrated disaster management training syllabus and program of instruction on cross-sectoral disaster management for master trainers, departmental core staff, and provincial and sub-provincial officials;

Output 2: Organization and procedures handbook providing basic standard guidance for disaster management;

Output 3: Measures to strengthen disaster-related communications and information management;

Output 4: Resource and procedures study on cross-sectoral risk monitoring and control; and

Output 5: Resource and procedures study on future options for disaster management in Indonesia.

Inputs were to be provided by both the GOI and the UNDP.

GOI inputs were: a National Project Director; activity leaders and one other staff member for each of the five activities; administrative support staff; local costs of training; and office facilities and supplies. The total budget for the GOI contribution was equivalent to almost exactly $1 million.

UNDP inputs were:

International staff

- One Chief technical Adviser, 18 person-months over 3 years;
- International consultants, 30 person-months over 3 years;

Local staff

- National Project Coordinator, full-time, 36 person-months;
- National consultants, 84 person-months;
- Administrative staff, 72 person-months;

Equipment

- vehicle, 6 micro-computers, duplicating equipment, books;

Training

- Fellowships; in-country training on micro-computers;

Travel

- international travel;

Miscellaneous

- sundry.

The UNDP budget totalled $700,000 plus support costs (overhead) of $34,684. OFDA contributed $350,910 to UNDP as "Third Party Cost Sharing." The UNDP country program in Indonesia contributed the other half of project costs; $350,000 plus the overhead.

Implementation

The structure of the project reflected the organization and structure of the Badan Koordinasi Nasional Penanggulangan Bencana, abbreviated BAKORNAS PBA, the National Coordinating Board for Natural Disaster Relief. The Coordinating Minister for People's Welfare acts as the General Chairman of the Board, and the Ministers of the Departments of Social Affairs, Home Affairs, and Public Works are respectively the first, second and third chairmen. The Director General for Social Assistance Development is the *ex officio* Secretary to BAKORNAS PBA. Following this arrangement, the Department of Social Affairs was designated the Government Implementing Agency of the project. The Director General was designated as National Project Director with responsibility for overall supervision. Day-to-day implementation was the responsibility of the National Project Coordinator, a retired senior government official.

Implementation of the project formally started on 14 April 1986 and ended three years later, in April 1989. Tripartite Reviews by the GOI, UNDP, UNDRO, and OFDA were held in July 1987 and August 1988. The terminal Tripartite Review was held following the completion of the project, on 1 August 1989.

An independent evaluation of the project was carried out during the summer of 1989 by the UNDP and UNDRO in the context of a thematic evaluation of UNDRO-executed disaster mitigation projects. There is thus an unusual amount of high-quality documentation on the achievements and problems of the project. The following summary is drawn from the project Terminal Report and from a draft of the relevant chapter of the UNDP thematic evaluation.

GOI in-kind contributions are estimated to have been equivalent to slightly more than $1 million. Both full-time and part-time staff were made available, and a substantial building complex was allocated to the project and designated as the Indonesia Disaster Management Center.

The achievement of project outputs may be summarized as follows:

Output 1: Integrated disaster management training syllabus and program of instruction on cross-sectoral disaster management. This was achieved through training 371 people:

- National level: 38 graduates of one course, including participants from all concerned departments and NGO members of BAKORNAS PBA;

- Provincial level disaster management core staff: 78 graduates of two courses, including participants from all concerned members of SATKORLAK; and

- Regency and municipal level: 255 graduates of eight courses.

Output 2: Organization and procedures handbook. The project produced three drafts of guidelines for disaster management, the last of which received interdepartmental approval but is not considered fully satisfactory.

Output 3: Measures to strengthen disaster-related communications and information management. Capability analyses and specific proposals for better integration of systems were produced.

Output 4: A study on risk monitoring and control. Analyses of the disaster risk monitoring mechanism and capabilities was produced; a conceptual framework and draft legislation on disaster impact analysis was produced; and specific proposals for integration of risk monitoring in development planning and disaster mitigation were developed.

Output 5: A study on future options for disaster management in Indonesia. Recommendations on policy, organization and procedures to strengthen disaster management at all levels was produced.

Present Status

When this case study was being prepared, in October 1989, the project had been completed six months prior. Concerned officials in the GOI, UNDRO and UNDP were awaiting a revision of the Presidential Decree that provides the legal basis for disaster mitigation and relief in Indonesia. It was expected that this would be forthcoming before the end of 1989.

Although the IDMC is open and continues to function, it does not yet command the regular budget resources to carry out an innovative and proactive program. Among the highest priorities are hazard mapping studies, by province, covering the major hazards in each province.

Indonesia is making rapid strides in linking computers and using them for decision-making. Among the strongest existing links are those among the Coordinating Ministry for Population and the Environment (KLH), the Board for

Science and Technology (BPPT), and the Ministry of Establishment (MENPAN). Adding disaster-related information to these networks is an obvious step which has recently gotten underway.

Most important for the long-term is the relationship between disasters and the environment. "We see a close link between disaster management and environmental management -- it is the other side of the coin," said Dr. R.E. Soeriaatmadja, the Staff Expert of the Coordinating Ministry for Population and the Environment (KLH), who is the KHL representative at the IDMC. The threat of industrial catastrophes and widespread pollution from industry and agriculture are well-recognized in Indonesia, as are tough issues of natural resources management including forest products, marine products, minerals, and petroleum. Links between these issues and more "classical" problems of sudden-onset natural disasters will need to be worked out in detail in the next few years.

ANALYSIS OF EFFECTIVENESS

Planning and project design

The draft project evaluation report found that:

> "Overall, the immediate objectives respond to a strategy which would, at the end of the project, enable the Government of Indonesia to consider how best to revise their existing disaster management system to better respond to the needs of the people. As such, the mission found those objectives legitimate and mutually supportive. Those objectives however were not formulated in measurable and verifiable terms...[I]t is difficult to assess to which extent the objectives of the project have been successfully reached."

Resource allocation

The UNDP budget was revised four times during implementation in accordance with standard UNDP procedures. A comparison of the budgets at start and completion of the project shows:

- Much less was spent on international consultants than originally planned ($76,568 vs. $126,000);
- Much more was spent on training than originally planned ($164,664 vs. 102,500); and
- Much more was spent on equipment than planned ($201,810 vs. $114,500).

Variations of these magnitudes are typical of UNDP-assisted projects. They may be interpreted as reflecting a lower perceived requirement for foreign advisers and more emphasize on capacity building through training and equipping the IDMC than was foreseen at the time of project formulation.

Overall, the project spent $695,975 out of its $700,000 budget.

Implementation

The project was started amid an atmosphere of considerable uncertainty about how well five separate ministries of the GOI would work together. It should be recalled that on the one hand the record of interministerial cooperation was mixed at best. And on the other hand the senior authorities of the GOI refused to countenance the creation of a specialized new agency to mitigate and manage disasters. Given these constraints, the project proved to be very successful; virtually every informant interviewed in the preparation of the case report said that it was fully to their satisfaction. Many of them indicated that it proved to be better than expected.

OFDA and USAID Jakarta stayed in close touch with the project throughout the three years it was underway. The OFDA Project Officer and the MDRO participated in the annual Tripartite Reviews.

Sustainability

In 1985 world oil prices fell from a high of about $32 a barrel to about $18. This had a major impact on Indonesian government revenue, about 60 percent of which came from petroleum exports. Along with all other government projects, the disaster preparedness and management project received a lower budget than had been hoped. Government of Indonesia funding nevertheless totalled the equivalent of more than $1 million during the life of the project, primarily in the form of a complex of buildings housing the Indonesian Disaster Management Center and the salaries of up to 24 officials who worked on the project part-time. From a financial viewpoint, the project appears to be sustainable indefinitely at its current level; although additional external technical assistance is expected in order to continue to strengthen the system.

This conclusion was also reached by the evaluation mission, which reported that it was "satisfied that the present results of the project will be sustained in the future. The meetings with the five ministers, members of BAKORNAS PBA, clearly revealed the determination of the GOI to pursue further all required efforts to mitigate the effects of natural and man-made disasters."

In June 1989 a UNDP/UNDRO team of consultants led by W. Nick Carter, visited Indonesia to formulate a proposal for a second phase of the project. It is anticipated that the project would start in early 1990 for a period of three years. The basic principles of the follow-up project are to: (a) capitalize on and maximize the products of the first phase and, (b) to assist the GOI toward the attainment of national self-viability in disaster management. The second phase of the project is expected to continue the fruitful cost-sharing and professional collaboration among OFDA, UNDP and UNDRO that began in 1982.

In conclusion, although the project was not designed with a rigor that allowed accomplishments to be measured and verified, the project has nevertheless improved disaster preparedness in Indonesia. A United Nations evaluation of the project stated that there is "no doubt that preparedness and prevention initiatives have lead to the decrease of the victims from disasters."

RECOMMENDED ACTION

- If a proposal for phase II of the project is presented for funding, OFDA should consider providing approximately 50% of the foreign exchange requirements over the next three years.

STRATEGIC IMPLICATIONS

- Long-term planning increases the probability of attracting multi-donor financing.

- Eliciting the support of key government planners from a variety of ministries will improve the results of disaster preparedness/ mitigation activities.

- Preparedness/mitigation programs benefit from a multi-sectoral approach that draws upon skills and resources resident in existing government ministries.

CASE STUDY 11

PHILIPPINES: TYPHOON FORECASTING PROGRAM

SUMMARY

In 1983, then-President Marcos made a state visit to the U.S. Knowing that Marcos was interested in a politically-unacceptable proposal to prevent typhoons through mechanical means (cloud seeding, etc.), OFDA quickly prepared a typhoon tracking proposal to forestall any awkward requests. That same year, OFDA contracted with Science Applications, Inc. (SAI) to transfer early warning technology to the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), to fund exchange of scientists between the U.S. and the Philippines, and to train PAGASA staff in the use of new computer hardware and software, as well as in radar technology.

This case, seen alone, seems limited in its applicability to mitigation (rather than early warning). However, OFDA seems to have overcome these initial limitations by funding corollary public awareness activities and by providing an additional direct goal to PAGASA for equipment upgrades and training.

FY 1983-1984 $559,544

INTRODUCTION

Typhoons are the most common of all natural disasters in the disaster-prone Philippines, with an average of 13 occurring each year. The most populous and largest of the 7,000 islands which make up the Republic of the Philippines is Luzon. This island sits directly astride the most common route for typhoons out of the Pacific, and sustains the brunt of damage from high winds and flooding. Manila, the capital of the nation, is a frequent target, as is the heavily-populated Bicol region on the south-east coast.

In this century (through 1986), 12,667 people have died in typhoons and related phenomena - nearly twice as many as the next most deadly event, earthquakes (6,812 dead in the same time period.) In the period 1982 to 1986, the Philippines suffered 33 major typhoons, which killed 3,057, injured 11,849, affected 8,650,800 persons, and did roughly US $500,000,000 in damage to homes, crops, and infrastructure. During 1989 to date (late October), typhoons killed nearly 400 persons in the republic. Much of the death and damage is a result of flooding and mud slides caused by typhoon winds, and this damage is increasing over time, with accelerating deforestation and the expansion of agriculture into marginal land. Death and destruction from typhoons are on the rise in the Philippines.

OFDA ACTIVITY

Project Context

Information on the Typhoon Forecasting project is scarce. USAID/P has no information available on the undertaking; it has recently moved offices and sent files of activities prior to FY 1987 to archives. The current PVO Specialist in the office, Mr. De la Cruz, was not at AID when this project was being implemented. The person at PAGASA responsible for the undertaking was not available during the field visit; others were aware of the project benefits (their equipment and training), but not of other details. Much of the information below, therefore, comes from OFDA itself, and from the proposal and quarterly reports of the contractor, Science Applications, Inc. (SAI). Little field verification of outputs other than tangible equipment was possible.

PROJECT DESCRIPTION

Rationale

In addition to responding to real and understandable political pressures, OFDA knew from previous work in the Philippines, and with PAGASA, that typhoon tracking capacities were archaic and incapable of accurate tracking at the critical, short range (24 hours or less) stages. For years, the Philippines had been able to get its short-term storm path information from U.S. weather flights out of Guam, but those had recently been terminated.

OFDA had previously worked with SAI in storm tracking and warning systems in the Bay of Bengal, and so they turned to that firm to assist in the Philippines. The plan SAI came up with was more ambitious than OFDA could afford; the two agreed to a less extensive series of tasks, and the contract was signed in July, 1983.

Objectives and Components

The project **PURPOSE** was "To provide technical assistance and to transfer state-of-the-art technology in typhoon forecasting to the Government of the Philippines (GOP), including hardware and software, training and technical assistance, to insure improved early warning of life threatening storms."

Project **INPUTS** include a main-frame computer (VAX11/730) and other computer hardware (IBM PC-XTS) for analog forecasting and KALMAN Filter Typhoon tracking, word processing and other software for probalistic forecasting analysis and local weather impact studies, technical books and manuals, and training for PAGASA staff on use and maintenance.

Project **OUTPUTS** were to be improved weather tracking capacities and staff trained to make full use of them. Neither is easy to document; among other problems, neither the proposal nor any subsequent reports give any indication of how many persons were to be trained. The final report does indicate that the contractor could not complete the final three of 14 tasks and that only 60% of the technical exchanges had taken place, radar maintenance training had not been done, and that other planned training had been "abbreviated."

Project activities largely involved an initial assessment of PAGASA's storm tracking capabilities and its equipment and training needs, and purchasing and installing the selected equipment. Staff were trained in both hardware and software use, but training in radar equipment was not held. Neither the proposal nor the reports use any progress indicators which indicate number trained, length of training, degree of mastery, or any quantifiable or qualitative measures of improved capacity.

Implementation Events

SAI purchased and installed equipment and provided training in its use within the two year time period. They requested an additional $80,000 to complete the final three tasks of their scope of work; OFDA determined that the priority activities had been accomplished, and asked the contractor to complete the activity with the available funds. SAI subsequently proposed a second series of activities, totaling $1.1 million for weather radar maintenance training, development of and training in hazards analysis and risk assessment models, and various other rainfall/tsunami forecasting, plus ten scientific exchange visits; OFDA activity managers, aware of contractor problems in meeting objectives, chose not to fund this proposal.

As part of its ongoing management of this project, OFDA contracted with Dr. Charles R. Holliday in 1988 to "assess the current capabilities of the Philippine Government typhoon warning, the consequences of previous OFDA assistance...." Holliday determined that PAGASA's "capacity for forecasting typhoon future center location is about state-of-the-science for the 24-hour period."

OFDA had also asked Holliday to provide recommendations for follow-on assistance. He recommended that OFDA provide $50,000 to PAGASA for the development of more effective warning messages. Funding would cover two workshops, which would be attended by (among others) villagers from the most seriously typhoon-affected areas of the country. The purpose would be to prepare a series of warnings of increasing urgency, couched in language and accompanied by directions which could be understood by those most at risk -- the rural poor in unprotected coastal locations. OFDA agreed; this $50,000 is part of the $108,000 amendment to the Public Awareness program mentioned above. This initiative is being coordinated by Ms. Lolita Garcia, a PAGASA seismologist and the very successful director of the Public Awareness program. OFDA calls this an "enhancement grant" and sees it as addressing (at limited cost) some of the human attitude issues SAI did not include in its initial activities.

The Public Awareness program itself is the result of OFDA's recognition that the very high rate of death and destruction from typhoons in the Philippines is caused by public attitudes as much as by technological shortfalls. That follow-on program is their attempt to teach people how to respond to the early warnings they receive.

Present Status

The Typhoon Forecasting program ended in 1985. OFDA has just made $108,000 in additional funding available to PAGASA, as described above. One purpose of the equipment up-grade is to improve communications links between PAGASA (located in Quezon City, Metro Manila) and the weather and disaster units at U.S. Bases Clark and Subic.

ANALYSIS OF EFFECTIVENESS

OFDA spent $559,544 on this project prior to this year's new grant. For this sum, PAGASA clearly received equipment and some training. It is equally clear that training got short shrift; the three incomplete tasks all involved human resources. Technology transfer projects generally require extensive training -- not only initially, but both re-training and the training of new staff need to be part of technology transfer if it is to continue to be useful. The contractor was unable to meet their training objectives, and their performance left OFDA unwilling to invest further through SAI. OFDA's 1989 "enhancement grant" provides needed equipment upgrading without the added costs of using an intermediary contractor.

OFDA's follow-on activities to this undertaking (hiring Mr. Holliday as evaluator; funding Public Awareness; funding equipment upgrades, training, and workshops), have gone a long way toward overcoming some of the problems of SAI implementation.

Planning and Project Design

Political necessity and the experience of the high technology firm contracted shaped the direction of this activity. Only equipment needs were assessed; SAI apparently did not analyze any socio-economic factors affecting individual response to warnings. By defining only half the problem, the missing machines, only half the solution could be reached. Fortunately, OFDA recognized the corollary human needs, and funded the Public Awareness program. If this program is successful (and it looks very promising), the second half of the problem, public attitudes toward disasters, will also be addressed. Both technology and community-based popular education are needed to mitigate disaster.

<u>Implementation</u>. Within the narrow definition of the project, the procurement portions of operations seemed to have gone well. As mentioned above, training and scientific exchanges suffered, and the broader problem of warning acceptance was not broached.

Sustainability. This project did not appear to recognize recurring costs. No provisions were made for equipment or training upgrades, nor for the additional training required due to inevitable staff turnover. OFDA may need to deal with this on an ad hoc basis in the future, as it has with the 1989 grant. Given the large number of similar projects in its portfolio, however, OFDA might consider an annual line-item for equipment upgrade and additional training in the use of high technology equipment.

The long-term sustainability of the benefits of improved tracking technology depends on PAGASA's ability to locate the funding required for additional equipment and training. They have been quite successful at this; Japan and Australia are both providing very expensive, very modern equipment to PAGASA. OFDA needs to recognize that sustainable benefits in a high tech project demand continued funding; there are recurring costs inevitable in such an undertaking. The failure to provide funding for these costs results in un-serviced, un-used equipment and a total loss of the initial investment.

RECOMMENDED ACTIONS

- None: Project has ended.

STRATEGIC IMPLICATIONS

- OFDA should try always to link the technology transfer aspects of early warning projects with popular education activities aimed at changing community attitudes so that warnings will be heeded.
- OFDA has the skills and the experience to assume a leading role in defining community-based models for disaster preparedness and mitigation.

CASE STUDY 12

PHILIPPINES: PUBLIC AWARENESS PROGRAM

SUMMARY

Begun in 1988, this is a pilot attempt at educating Philippine elementary students about natural hazards. The Public Awareness Program grew out of the OFDA-funded Typhoon Forecasting Program (Case Study #11); OFDA recognized that early warning technologies could not significantly reduce typhoon risks until public attitudes change.

The high degree of professionalism in planning and designing this activity virtually guaranteed success in the pilot phase. This is a modestly priced, highl innovative, and potentially extremely powerful public education program, taking place in a nation highly at risk for natural disasters. It would seem sensible for OFDA to protect this excellent investment by assisting PAGASA in locating additional donors for Phase II. This appears a natural opportunity for OFDA to leverage additional funds. Also, if evaluations show this project to be as successful as it appears to be, OFDA might well consider similar projects in other nations at high risk. Any country with a well-organized primary education system should be able to replicate this approach to hazard mitigation without too much trouble.

$108,716 FY 1988-1989

INTRODUCTION

The Philippines is a nation stretching 1,800 kilometers north to south, and its 58,000,000 people are scattered over more than 350 of its 7,000 islands. It is one of the nations most at risk from natural hazards. The island chain is a sub-oceanic mountain range, and is bordered by the deepest ocean trenches in the world. Plate activity along the eastern border of the island chain is among the most mammoth known, resulting in a nation characterized by active volcanism and strong seismicity, tsunamis, volcanoes, lahars, and mudslides. Additionally, the largest and most populous island, Luzon, is directly on the path of typhoons and other wind storms, which bring severe flooding.

In the period 1982 to 1986, the Philippines suffered 33 major typhoons (3,057 dead, 11,849 injured, US $500,416,000 damage to buildings and crops, 8,650,800 persons affected); 5 floods (241 dead, 596,000 affected, US$9,579,000 damage); 3 earthquakes (27 dead), one volcanic eruption (there are 21 active volcanoes) and mudflow which resulted in deaths (25), a tsunami which killed 10 and affected 11,363, and assorted landslides killing a total of 3 and affecting an additional 1,925. Although risk mapping is rudimentary in the Philippines, experts there say there is no portion of the population which is not at risk from natural disasters.

OFDA ACTIVITY

Project Context

The Public Awareness Program funded by OFDA and the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) of the Government of the Philippines Department of Science and Technology, is a pilot attempt at educating Philippine elementary students about natural hazards - how to prepare for and mitigate their effects.

This is an on-going project in its pilot phase; to date, OFDA has committed a total of US $108,716 in two allocations: the original $80,000 in May 1988, and $28,716 in February 1989 for production of a 30-minute film and additional teaching aids. An amendment for an additional $106,000 is shown in June 1989, but this money is actually for the Typhoon Forecasting Program. (See Case Study 11). This $106,000 includes $56,000 for computer up-grades for PAGASA, and $50,000 for materials development and testing and two workshops intended to improve the effectiveness of typhoon warning messages for the public.

PROJECT DESCRIPTION

Rationale/Planning Process

The Public Awareness Program grew out of the OFDA-funded Typhoon Forecasting Program, and reflects the feeling that early warning capacities would not significantly reduce typhoon risks unless public attitudes were changed. Educating the public about methods for reducing risk is necessary to offset the belief that natural disasters are unavoidably life- and property-threatening.

Planning process

Ms. Lolita Garcia, a seismologist at PAGASA, took the public education idea to USAID, which forwarded it to OFDA. OFDA funded a three-month planning study in June, 1987 which resulted in a comprehensive survey and proposed activity paper. PAGASA, under Ms. Garcia's lead, then prepared a final proposal, and received assistance from USAID/P (PVO Specialist Lino de la Cruz) in final wording and formatting. OFDA granted the requested $80,000 in May 1988. Funding was to cover an eighteen-month pilot project.

The Public Awareness program appears to have been carefully planned, and to have involved necessary technical experts (i.e., educators and public information specialists) from the concept phase. Needs and existing institutions were thoroughly surveyed; activities were planned based on an informed assessment of both needs and resources. From the beginning, attention was paid to involving experts (teachers) and beneficiaries (students) in designing outputs. The high degree of professionalism in planning and designing this program virtually guarantees success in the pilot phase.

Project Components and objectives

The project **PURPOSE** is to "develop and test effective information packages on natural hazards in the Philippines."

Activities are:

1. Community awareness
   - -conduct baseline research
   - -select audience and media
   - -develop, pre-test information packages
   - -disseminate information packages
2. Awareness of school children
   - -study grade school curricula
   - -develop disaster preparedness program
   - -implement pilot
3. Training for program staff and workers
   - -develop program
   - -organize and conduct training activities
4. Evaluation

Target: Eight to ten million Filipinos receive information on natural hazards through (a) school curriculum for 5th and 6th graders, and (b) popular education for adults and others not in elementary school.

INPUTS: Training for 100 teachers and 600 program workers; preparation (by PAGASA program staff, teachers, and program informants) of school-based and popular education materials.

OUTPUTS: 15 minute documentary on each hazard
30 second/ one-minute PSAs for movie houses
45 minute lecture one per week to 5th and 6th graders in 100 elementary schools
"school on the air" radio programs on hazard mitigation
30 minute docu-drama for community education
comic book series illustrating three hazards
hazard awareness being taught to 40 - 60 5th and 6th graders in the 100 selected schools
100 school teachers and their supervisors trained
600 community workers/information disseminators trained

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Implementation Events

Program staff have completed extensive studies of the best educational approaches for both school-based and popular education, by pre-testing the population on its awareness of disaster prevention, and post-testing the same audiences after exposing them to PAGASA-prepared educational materials. They have worked with educators to establish such basic information as optimal voice pitch and attention span for 5th graders. They have selected 270 pilot classrooms (exceeding the 100 in the proposal), and have prepared materials for and trained the teachers of those classes. Working with graphics designers and film-makers from the Philippine Information Agency (PIA), they have prepared and are printing posters, film strips, videos, and a series of comic magazines and puppet shows, each of which addresses a different hazard. All materials include the same program slogan "Timely preparedness is the key to survival."

Eleven governmental and non-governmental agencies are included in the implementation of this project, from the Department of Education (to ensure institutionalization of the activity in primary school curricula and to allow teacher training), to PIA, which will be largely responsible for dissemination of the materials for community education through its nation-wide network. PIA's mobile units will show the 30-minute documentary throughout the nation, and its staff will hang the posters at designated "poster points" in all regions.

Present Status

Activities completed:

- 270 primary teachers received 3 day training in use of project material;
- 46 radio stations are carrying 30 second and 1-minute PSAs on disaster preparedness;
- all 5 TV stations are showing preparedness advertisements, the same ads are being shown in cinemas;
- 5 live puppet shows and teacher materials for "instant recall sessions" prepared and being tested. Shows have been put on video for remote areas; one show per week is planned for schools;
- activity-oriented teaching materials (such as using an electric fan, a pan of water, and a model coastline to demonstrate storm surge) have been prepared and tested;
- A primer and a teachers handbook have been prepared and are being tested by teachers in the 278 classrooms.

Ongoing activities include:

- preparation for training 600 dissemination workers for community education;
- final editing and printing of a 30-minute, 16mm docu-drama on natural hazards;
- printing of a series of 3 comic books, all with the same characters in an on-going love story. Each comic illustrates a different natural hazard (typhoon, volcano,

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and tsunami/earthquake). These comics are designed to appeal to adults, as well as to children;

- preparation of a Compendium of Natural Hazards, which will include all the written materials from PAGASA's series on natural hazards;
- distribution of posters (4 in the series, each covering one disaster).

ANALYSIS OF EFFECTIVENESS

Planning and project design were thorough and thoughtful. Involving teachers and students in materials design seems to have assured wide and effective use of the materials, at least during this pilot phase. Design included much testing and re-testing, and the project continues to modify materials based on feedback from users at regular meetings. Involving eleven other agencies in dissemination also appears to guarantee wide-spread use of materials through-out the country.

A recognized draw-back is that all pilot materials are in English; translation into local languages is seen as an activity in Phase II, which has not yet been proposed.

Resource Allocation is difficult to judge in an on-going activity - particularly one which intended follow-on activities from its inception. The project is modest in cost, and is also reaching more beneficiaries than originally proposed. Main resource questions are two: (1) is current funding sufficient to complete the materials and training planned; and (2) will PAGASA locate the funding for Phase II, under which the program would be provided nation-wide, with materials translated into local languages.

Implementation and Operations are impressively on-target. Ms. Garcia is an excellent project manager who puts great emphasis on community involvement, participant training, and regular follow up visits to classrooms. She monitors performance of materials and trainers on a consistent and regular basis, and arranges regular feedback systems for materials users. Quarterly reports are on time and complete, and Ms. Garcia brings them to AID/P in person, in order to discuss the program with AID staff.

Sustainability Issues are being addressed, but ultimate success rests on a number of factors not entirely within project staff control. For example, if this is to move beyond a pilot phase, additional funding will be required. PAGASA proposed to bring in additional donors at that point; efforts to accomplish this have not yet been successful. If a second phase is not funded, the continuation of both school and community education may be in doubt. A second phase would have to include costs of translating the existing materials into several different languages, and would have to include replacement costs for existing materials.

If school-based training is to be sustainable, it will have to be institutionalized within the Department of Education. This means that the training of teachers and acquisition of materials will have to become part of the budget of the Department of Education. Attention to and understanding of these recurring costs will have to be part of Phase II.

RECOMMENDED ACTION

- It would seem sensible for OFDA to protect this excellent investment by assisting PAGASA in locating additional donors for Phase II.
- OFDA might well consider similar projects in other nations at high risk. Any country with a well-organized primary education system should be able to replicate this approach to hazard mitigation.

STRATEGIC IMPLICATIONS

- The care that went into the needs assessment and activity design for this program, and the participation of both experts and beneficiaries in planning outputs, is a dominant factor in its success. OFDA could well use the planning documents from this activity as a model.

CASE STUDY 13

SOUTH PACIFIC SEVERE STORM DETECTION AND WARNING SYSTEM (SPSSD/WS)

SUMMARY

In Fiji, there are frequent violent cyclones. Forecasting such severe storms is the first step in preparing for these, the most common disasters in the region. An activity titled the South Pacific Severe Storm Detection and Warning System (SPSSD/WS) was funded by OFDA between early 1981 and late 1988 at a cost of more than $600,000. It was implemented through Participating Agency Service Agreements (PASAs) with the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA), which in turn contracted with a minority-owned firm to handle actual implementation of the activity.

It is a credit to OFDA that the warning system is functioning and disseminating storm warning information throughout the South Pacific region. Inadequate consideration, however, has been given to the on-going operation and maintenance requirements of a complex technological system. The system's performance could be enhanced by providing both additional technical training and discretionary funds necessary to purchase spare parts. Overall, the project provides a valuable service and is a foundation for developing a comprehensive regional disaster preparedness strategy.

$611,430 FY 1981-1988

INTRODUCTION

Fiji is a country consisting of two large and more than 300 small islands in the South Pacific. The country is subject to frequent violent cyclones. Although the storms have not been major killers during the past century, they destroy a great deal of property, especially crops and houses. Forecasting severe storms can provide vital preparation time to minimize damages and loss of life. The South Pacific Severe Storm Detection and Warning System (SPSSD/WS) was implemented between early 1981 and late 1988 at a cost of $611,430. OFDA financed the project through PASA agreements with NOAA and NASA, which in turn contracted the actual implementation to a monitoring controlled (8A) firm.

Preparation of this case study included interviews with concerned NASA staff and a visit to Fiji in October 1989. Officials in the Government of

Fiji (GOF) in Suva, and all senior staff members of the Fiji Meteorological Service (FMS) were interviewed, and the ground station was inspected.

OFDA ACTIVITY

Project Context

Fiji is located in the South Pacific between approximately 12 and 28 degrees South and straddles the 180th meridian, from approximately 176 degrees East to 178 degrees West. The country consists of more than 300 islands with a total land area of 18,272 sq. km. dispersed over a wide area of ocean. The two largest islands, Viti Levu and Vanua Levu, constitute 87 percent of the country's land mass. The total population, inhabiting 97 islands, is estimated at 715,000. Three-fourths of the population live on Viti Levu.

Fiji is affected by several types of natural events including earthquakes, tsunamis and droughts, but by far the most frequent, severe and important of these is cyclones. Smaller in area but more violent than temperate hurricanes, tropical cyclones are destructive through high winds, torrential rains, and storm surge. Rapid upward movement of spiralling air may cause extremely heavy rainfall, especially where winds are forced to rise over mountains, as on Fiji's two large islands, where torrential rains often cause flooding. Low atmospheric pressures cause storm surges that may reach two or three meters above normal sea levels.

Despite their violence, cyclones have not been major killers in Fiji. The most severe storm in the past century in terms of deaths occurred in 1931, when 206 lives were lost, mostly from drowning. Cyclone Meli, described as "vicious", struck in 1979, killing 53 people. The seven severe storms which have struck Fiji since then have killed between zero and 28 people, an average of six people per year. This is only slightly lower than the annual average for the past century, estimated by a leading authority to be eight deaths.[1]

The major impact of cyclones is on agricultural production through direct and indirect damage to crops, and on tourism, through damage to hotels and adverse publicity. In addition, every hurricane destroys houses, although traditional Fijian houses are quite resistent to high winds. New housing materials such as nails, hardboard panels, and cement blocks are often used now to construct residences that are not as well-designed and built as traditional houses, and, therefore, less resistent to cyclones.

Fiji has taken a leading role in advancing meteorology in the South Pacific. In recent years, the institutional framework has been the Tropical Cyclone Committee for the South Pacific, a regional working group of the World Meteorological Organization (WMO). The Committee, organized in 1985, is composed of 13 members: Australia, New Zealand, Vanuatu, Solomon Islands,

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[1] John R. Campbell, Dealing with Disaster: Hurricane Response in Fiji, Honolulu: East-West Center Pacific Islands Development Program, 1984.

Papua New Guinea, Tonga, Samoa, Kiribati, Tuvalu, Cook Islands, French states, Tokelau, Niue, Fiji, USA, UK.

The Fiji Meteorological Service (FMS) facility at Nadi is the regional center. The satellite facility has the capacity to "see" the whole South Pacific region. It provides meteorological forecasts throughout the year to other countries on the basis of their capacity to decode and use the information. For some countries, FMS provides warnings that go directly out on the radio. All FMS warnings are issued in English. However, in those countries which receive direct radio warnings, the level of education is so low that technical terms and information concerning storm surges, speed in knots, or compass directions cannot be interpreted or assimilated by the population. Within the South Pacific region, the population on Vanuatu has the basic pre-requisite knowledge to act on the general FMS warnings. For most other countries, the FMS attempts to provide tailored, more-easily-understood warnings.

The extent of early warnings of tropical cyclones is a strong determinant of the local meteorological department's capability. In the Cook Islands, it is fairly good, due in large part to assistance from New Zealand, which donated conventional meteorological stations and provided technical training in their operation. The other island countries have real problems, according to Mr. Ram Krishna, Director of the FMS.

The South Pacific countries have great difficulty in identifying their priority meteorological needs. To fill this gap, The United Nations Development Programme (UNDP) is funding a project executed by the WMO with a budget of $1 million over four years, in support of the Tropical Cyclone Committee. The project provides $400,000 for equipment with the remainder for consultancy and training; the project has also financed some workshops. Mr. Ram Krishna is Regional Coordinator of the project.

Fiji sees itself, and is seen by A.I.D., as being the most advanced country in the South Pacific region regarding disaster preparedness. The country has received substantial bilateral development assistance in this area. Mr. Tom Tuiloma, Principal Assistant Secretary, Ministry of Home Affairs, noted that the Australia Counter-Disaster College (ACDC) offered training courses one of which he had attended. National Disaster Preparedness Week is held annually and was last held in April 1989. Also in 1989, a German foundation held two one-week courses, the first for public servants and the second for NGOs.

Disasters in Fiji are managed by two separate committees: the Emergency Services Committee (EMSEC) and the Relief and Rehabilitation Committee. The EMSEC has one full-time staff member, the National Disaster Coordinator. During preparation of this case study, in October-November 1989, the Coordinator, Mr. Joeli Rokovada, participated in the eighth Disaster Management Course at the Asian Institute of Technology, Asian Disaster Preparedness Center (AIT/ADPC)(See Case Study #21).

The link between severe storm detection and public warning has been carefully nurtured in Fiji. The Director of the FMS said, "In Fiji, we don't rely just on warnings, which go out to the radio every three hours. I have full authority to issue warnings directly." There were some big problems between the FMS and EMSEC in 1982-83, when EMSEC wanted to see all warnings before they went out on the radio. But this bureaucratic control caused delays in relaying storm warnings to the radio, and the FMS was again given authority to issue the warnings directly to the radio with a copy to EMSEC. This was the procedure followed in 1989.

PROJECT DESCRIPTION

Rationale

In 1980, Fiji had a low resolution "WEFAX" satellite reception system. The detail of images received was not very good, and the system had no real analytic capacity. The satellite ground station had been purchased and installed by the GOF.

The proposal for this activity noted that a meteorological satellite receiving station on Fiji would greatly add to the timeliness and accuracy of weather warnings. It recommended a two-phase program, the first phase of which would consist of a facility to receive and process pictures from the Japanese Geostationary Meteorological Satellite (GMS). If the Fijians showed the ability to operate the simple first phase system, then the second phase project, consisting of a Local User Terminal of the U.S. Geostationary Orbiting Earth Satellite (GOES), could be implemented. The proposed first phase had a budget of $204,000.

Project Components and Objectives

The technical assistance was provided in two distinct phases, both implemented through a PASA between OFDA and NOAA/NWS, which in turn used NASA to actually carry out the project.

The first phase, known as the Satellite Early Warning System, was to design, configure, procure and install a meteorological satellite receiving station. Initially budgeted at $204,000, this phase ultimately cost $361,180. The Scope of Work of the first phase was to:

- Conduct a site survey of Fiji to determine optimum (most cost effective) location of satellite receiving station facility;
- Identify training requirements for equipment operation and maintenance, imagery analysis, and severe storm forecasting;
- Design, configure, procure, integrate and test equipment and system in U.S. prior to delivery to Fiji;
- Install a satellite receiving station on selected site; and
- Provide spare parts, expendable supplies, instruction manuals, maintenance/operation manuals, tools and test equipment as required to maintain and operate system for one year test and evaluation period.

After a hiatus of one year, OFDA approved the project's second phase, at a total cost of $250,250, to enhance the satellite ground station. The planned outputs of the second phase were to:

- Design, procure and install equipment and technical system enhancements for the SPSSD/WS, including the installation of an uninterruptable power supply;

- Install a hard copy image processing unit capable of receiving HRPT for the GOES and Japanese weather satellites, and provide software development and equipment modifications;

- Provide hardware maintenance training for one CAAF representative to make routine diagnostics and minor repairs;

- Train FMS staff in imagery analysis; and

- Develop a draw down from the PASA to cover the cost of emergency field maintenance replacement and spare parts.

A Logical Framework was not prepared at the time of project approval or implementation, but a reconstruction of a schematic Logframe might be:

GOAL: Save lives through providing early warning of severe storms.

PURPOSE: Improve timeliness and accuracy of meteorological detection and forecasting of severe storms

OUTPUT: Installation and operation of HRPT ground station

INPUTS: $611,430.

Implementation Events

Implementation of the first phase project began in January 1981, and in August 1981 the PASA between OFDA and NOAA was amended to add $204,000 for a site survey, identification of training requirements, design and installation of equipment, and spare parts and maintenance for one year. From the outset there was a major delay; for what are essentially bureaucratic reasons, NOAA took a year to transfer the project to NASA, which was expected to actually implement the activities.

In May 1983, the PASA was modified to add $156,000 to enable the project to be completed and to set a completion date of 31 July 1984. In August 1984, the PASA was again modified to extend the contract, at no cost to OFDA, because of both technical problems and delays in transferring funds from NOAA to NASA. The extension, for 17 months, rescheduled the project termination to 31 December 1985. In November 1985 the PASA was again modified to extend the project for yet another year, to 31 December 1986. Before this deadline, in October 1986, NASA informed NOAA that the SPSSD/WS facility had been successfully installed and was operational. A final no-cost extension, through 30 April 1987, was approved to permit continued training of local staff.

With the ground station operational, OFDA commissioned an independent evaluation of the effort, through a purchase order contract with Mr. Charles R. Holliday. The evaluation was conducted in December 1986.

On 28 May 1987, the OFDA Director submitted a report that noted:

- The Fijian system utilizes "state-of-the-art satellite data reception and processing techniques;"

- NASA contributed $440,000 to "match" the OFDA contribution of $360,000;

- The Holliday evaluation was "very positive" and "characterized the SPSSD/WS as the prime tool of the FMS in its role as the regional tropical cyclone warning center for the southwest Pacific. The improved storm detection, tracking and prediction capabilities were significant and constitute a substantial life-enhancing system;"

- The evaluation identified two problems: the need for a uninterruptable power supply (UPS) and the scheduled movement to a different orbit of the Japanese GMS, which would block out about half of Fiji's weather data.

On 14 April 1987, USAID/Suva sent Cable Suva 1666 which stated, "The FMS was able to assist several countries this past cyclone season with advanced weather warnings more accurate and timely than those available before the [SPSSD/WS] system was installed. We are convinced that these early warnings helped reduce loss of life and property."

The second phase began the following month, in May 1987, with a PASA amendment to NASA adding $100,205. The amendment was to facilitate corrections of the technical defects identified in the evaluation, especially the UPS, and to enhance the existing hardware and software. The work was to be completed by 30 September 1988 and it was anticipated that additional funding would be required. In June 1988, the final $150,000 was added and the project was extended through 30 June 1989.

The annual budgetary allocations of the project were as follows:

FY 1982	$194,000 + $4,115
FY 1983	$156,000
FY 1984	$4,115
FY 1985	$2,950
FY 1987	$100,250 + $7,824 for evaluation
FY 1988	$150,000

The project was carried out by a (then) 8A firm, Science Systems & Applications, Inc. (SSAI), under contract to NASA. Task orders were issued to SSAI under the provisions of a large negotiated general contract.

Very little training seems to have been provided to the staff of the FMS during the first phase of the project, but the second phase put greater emphasis on training to accurately interpret information that came out of the system. The FMS Director judged the training to be "very good."

Before the 1986 training was started, almost no one in the FMS was knowledgeable about computers. The OFDA/NASA project provided fairly detailed training to FMS technicians in how to use a computer, in picture reception and in picture (data) storage. Limited training was conducted in 1986 when the system was first installed and further training was provided for two weeks in 1988. At neither time was it possible for the entire staff to be involved in training because of ongoing workloads, and the situation deteriorated badly between 1986 and 1988 because of the coups of May and October 1987, which prompted widespread emigration of ethnic Indian Fijians. Of a staff of 40, only six people could be spared for full time training and three or four others received some part-time training. The trainees have helped others with 'hands on' learning. The training was done by the same firm that did the hardware installation.

NASA provided training courses for the FMS staff. These were apparently beyond the Scope of Work of the OFDA-funded activity. The training in image processing from Dr. Hessler was considered by the FMS Director to be "of little use."

The Civil Aviation Authority of Fiji (CAAF) maintains all of the hardware of the FMS. OFDA/NASA training in hardware maintenance was very limited, only at the level of first-line fault-finding. No CAAF staff has had any full training, and "people are very hesitant."

Present Status

The departure of key technicians during the past two years has exacerbated what appears to have been chronic hardware and software problems that appeared even before the "enhancement" of 1987-88. The 14 most important problems are described in a letter dated 15 December 1988 from the Director of the FMS to the NASA Project Manager. The Director stated in his letter that the problems needed correction before the system could be considered fully operational, and he reiterated this view in an interview on 17 October 1989. The 14 problems are summarized as follows:

1. Inaccurate world database overlay over Fiji;
2. Incomplete grid and world database overlay;
3. Duplication of image files;
4. International Imaging Systems problems;
5. Light leakage in laserfax hardcopier;
6. Picture shifts in loops;
7. Multiple probability elipses;
8. General Meteorological Package (GEMPAK) software;
9. GOES data;
10. Single antenna and limited disk space;
11. Need for additional VT220 terminal;
12. Lack of grids on quick-look fax program;
13. World database outlines east of 180 degrees;

14. GGMS sectorization of infra-red half resolution.

The list above does not include the major embarrassment of the project, the failure and eventual abandonment of the Data General model MV4000 computer installed in 1986. The Data General system has not been operational since shortly after the 1987 enhancement that replaced it with a DEC Micro-Vax. In October 1989 the Data General stood defiantly idle in the center of the ground station facility, nicknamed the White Elephant. The replacement of the Data General with the DEC computer was cost effective from the viewpoint of servicing, since DEC maintains a service office in the Fiji capital of Suva, whereas Data General's nearest service office is in New Zealand. To the regret of the FMS staff, however, the 1986 data tape produced on the Data General can not be accessed by the Micro-Vax computer.

The problem list also does not mention the uninterruptable power supply, which frequently malfunctioned in its first years but is now running smoothly.

Initially it was planned to access both the U.S. satellite in the Pacific (GOES-WEST) and the Japanese GMS. The FMS Director summarized the situation by saying, "What we have been given is the capacity, but we have only one antenna, which has to be moved by hand. We have good coverage to 165 degrees west and to the west of that."

The U.S. satellite over Central America failed a few months ago, so the satellite over the eastern Pacific has been moved. According to Mr. Rajendra Prasad, Principal Scientific Officer of FMS, only the Japanese GMS can be received. The GOES-WEST satellite is aging with a weak signal and many problems. The GMS is usable to 160 degrees West and the weak U.S. satellite is at 150 degrees west. Therefore the area between 160 and 150 degrees cannot be reached and the antenna is too weak to pick up the polar orbiting satellite.

ANALYSIS OF EFFECTIVENESS

Planning and Project Design

Two features of the planning and design of this project are particularly striking. First, it seems to have been overwhelmingly viewed by NASA as a technological operation which only tangentially had something to do with disaster preparedness or mitigation. Second, the "project" was never planned as such but simply emerged as a set of ad hoc activities depending on a variety of opportunities and on available funding.

The first problem, whether meteorological forecasts are properly used for public warnings, does not appear to be a significant issue in Fiji, but it certainly is on a region-wide basis. To take just one example, according to Mr. Rajendra Prasad, more than 40 advisories were sent to Vanuatu from the Fiji facility. But there seems to be very little feedback to the FMS ground station from the countries in the region about how useful the forecasts are, and the OFDA project did not provide any resources to address this problem.

Resource Allocation

The most obvious finding regarding resources is that the initial budget, which was intended to establish an adequate system, amounted to only one-third of final expenditures. It is not clear whether the original proposal was seriously under-budgeted, but there does not seem to have been any objection raised by OFDA. The PASA amendment reflects full acceptance of the NOAA proposal.

Implementation

At the very outset of the project, there was a delay of about one year caused by bureaucratic problems within NOAA in moving project funds so that NASA could begin implementing the activity.

One obvious question about the project is whether the right hardware was selected. Although it is relatively easy to pass judgment with perfect hindsight, there may be legitimate questions about the selection of the Data General computer. According to the NASA Project Manager, the Data General computer was selected because OFDA insisted that the computer be compatible with what the U.S. Navy was using in Monterey, California to study storm surges. OFDA planned to link Monterey and Nadi with a telephone modem so that storm surge data could be sent back and forth quickly. The Navy was using a Data General computer, which left NASA with little choice but to install an MV4000. Subsequently OFDA seems to have dropped its interest in storm surges and in 1987, when free to make its own decision, NASA selected a DEC Micro-Vax which is the computer that NASA itself uses for meteorological imaging.

In 1989 the greatest training deficiency seemed to be that the System Manager, Mr. Manoj Singh, had not yet received training in system maintenance. According to an official at RDO/Suva, NASA provided training in 1988 and 1989. It seemed to be good, "but they had pretty heavy baggage, including PR people." Not all of those on the training team were professionals.

NASA staff stated that NASA provided the hardware at very low cost because they did a lot of development work in-house.

Sustainability

The FMS has not been able to sustain the ground station at the maximum performance potential of the hardware and software. Although it has not been possible to identify and weigh all of the reasons why performance of the system has declined, some of the reasons are quite obvious.

Two exogenous factors have played important roles. The coups of 1987 led to a serious brain drain of technicians that has reduced capacity in virtually every aspect of government in Fiji. And the failure of the U.S. satellite over Central America and the shifting and aging of the GOES-WEST satellite have reduced the quality of signals to be received.

The ethnic tensions and emigration sparked by the 1987 coups have, directly and indirectly, reduced the capacity of the FMS to the lowest level since before independence nearly 20 years ago. The situation is particularly acute in the operation and maintenance of hardware, which is performed for the FMS by the Civil Aviation Authority of Fiji (CAAF) which has been particularly hard hit by emigration.

Although both the FMS and the CAAF were fully localized in the years following independence, the country now finds it essential to rely on three expatriate technicians, who are financed through bilateral aid. Senior government officials consider that emigration will remain a problem for at least the next five or ten years and that the situation is likely to worsen before it improves.

Even without these factors the FMS could not realistically have been expected to sustain the high resolution ground station; the technology is simply too complicated and expensive to remain operational at optimum performance without a fairly major long-term commitment from a foreign aid partner to provide foreign exchange for spare parts and supplies, technical training to keep up with normal staff turnover, and advisory services to keep the system in the comfortable middle ground between the technological cutting edge and obsolescence. This project's performance has suffered from lack of long-term planning. The key to this partnership is funding, and OFDA has a great opportunity here to reduce the uncertainties by making a commitment to financing needed spare parts and gradually upgrading the system which can be expected to take several years.

Meeting recurrent costs has been a big problem for both FMS and the USG since no thought seems to have been given to this critical issue when the project started. Mr. Kirk Dahlgren, Program Officer at RDO/Suva, expressed a concern regarding recurrent costs, saying, "We were hit by NASA for money for new software." NASA has urged that the Nadi ground station get access to a polar orbiting satellite. OFDA has been unwilling to fund such an upgrade, arguing that another satellite is gradually moving and will fill part of the gap. The Regional Development Office in Suva has provided the FMS Director with $30,000 for spare parts, available in a US Embassy account.

In conclusion, it is a credit to OFDA that the early warning system is functioning and disseminating storm warning information throughout the region. However, the systems performance can be enhanced by providing both additional technical training and discretionary funds necessary to purchase spare parts. As with the Bangladesh Disaster Alert System (Case Study #8), inadequate consideration has been given to the ongoing operation and maintenance requirements of an extraordinarily complex technological system.

Overall, the project provides a valuable service and is a foundation for developing a comprehensive regional disaster preparedness strategy.

RECOMMENDED ACTIONS

- A.I.D. should continue to provide funding for spare parts and training required to keep the system operational. Either OFDA or USAID/F should reaffirm a commitment to long-term funding to maintain the system at an acceptable level of performance.

- Although it is beyond the scope of this small case study to judge the merits of a large radar system, the GOF has not forgotten the U.S. promise to provide it. This consideration could provide an impetus for OFDA to re-assess the region's needs and then develop a multi-year strategy to address these needs.

STRATEGIC IMPLICATIONS

- Full consideration must be given to the continuing operational and maintenance requirements of complex technological systems.

- The relationship between satellite technology and disaster preparedness must be subject to further study and practical actions.

CASE STUDY 14

FIJI: CYCLONE OSCAR DISASTER ASSISTANCE/MITIGATION

SUMMARY

In the immediate aftermath of Cyclone Oscar in March 1983, which caused widespread damage to housing in parts of Fiji, OFDA made a grant to the Salvation Army's World Service Office to repair or rebuild damaged housing. The activity was implemented over a five month period and succeeded in rebuilding 174 houses, which exceeded the planned output of 160 houses. The activity was designed to provide relief to disaster victims and, consequently, materials were provided free of charge.

The activity was not designed to incorporate developmental strategies and, as a result, an opportunity to expand the benefits of the investment was lost. However, as housing relief the activity was a success because the number of houses constructed exceeded planned expectations and did so in a timely manner.

$52,780 FY 1983

INTRODUCTION

In the immediate aftermath of Cyclone Oscar, which caused widespread damage to housing in parts of Fiji, OFDA made a grant of $52,780 to the Salvation Army World Service Office (SAWSO) to repair damaged houses and build new ones in affected areas. The project was implemented over a period of five months.

Preparation of this case report included review of all available documents, a visit to one project site, and interviews with the project evaluator, officials of the Salvation Army, and beneficiaries in October 1989.

OFDA ACTIVITY

Project Context

Fiji is located in the South Pacific between approximately 12 and 28 degrees South and straddles the 180th meridian, from approximately 176 degrees East to 178 degrees West. The country consists of more than 300 islands with a total land area of 18,272 sq. km. dispersed over an ocean area

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of 1,290,000 sq. km. The two largest islands, Viti Levu and Vanua Levu, constitute 87 percent of Fiji's land mass. Fiji's population is estimated at 715,000 inhabiting 97 islands, of whom more than three-fourths live on Viti Levu.

The country is highly dependent on agriculture, which accounts for about 40 percent of employment and 90 percent of exports. The most important crops are sugar and copra.

Fiji is affected by several types of natural events including earthquakes, tsunamis and droughts, but by far the most frequent, severe and important of these is cyclones. Smaller in area but more violent than temperate zone hurricanes, tropical cyclones are destructive through high winds, torrential rains, and storm surge. Rapid upward movement of spiralling air may cause extremely heavy rainfall, especially where winds are forced to rise over mountains, as on Fiji's two large islands, where torrential rains often cause local flooding, and low atmospheric pressures may cause storm surges that reach two or three meters above normal sea levels.

Despite their violence, cyclones have not been major killers in Fiji. The most severe storm in the past century in terms of deaths occurred in 1931, when 206 lives were lost, mostly from drowning. Cyclone Meli, which struck in 1979, was described as "vicious" and killed 53 people. The seven severe storms which have struck Fiji since then have killed between zero and 28 people, with an average of six people per year. This is slightly lower than the average for the past century, estimated to be eight deaths per year.[1]

The major impacts of cyclones are on agricultural production through damage to crops, and on tourism, through damage to hotels and adverse publicity. In addition, every hurricane destroys houses. Traditional Fijian houses are quite resistent to high winds, but new materials such as nails, hardboard panels, and cement blocks are often used to construct residences that are less well-designed and built, and therefore less resistent to cyclones, than traditional houses.

There is a long history of Fiji Government involvement in housing reconstruction following disasters, and OFDA had been active in housing issues generally in the South Pacific for at least two years before Cyclone Oscar, when INTERTECT was commissioned to do a study on housing vulnerability.

PROJECT DESCRIPTION

Rationale

On 1-2 March 1983, Cyclone Oscar crossed the southwestern part of the main island of Fiji, Viti Levu. Government surveys indicated that in the Western Division of the country 4,232 houses were damaged and 3,972 houses were destroyed. In addition, 372 school classrooms and 107 teachers'

1251

quarters were damaged. Government placed top priority on rebuilding schools with its own funds.

At an initial joint meeting with voluntary agencies on 23 March 1983, Government officials indicated that they would welcome assistance in rehabilitation, including the reconstruction of housing. The Salvation Army was requested by the PMRRC to assist in repairing and strengthening partially damaged homes in the Sigatoka District.

Soon afterwards, in March or April 1983, the Salvation Army World Service Office, (SAWSO) in Washington, D.C., requested OFDA funds on behalf of the Salvation Army Regional Headquarters in Suva, Fiji.

Objectives and components

In retrospect, it is obvious that this project was seen by all parties as being "simple" and "straightforward," and little effort went into formulating it. Although a Logical Framework was not prepared when the project was proposed, it is not difficult to construct one after the fact:

GOAL: Rapid post-disaster social and economic recovery.

PURPOSE: Rapid post-cyclone reconstruction of destroyed housing in the most heavily damaged areas and the introduction of a model house intended to mitigate the effects of future cyclones.

OUTPUT: To rebuild and strengthen the structures of 160 partially destroyed homes in eight communities in the Sigatoka District on the main island of Fiji, Viti Levu.

Four different types of rebuilding efforts were distinguished:

1. Demonstration houses, totally rebuilt using project materials and Salvation Army staff including New Zealand volunteers;

2. Houses completely rebuilt using project materials supplied to village carpenters under Salvation Army staff supervision;

3. Houses repaired to the "INTERTECT Standard" using project materials and Salvation Army staff; and

4. Houses repaired to the "INTERTECT Standard" using project materials and village carpenters under Salvation Army staff supervision.

INPUTS: Key inputs were building materials and skilled labor, including foreign volunteers. Important inputs were transport and unskilled labor.

The total project budget was $124,750, of which OFDA provided $48,750. SAWSO provided $59,000, of which $38,000 was an in-kind contribution of a 3-

ton truck, a 1-ton utility truck, and a pickup. Contributions of other donors, including the Tear Fund, BHC, Christian Aid, Australian Council of Churches, Fiji Council of Churches, and Fiji Sixes Committee, were estimated at $17,000. However, provision of an additional $20,000 worth of building materials by the Fiji Sixes Committee raised the figure to $37,000 and the total project budget to $144,750.

Implementation

The project was initially planned to commence on 1 May 1983 and be completed within a three month period. The initial deadline could not be met, however, and on 23 August a "no-cost" extension was granted through 30 September.

Regardless of whether the Salvation Army team actually built a house, supervised its construction by village carpenters, or simply handed over materials to be built in accordance with the owners' wishes and needs, the basic materials were:

- large pine posts, about 12" at the butt and 10' or 12' long, grown on Viti Levu and treated by the factory that processed them;
- dimensional lumber, produced on Viti Levu, for rafters and roof trusses; and
- cement blocks, cement, fasteners, including straps and nails.

An evaluation of the project was conducted by Mrs. Susan Douglas, Director General of the Fiji Red Cross, during September and early October 1983. The Progress Report and Evaluation of the Cyclone Oscar Disaster Assistance, dated 10 October 1983, proved to be the only important document that survived the six years between implementation and the current study.

The evaluation report found that the project had succeeded in rebuilding 174 houses, which exceeded the project target of 160 houses. It concluded that "the PMRRC request to The Salvation Army in Fiji for assistance in repair and strengthening of partially damaged homes in the Sigatoka District has been met."

Although the extant documentation leaves some uncertainty, it appears that the Government of Fiji played a minimal role in this project after making the initial request for housing reconstruction assistance.

Present Status

On 16 October 1989 the MSI team member visited the village of Votua, accompanied by Mr. Joseph Chung, OFDA Regional Disaster Preparedness Adviser. Votua is located between the beach and the main highway along the southern coast of Viti Levu, a few miles east of Sigatoka, a district headquarters town. Votua was selected as a case study village because 16 of the 174 Salvation Army houses were reported to have been constructed there and because the houses fell into three of the four categories noted above. Votua is, at least superficially, a typical Fijian village in one of the major resort areas of the country. It gives the impression of considerable economic dynamism, as there are at least eight concrete block houses under construction. Most households have at least one member who works in the nearby resorts.

Votua was devastated by Cyclone Oscar. Today there are 29 houses in the village, as well as a large church and a community center, even though Cyclone Oscar left only six houses standing and blew the roof off the church, where most of the villagers had fled for shelter.

Shortly after the storm, the Provincial Council provided tents (possibly including some donated by OFDA) to the villagers whose houses had been destroyed. The villagers lived for about three months in the tents, until the first reconstruction assistance arrived. Since they were valuable relief goods, the tents were supposed to be returned to the Provincial Council to be stored until needed again, but many of the tents were said to have been become worn out during their use in Votua, and only the few good ones were returned.

In her evaluation report, Susan Douglas wrote,

> "Following the cyclone village people were so stunned that they felt helpless to cope with the magnitude of work that needed to be done. When building teams arrived on the scene, the village people were generally very willing to help and continued reconstruction on their own even after the teams left... Often the village priority was to rebuild the church before any permanent house building could be undertaken. The Salvation Army rebuilt 5 substantial Methodist churches. The village people responded to this with "Now the House of the Lord has been rebuilt we can think about our own housing needs.'"

In Votua, the evaluation report found that the Salvation Army had:

- totally rebuilt two houses using Salvation Army staff;
- supplied all materials to village carpenters to rebuild eight houses; and
- supplied materials to village carpenters to repair six houses to the "INTERTECT standard" under Salvation Army supervision.

We spent several hours in the village, hosted by Mr. Kiniviliame Ravonoloa, the Turagna-ni-Koro, or mayor, and Mrs. Suliana Buruvatu, the village nurse. We attempted to visit all 16 of the houses but were able to positively identify only 14. Of these, it was found that:

- For five houses, owners were given materials for posts and a roof, and the shell of a new house was erected by village carpenters, to which the owners added walls. The walls, of the owners own choosing, were made of hardboard panels (2), corrugated iron sheeting (1), and bamboo matting (2);

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- One house was subsequently broken down and replaced by a much bigger cement block house;

- One owner rebuilt his house immediately, but the Salvation Army would not help further. This owner has recently expanded his house further using cement blocks.

- One house consists of a big pile of cement blocks and pine posts;

- One "house" is a small shed representing partial use of materials provided by the project;

- One house is much larger than the others, with corrugated iron sheet sides and jalousie windows;

- One house is unfinished and uninhabited, consisting of the original materials as erected, without sides;

- All the materials for one house were carried to another village;

- One house had major additions to the Salvation Army materials.

A visitor to Votua today sees a neat, orderly settlement which gives many indications of economic and social well-being. Since the village is located in one of the coastal resort areas of Viti Levu, many of the villagers work at hotels in the general vicinity. There are perhaps a dozen cement block houses in various stages of construction, a process which can take several years depending on financing. Most houses are financed through loans from Provident Funds into which both employers and employees contribute seven percent of their salaries. No one gave up and left the village after its devastation in 1983, and no one has moved to the village in search of gratuitous aid from the Salvation Army or the Provincial Government. Villagers say that they learned that even concrete block houses can be destroyed by a direct hit from a major hurricane, and new houses are being built with more reinforcement bars, concrete, and steel and with stronger fastening between the walls and roof.

Virtually every trace of institutional memory of Cyclone Oscar housing reconstruction has been lost by SAWSO during the six years that elapsed between the reconstruction effort and the present study. In neither the regional office in Suva nor the district office in Lautoka were there people or files who could further illuminate progress reports and the evaluation completed immediately after the reconstruction effort. Housing has been important to the Salvation Army only following major cyclones and not as an ongoing development issue. Since no big cyclone has stuck Fiji in the past two years, the Salvation Army has built no houses since 1986.

Despite what was reported to have been a success following Cyclone Oscar, within a year the Salvation Army had abandoned construction of pole houses and shifted its efforts toward standard frame houses. This change was due to the arrival of a Western District Officer who resided in Lautoka from 1984 to 1988 and who was described as being "a master builder who wanted to

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make houses as hurricane-proof as possible." The newer houses are a single room, approximately 14.6′ x 20.5′ with a shed roof.

ANALYSIS OF EFFECTIVENESS

Planning and project design

This project was conceived, entitled, and implemented as "disaster assistance," and consequently the housing materials and labor were given away free and the project was planned for completion within three months of the disaster (subsequently extended to five months). By not charging anything for the materials, even from people who were obviously in a position to pay something, SAWSO gained favor with the beneficiaries at the cost of losing income that could have greatly expanded the scope of the reconstruction effort. This is simply to say that the Salvation Army acted in this instance as a charitable organization, not a development agency, and that an opportunity for development was not seriously taken at the very outset by the motivations of the implementing agency.

Resource allocation

OFDA's grant to SAWSO was the major cash element of the project. The initial ($124,750) budget allocated $31,566 for materials, of which the OFDA grant funded $26,556. Surprisingly, however, the budget for transport and logistical support was $53,500, meaning that $1.69 was spent in transporting each $1.00 worth of building materials. There are at least two possible explanations for this: a greatly excessive amount was spent on transport, especially given the fact that all ten villages were on all-weather roads; or SAWSO's monetized value of its contribution in kind was greatly excessive.

Implementation

In assessing the implementation of this project, it should be recalled that OFDA provided funds to SAWSO as disaster relief. Under these circumstances, speed was a top priority. The project managers deserve high marks for completing the project within the allotted time.

The evaluation report noted that "a major contribution has been the introduction of established models [from INTERTECH] of low-cost cyclone resistant housing and the introduction of progressive upgrading measures."

Sustainability

As was noted above, the project was never intended to be financially sustainable, inasmuch as the house frames were given as gifts to the recipients, without recovering any costs.

Institutionally, this project has not been sustained by the Salvation Army, which has shown very little interest in the development aspects of housing assistance. The organization seems to have moved from supporting pole construction to supporting frame construction without any systematic study of the merits of either approach.

RECOMMENDED ACTION

- None. The project was completed in 1983.

STRATEGIC IMPLICATIONS

- Disasters provide an opportunity to introduce new technologies and to demonstrate their utility to an audience which is much larger than the direct beneficiaries. However, extensive planning is a key ingredient to success.
- A greater effort should be made to introduce development strategies into disaster relief and reconstruction grants so that the grant's benefits can be expanded.

1. John R. Campbell, Dealing with Disaster: Hurricane Response in Fiji, Honolulu: East-West Center Pacific Islands Development Program, 1984.

CASE STUDY #15

LAC REGIONAL: ORGANIZATION OF AMERICAN STATES NATURAL HAZARDS PROJECT

SUMMARY

In 1983, the OAS began the "Natural Hazards Risk Assessment and Disaster Mitigation Pilot Project (NHP) in Latin America and the Caribbean Basin." The project was designed to reduce the negative impacts of disasters by ensuring that development planning incorporates hazards analysis information as a standard procedure. This has led to a large scale effort, begun in 1985, to develop hazards mitigation training materials and courses. Over 215 participants have since completed the four week hazards mitigation training.

The NHP is one of the most important activities being funded by OFDA and offers tremendous potential to reduce the effects of future natural events. It is significant that the NHP systematically collects, catalogues, and then disperses hazards analysis information that is produced by numerous, previously funded, OFDA activities including seismic networks.

$1,407,100 FY 1983-88

INTRODUCTION

This case study examines the Natural Hazard and Risk Assessment Project (NHP) implemented by the OAS. Information upon which the case study is based comes from a variety of sources: interviews with OAS staff in Washington D.C., the Dominican Republic, Jamaica, Costa Rica and Peru; interviews with several participants in OAS training programs; discussions with OFDA staff; and a review of project documentation.

OFDA ACTIVITY

Project Context

The OAS project covers all of Latin America and the Caribbean, a region which has experienced numerous natural disasters. Even without such life threatening and development retarding natural phenomena, the entire region faces the challenge of underdevelopment including, in many countries, low and declining per capita GNP, high inflation and unemployment, high rates of disease and infant and child mortality as well as considerable political instability. Clearly, if development planning to help mitigate the effects

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of natural disasters is possible, such measures should be taken. The NHP has begun to do just this.

Background material from the OAS grant documentation puts it this way:

> "Tectonic events and major storms are natural phenomena which continue to shape the land that man inhabits. Earthquakes, volcanic eruptions, hurricanes, tsunami, floods and landslides are reoccurring events deemed disasters by man because of the destruction and loss of life. To some extent, this is due to human activities which disregard these natural phenomena. To a degree man's activities can be modified, whereas large scale natural events cannot, therefore, damage can be avoided or lessened. One critical task is to assess the danger posed by hazardous natural phenomena, and modify development activities to avoid or minimize danger from potential disasters."

PROJECT DESCRIPTION

Rationale

In 1983, as stated by the OAS, "...in response to the increasing requests from its member states for information about natural hazards management," the OAS solicited and received support from OFDA for what began as a modest activity with the complicated title of "Natural Hazards Risk Assessment and Disaster Mitigation Pilot Project in Latin America and the Caribbean Basin," which became known as the Natural Hazards Project or NHP.

Whether motivated by such demand from the field, or by the farsightedness of key OAS and OFDA staff, which seemed more likely, the project began in July 1983 with an initial allocation of $95,000.

The NHP is an office within the OAS' Department of Regional Development. The program identifies natural hazards information, collects this information, and then applies it to protect development investments. Since its relatively low-key onset as a "pilot" project covering only a few countries, the activity has expanded to include training and activities in twenty-three countries in the region. As a result, as of September 1989, through numerous grant extensions and additional financing, OFDA has invested $1,082,000, and OAS has built an important base of experience and capability in the field of hazards management. The NHP grant is ongoing.

Objectives and Components

The project's objectives, although not constructed using the logical framework matrix, have been relatively straightforward.

GOAL: Avoid or reduce the negative impacts of disasters through intervention in the development planning and project formulation processes.

PURPOSE: To insure that natural hazards information is considered in development projects in the region. This will be done by transferring hazards assessment skills to development planners.

OUTPUTS:

1. The design and implementation of region-wide training courses on the application of hazard analysis to development planning. This has included the development of technical manuals.

2. Installation of Geographical Information Systems (GIS) in selected target countries including Peru and Costa Rica. The GIS is a comprehensive geo-referenced data base relating natural hazards to natural resources, infrastructure, and population information.

3. Installation of Emergency Information Systems (EIS) in six pilot countries. This is a geo-referenced database inventorying resources that may be needed in planning for, and responding to, disasters.

4. Creation of landslide hazard assessments and maps in several areas and attempting to integrate this information into the infrastructure development plans of selected countries including St. Lucia, Jamaica, and the Dominican Republic.

5. Participation in a wide range of conferences, workshops and seminars.

INPUTS:

1. OFDA contribution of $ 1,082,000.

2. OAS's Department of Regional Planning contribution for staff salaries, program expenses and office space. Also the selected use of OAS field staff along with selected consultants from host country or international agencies.

Implementation Events

The grant has logically evolved and matured since its inception in 1983. The NHP initially focussed on six countries in the Caribbean and South America, but as of 1989 twenty-three countries were involved in the program. In recent funding allocations from OFDA, the OAS has begun a new dual emphasis on activities in the Caribbean basin and in Metropolitan areas of the Latin America region. Efforts in the Caribbean have been able to build on and continue the work begun under past NHP activities. Some of the NHP activities also incorporate work done through OFDA-funded programs other than those of the OAS. For example, in the Dominican Republic, the NHP is incorporating seismic hazards analysis information into its development activities along the Haitian border. (This seismic information is being generated as a result of an OFDA grant to the Seismological Institute of the Dominican Republic, Case Study #2.)

Currently, there are two main components to the NHP: 1) natural hazards assessment for reduction of disaster vulnerability; and 2) natural hazard information management for disaster preparedness.

The NHP's activities in the Dominican Republic are illustrative of the program's first component, Natural Hazards Assessment for the Reduction of Disaster Vulnerability. This is a comprehensive project that includes planning basic infrastructure and community lifeline systems in five towns. In these, the OAS program applies studies of water and land use, forest management, agricultural development, irrigation and housing to development planning.

The risk management component of this project involved the detailed mapping of hazard zones, coupled with recommendations to the government on appropriate use of those areas. Using detailed maps, historic 100 year river flood boundaries were overlaid on the sites of government planned development activities. Because the hazard assessment map showed that one of the planned communities was to be located in an area highly vulnerable to flooding, the government relocated the site of the planned town to an area less vulnerable. This decision undoubtedly prevented losses that would have occurred due to flooding.

The OAS project chief in the Dominican Republic candidly admits that the notion of risk assessment had not occurred to OAS prior to its association with OFDA. Additionally, the OAS director indicated that all future OAS development planning efforts in the Dominican Republic will require a hazards assessment and mitigation component.

The second major component of the NHP, Natural Hazard Information Management for Disaster Preparedness, was first implemented in Jamaica in December 1988 following Hurricane Gilbert. This effort involves inventorying the country's resources that may be needed to respond to a disaster, and then entering the information into a central database. To accomplish this the OAS is promoting the use of the Emergency Information System (EIS), an integrated emergency management software package. The system is now in the hands of eleven government agencies including the Ministries of Public Works, Communications, Education, and Health, as well as the Jamaican Office of Disaster Preparedness.

Although it was the OAS that purchased and initially conducted training in the use of the EIS in Jamaica, the UNDP has since assumed responsibility for its continuing intragovernmental coordination and training requirements. The UNDP now views the system's main utility as being its ability to enforce rigor and accountability into all public sector programs. Because of the system, a database of the country's resources and facilities exists for the first time. The EIS was introduced as an emergency management tool but is now being primarily used, in this case at least, for the planning and monitoring of rehabilitation activities. This does not preclude its use in emergency management situations, and, in fact, should improve the management of resource coordination during relief operations.

As an example of the system's utility, the UNDP cited its use by the Ministry of Education. Following Hurricane Gilbert, the Ministry used the system to inventory the country's schools and to note the amount of damage sustained due to Hurricane Gilbert. Prior to the introduction of the EIS system, the Ministry had no database listing each of the country's schools. Other Ministries have used the system for similar purposes. In addition, the system provides a historical record of the activities undertaken in the rehabilitation of the school system, chronologically and by location, thus introducing tool for tracking rehabilitation commitments.

The two information systems -- the EIS and GIS -- have become a standard focus of the NHP. The UNDP intends to continue to actively coordinate with the OAS in introducing the system in numerous Central American and Eastern Caribbean nations.

As the NHP program developed, and hazard information was identified and catalogued, the OAS realized that there was a tremendous need to train planners to routinely use hazards assessment information. This led to a large scale effort to develop hazards mitigation training materials and courses. Pilot courses were run in 1987 with forty-two participants from eighteen countries, and other courses based on these initial courses have gone forward.

Present Status

All major elements of the project are underway.

In the Caribbean the NHP continues to provide technical assistance to individual countries for the assessment of natural hazards affecting settlements and public infrastructure. The emphasis is on landslide hazards, coastal settlement areas, lifeline (or critical facilities) mapping, and the identification of mitigation measures that involve public and private sector actions to protect infrastructure from potentially destructive natural occurrences.

Assistance in the Caribbean has included completion of a hazard risk assessment in the capital of Saint Lucia and eight coastal towns. A workshop on hazards was held for town clerks and a manual was produced for the use of local emergency managers. Similar activities were completed in Grenada. Landslide hazard assessments and maps were completed for Dominica, Saint Lucia, St. Vincent and the Grenadines, Jamaica, and Trinidad and Tobago.

Likewise work continues in South and Central America. For example, national level data bases have been prepared for Ecuador, Peru, Guatemala, and Bolivia. GIS installations have moved forward in Costa Rica, Honduras, and in Brazil. Technical assistance has been provided in Honduras to the municipality of Tegucigalpa incorporating natural hazards information in urban settlement and building site development. In all areas training in hazards management and the operation of the GIS and EIS have preceded actually making the systems available.

Over 215 people have been trained, over half of whom have taken the course "Hazards Management and Public Sector Development Planning." This four week course includes approximately 85 hours of formal instruction, 25 hours of classroom exercises and 30 hours of technical field work. Plans to conduct considerably more training in this format are well developed and financing is being sought.

Other activities that typify programs that have been influenced by NHP include:

- In St. Lucia, a government proposed drinking water reservoir has been redesigned as a result of a hazard assessment study;
- The World Bank has requested preparation of a summary of national natural hazards assessments as they affect lending for development projects in Central America;
- The governments of Ecuador and Colombia are publishing development atlases which include natural hazards information for proposed development areas.

ANALYSIS OF EFFECTIVENESS

Planning and Project Design

The initial pilot project was well designed and provided the basis for considering widening the program. As implementation continued, the grant has undergone various logical alterations and amplifications. New objectives were added and geographic coverage extended through a series of six grant amendments.

Resource Allocation

Funds from OFDA and other sources, mostly the UNDP, seem to have been adequate to get the project firmly established and initial experimental and demonstration operations underway. As the project is beginning to show results, it can be expected that its benefits will begin to be perceived by other donors who may be interested to contract with the OAS for specific hazard assessment studies. To some extent this has already begun to happen as the World Bank and the region's governments are discovering the importance of hazards information to their development plans.

Sustainability

In its beginning years, the project relied almost exclusively on OFDA funding. However, in recent years, the NHP has been able to attract funding from a number of sources including increased commitments from the Department of Regional Development at OAS. Although the project's potential benefits have a long gestation period, the NHP seems to be on the threshold of gaining increased prominence and acceptance throughout the region. In the short term, the NHP may need to continue to rely heavily on OFDA funding but prospects for decreasing financial dependency seem positive. In fact, the NHP is currently negotiating hazard assessment studies for the World Bank as well as regional development banks.

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In conclusion, this is a well managed project currently making a moderate contribution towards reducing the destructive effects of natural hazards. If the project continues its current momentum, it offers tremendous potential to significantly reduce losses throughout the region. The project should continue to be supported and promoted as an exemplary disaster mitigation strategy.

The EIS system installed in Jamaica is being used, is well thought of by those who use it, and is producing high expectations concerning its future potential for both emergency management and development planning. In Costa Rica, on the other hand, the EIS has not been accepted. The GIS, however, has been installed in Costa Rica and is beginning to be widely used.

Major concerns about the computer systems are their personnel requirements and high costs. To get the system operational, and to keep it current, a minimum of several full time data entry specialists are required, making the system's upkeep expensive. In addition, the firm that developed the systems charges premium rates for each additional component added to either system. The UNDP is currently completing a comprehensive evaluation of the EIS system in Jamaica which may provide some insights into these concerns. It would be advisable to assess the utility and acceptance of the geo-referenced computer systems before committing to their installation throughout the region.

RECOMMENDED ACTIONS

- OFDA should keep abreast of the program's achievements and promote its strategy among the region's donors.

- In the field, OFDA and USAID staff were not well acquainted with the project. This should be reversed to assure that the project reaches a wider audience.

- The computer information systems are meeting with mixed results and their acceptance and application should be closely monitored. Also, care should be taken not to make mitigation efforts dependent on electronic information systems. In some countries, a less computerized approach to natural hazards reduction could yield similar results, higher acceptance, and more modest operating costs.

- The NHP is one of OFDA's potentially most important grants and should certainly continue to be funded.

STRATEGIC IMPLICATIONS

- Continuing effort should be made to ensure that development planning, routinely, includes the integration of hazards analysis.

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- The hazards information collected by the project, should be considered as all USAID infrastructure projects are planned.

CASE STUDY 16

PARTNERS OF THE AMERICAS EMERGENCY PREPAREDNESS PROGRAM

SUMMARY

Begun in 1984, this activity was designed to creatively permit U.S. emergency managers to provide expert volunteer technical assistance to their counterparts in Latin America and the Caribbean. In part, OFDA decided to use Partners because of their established network of programs in 31 countries throughout the region. This activity supports a wide range of disaster preparedness and prevention issues including strengthening fire prevention programs and improving incident management capabilities for earthquakes, hurricanes, chemical accidents, and airplane crashes.

The proper functioning of the program is dependent upon interaction between the small program staff in Washington, D.C., and volunteer managers in U.S. states and over 30 countries. Not surprisingly, this has led to widely varied understandings of what the EPP is to accomplish and large differences in efficiency between subcommittees in different countries. In the Dominican Republic, EPP activities have significantly improved the professional skills of the emergency medical sector, but, in other countries, the program has produced inconsistent results.

$1,862,680 FY 1984-1988

INTRODUCTION

This case study examines the Emergency Preparedness Program (EPP) of the National Association of the Partners of the Americas (NAPA). It is based on numerous sources, including a review of project documentation, project proposals and periodic progress reports, and discussions with the following individuals: the EPP program's implementors in the Dominican Republic, Jamaica, Costa Rica, and Peru; a project officer at OFDA; discussions with AID Mission Disaster Relief Officers (MDROs) in Jamaica and the Dominican Republic; OFDA Regional Advisors in Costa Rica and Peru; the Director of the EPP program and his assistant in Washington, D.C.; and the U.S. Chairpersons of the Michigan and New York EPP subcommittees.

NAPA was established by USAID in 1964. Partners has an existing management and program structure that links professionals in U.S. communities

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with their counterparts in developing countries to implement various cultural exchange and development programs. In part, OFDA decided to use Partners to foster disaster preparedness because of their existing network of programs throughout Latin America and the Caribbean which includes partnerships in 31 Caribbean and Latin American Countries and 47 states.

OFDA ACTIVITY

Project Context

Latin America and the Caribbean are highly vulnerable to disasters triggered by natural events as well as those caused by human activities such as industrial accidents and exposure to toxic waste. Each disaster requires affected countries to be capable of responding to these events in the most efficient and technically competent manner possible. This must be done in order to save lives, mitigate suffering, and minimize financial and environmental losses.

The program is intended to improve aspects of emergency management throughout the region as identified by EPP subcommittees. This includes supporting preparedness and prevention systems responsive to the day-to-day emergencies such as kitchen fires and traffic accidents, as well as large catastrophic events such as earthquakes, hurricanes, and airplane crashes.

The EPP program began with an OFDA grant in 1984. Since then the EPP program has received a second grant from OFDA making OFDA's total contribution to the program, between March, 1984 and February, 1990, in excess of $1.8 million. A third grant has recently been submitted to OFDA requesting that the program be continued for an additional three years. The project was designed to draw upon U.S. expertise in the fields of disaster preparedness and response. Partners' program attempts to induce individuals with the requisite skills to provide volunteer expert technical assistance to their counterparts in Latin America and the Caribbean. In Washington, D.C. a full time disaster professional and a full time assistant were hired to manage the program.

Nearly all of the 60 Partnerships in Latin America and the Caribbean have established an EPP subcommittee. The establishment of EPP subcommittees was facilitated by the leadership of existing partnerships throughout the region. Each EPP subcommittee has a U.S. counterpart subcommittee. All EPP subcommittees have a designated chairperson. These chairpersons are responsible for identifying, planning, and executing emergency preparedness and prevention activities. All activities must be coordinated between, and approved by, both the U.S. and southern EPP subcommittee chairpersons. The EPP subcommittees are but one of up to fifteen subcommittees active within the administration of a particular partnership.

The EPP subcommittees are managed entirely by volunteers. Administrative support may be available to these subcommittees through the local partnership organization; this varies among partnerships depending upon the level of external assistance received through programs other than the EPP. Some Partnerships have permanent offices, others do not. Direct program support is available through travel grants and small project grants administered and approved by the EPP Program Director in Washington, D.C. Those traveling are expected to stay in housing provided by the host partnership (or pay for their own hotel), may not stay for less then ten days, and receive only $100 for total expenses incurred during a visit of ten days. Small grants may not exceed $5,000 and approximately six are dispersed per year within the entire EPP program.

The focus of the current Partners' grant "... is on the more active partnerships within the region and to continue strengthening their capacity to deal with man-made and natural disaster such as fire, storms, crop damage, hurricanes, floods, droughts, earthquakes, traffic accidents, chemical and toxic wastes, etc." In 1988 the grant was amended to allow Partners to conduct five training events. These training events have supported OFDA sponsored activities, such as additional training for Jamaica's ODP, and provided OFDA with a flexible mechanism to program the movement of training participants. This has effectively reduced OFDA's workload by shifting administrative responsibilities to Partners.

Objectives and Components

The following schematic Logical Framework shows how the activity was designed.

GOAL: Develop a disaster prevention and preparedness linkage between U.S. communities and their Latin American and Caribbean counterparts to prevent, or prepare for, man-made and natural emergencies.

PURPOSE: Use volunteer technical expertise to expand and improve community-based programs of disaster prevention, preparedness, and emergency management in 27 countries of Latin America and the Caribbean through professional and institutional linkages with states, counties, and municipalities in U.S. "Partner" states.

OUTPUTS:

1. EPP committees set up in 56 U.S. partnerships.
2. EPP committees set up in 31 Latin American and Caribbean countries.
3. Disaster related activities in 12 target countries involving highway, traffic, fire, and health departments; local civil defense; local and regional Red Cross; and police.
4. Training seminars developed.
5. 100 Brazilian first responders trained in radiological hazards.
6. 600 Latin American and Caribbean emergency responders exchanged, current level of travel is approximately 200 EPP participants per year equally divided between U.S. and non-U.S. nationals.
7. Dispersion of 24 seed grants totalling $106,000.

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8. 12,000 days of volunteer technical assistance delivered between 1987-89.

INPUTS:

1. Full-time disaster expert program manager, a full-time assistant, and a part-time secretary.
2. Established EPP subcommittees in 27 Latin American and Caribbean countries.
3. $1.8 million in OFDA grants over a five year period.[1]
4. Partner's roster of volunteer experts.
5. $402,514 in cash contributions from 1985-89.
6. $347,800 in equipment donations from 1986-89.
7. $2,678,000 in technical assistance donations from 1987-89.

According to information provided by Partners, the aforementioned outputs were achieved by 1989.

Under the financial and time restrictions of this assessment, it was not possible to visit each of Partner's EPP committees to ascertain their level of activities and accomplishments. In lieu of this, EPP programs in four countries were visited: the Dominican Republic, Jamaica, Peru, and Costa Rica. In fairness to the Partner's program, it should be noted that these were not countries which Partners cited as being host to their most active EPP programs. Rather, these countries were selected because they had been recipients of a significant amount of OFDA funding, the majority of which is not related to NAPA programs. Nevertheless, Partners' had formed an EPP subcommittee in each of the four countries visited, and had provided the evaluation team with a list of EPP activities within each country. Therefore this sample can be considered representative, to a limited degree, of the level and types of activities being implemented by EPP subcommittees in various Partner's countries.

The following are descriptions, by countries visited, of EPP subcommittee activities;

DOMINICAN REPUBLIC:

Of the four countries visited, the Dominican Republic's EPP subcommittee had the highest level of activity. The partner state of the Dominican Republic is Michigan. The EPP is one of several programs for which the Dominican-Michigan partnership had formed a subcommittee.

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[1] Although this evaluation assessed Partners' activities only through 1989, their current grant from OFDA extends until February 1990 and will make OFDA's total contribution to the program $2,330,512.

The EPP program focuses on emergency medical assistance and has undertaken a number of training activities to support this. The EPP subcommittee arranged for U.S. emergency medical technicians to visit the Dominican Republic to conduct training in various facets of emergency medicine, and to send medical personnel to Michigan for technical training. Training to date has been in the areas of CPR, Basic Trauma Life Support, and Advanced Cardiac Life Support. This training was designed to have achieved a multiplier effect and appeared to be quite successful in doing so, however, due to lack of documentation, the quantity of additional training could not be determined.

It was not possible to document the number of participants trained because lists of those trained, training schedules, and training histories were not made available. It seemed that very little formal documentation existed. The Michigan Partners had conducted two major emergency medical program training exercises in Santo Domingo and a third was planned for February 1990. Despite the informal plans, there seemed to be frequent communications between the EPP subcommittees, often as much as a telephone call per week, and excellent coordination regarding the activity.

Both in Michigan and in the Dominican Republic, the EPP subcommittees appeared focused, active, and to have made significant accomplishments. Last January, 22 persons from the Michigan Department of Emergency Services traveled to the Dominican Republic for fourteen days to conduct training in Advanced Cardiac Life Support and Basic Trauma Life Support. The training team took with them several thousand dollars worth of equipment, including heart monitors, which were left behind as a donation to the Dominican Republic. Only two of the Michigan participants' travel was funded through Partner's EPP program, the others secured travel money from other sources or paid themselves. While in the Dominican Republic for two weeks the Michigan trainers stayed free of charge in a hotel owned by a member of the Partner's organization.

The EPP subcommittee had also worked with the Santo Domingo Fire Department, which has a critical role in the country's emergency preparedness response plan. Partners' sent the fire chief to a training course in Michigan. In addition, two Michigan volunteers visited the fire department in 1987 to conduct a needs assessment. One conclusion of that assessment was that the fire department is not prepared to respond to emergencies because of its antiquated fire trucks. This visit prompted some action. The EPP subcommittee is arranging a donation of five, four year old, fire trucks from New York. USAID/DR has indicated they will assist in getting the trucks transported from New York to Santo Domingo. In addition, last May, the USAID/MDRO assisted Partners in shipping two donated ambulances from Michigan to Santo Domingo. However, as of October, the ambulances have yet to be used because the government had not yet been able to resolve the issue of their duty free importation.

In sum, the EPP program appears to be making a valuable contribution towards increasing the capabilities of the emergency medical community in the Dominican Republic. It is an excellent example of a modest amount of seed money being used to generate significant private sector volunteer involvement. This involvement has resulted in substantial in-kind contributions of both skilled trainers and equipment. Any lack of formal management procedures is more than made up for by the commitment and enthusiasm of those involved.

JAMAICA:

Partners has been operational in Jamaica since 1970 and Jamaica's partner area is western New York. An EPP subcommittee was formed in 1984 as one of eight subcommittees. Other programs include sports, assisting the handicapped, drug abuse prevention/counseling, and cultural exchange. The Partner's Jamaica office has two full time staff members, reduced from four in August 1989. In the past Partners/Jamaica has received significant grants from USAID and the European Economic Community (EEC), neither of which was for their emergency program. The emphasis of their EPP program is human resource development and public awareness campaigns focusing on safety issues and disaster preparedness.

Partners' EPP program in Jamaica had not been active during the year preceding this evaluation. Its only activity involved an ODP staff person traveling to Buffalo to visit the National Center for Earthquake Engineering Research and the N.Y. Red Cross. In fact, since its formation in 1984, little seems to have been accomplished. The main role of the subcommittee seems to have been in supporting human resource development of personnel from the Jamaican Office of Disaster Preparedness (ODP), an office of the Jamaican government. Of the three travel grants for Jamaicans to visit the U.S.,two exclusively involved staff from the ODP.

The Subcommittee Chairperson from New York, who has held the position for one year, reported that she has had virtually no communication with her counterpart in Jamaica. She stated that the previous chairperson had been relatively inactive. Since assuming the position, her single activity had been coordinating the visit of the staff person from Jamaica's ODP. She professes not to know the focus of the Jamaican EPP program and admitted that no plans existed. Her hope was that concrete activities would emerge during an upcoming regional planning meeting. (Such a meeting had been scheduled for September, but was postponed due to Hurricane Hugo. The meeting was rescheduled for January 1990.)

One of the more significant activities listed on the 1989 EPP Country Profile for Jamaica was a 1988 EPP small grant to help finance a National Safety Fair entitled, "The Environment and You." The fair, which was part of National Safety Week in Jamaica, included exhibitions on fires, dangerous chemicals, natural disasters and other health and safety topics. This activity was postponed due to Hurricane Gilbert and has yet to occur. Other activities listed on the profile seemed to be repetitious and, based on the limited information provided, achievements were difficult to determine.

Partners/Jamaica perceive the current needs in Jamaica to be a continuing emphasis on public awareness, particularly concerning day to day safety issues and cite fires as perhaps the single greatest cause of preventable deaths in Jamaica.

The Jamaican-New York Partners have made some efforts to develop an EPP, but as of yet without appreciable success. The majority of activities undertaken thus far involved travel of government officials from the Jamaican

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Office of Disaster Preparedness. Although there was considerable interest shown by Jamaican Subcommittee members, tangible results remain elusive.

PERU:

The partner state of Peru is Texas; an EPP subcommittee was set up at the end of 1987. A briefing paper indicated "...with the intention of creating a place for coordination between institutions already working in the field [of disaster preparedness] free of tribulations and competition, and where individuals who share an interest in the prevention of disasters would find freedom of action in order to multiply their efforts and coverage."

In July 1988 a workshop was held in Lima for members of the partnerships in the southern cone of South America. Representatives from six partnerships (Arkansas-Bolivia, North Carolina-Bolivia, Utah-Bolivia, Kentucky-Ecuador, Idaho-Ecuador, and Texas-Peru) were represented. Altogether ten persons from the U.S. and eleven from Ecuador and Bolivia flew in to join thirteen Peruvians and other participants resident in Peru for the three day workshop.

The purpose of the session was twofold. First to encourage EPP work among partnerships, some of which were, like Peru, off to a slow start; and secondly to expose participants to a disaster simulation run by PAHO, Lima. The workshop schedule provided one day for the simulation and two other days for presentations on how to organize EPP subcommittees, "the impact generated by volunteerism in the Partners," and subgroup work on preparing plans for the next 18 months.

There was no way for the evaluation team to judge the effects of the workshop on other partnerships involved. However, in Peru, two years after the founding of an EPP subcommittee and over 18 months after the workshop, it was clear that not much in the way of a disaster preparedness program had developed.

As indicated earlier concerning Jamaica, the handouts for Peru provided by NAPA in Washington (EPP Achievements Matrix and EPP Country Profile) were repetitive and unclear concerning specific achievements. Under the category "Disaster Management" the document lists the training of a Peruvian in video production, under "Fire Prevention and Suppression" it lists a "...project focused on preventing fires started by cooking accidents, a major hazard in Lima's shantytowns," and under "Community Education" a "small grant awarded for development of educational video materials and TV and radio spots for a public safety program." Essentially, these were all the same project.

OFDA's Regional Advisor in Peru spoke enthusiastically about the Partner's program emphasizing that it operated through its own structure and did good work in areas otherwise overlooked by OFDA. He used fire fighting, managing toxic waste, and community training as examples, as had persons interviewed earlier at NAPA/Washington. He said that some weaknesses in the program were somewhat counteracted "by the personal intensity of connections between local groups and those in the U.S., and the loyalty that results."

In a later conversation, OFDA's Regional Advisor also pointed out that Partner's was a convenient and flexible conduit for funding training and other travel. He cited a workshop he had run in Peru for Civil Defense officials for which Partners passed through funds even though Partners was not directly involved as a participant. He also said that the large project in Ecuador, for which a grant with Partners was recently signed, was not based on Partners' capabilities in disaster preparedness but, rather, was to assure accountability in a location where a small USAID mission did not have sufficient staff to manage the project.

Partner's EPP subcommittee in Peru does not seem to have made a significant contribution to that country's state of disaster preparedness. However, OFDA's regional advisor thought highly of other EPP programs throughout South America and is actively working with NAPA/Washington to determine how the Peru program can be improved. Expectations exist that the future will bring an increased level of program performance in Peru.

COSTA RICA:

The activities of Partners in Costa Rica revealed a situation similar to that in Peru. Partners' staff said that the main stumbling block in the EPP was a lack of responsiveness on the part of the Oregon EPP subcommittee.

The Costa Rica staff reported the following technical interchanges between Costa Rica and Oregon:

- A specialist from Costa Rica had traveled to Oregon to discuss the needs of the disabled in disaster situations.

- A member of the California Partners who happened to be traveling in Costa Rica was visiting a forest reserve when fire broke out. When he paid a courtesy call on Partners Costa Rica he recommended that the EPP consider becoming involved in Forest Fire Control. This resulted in the eventual recruitment U.S. Forest Service volunteers in Oregon to become involved in such a program.

- A final example of technical assistance given by the Costa Rica staff is that the chairperson of the Oregon EPP subcommittee, who is an emergency medical services nurse, taught a CPR course when she was visiting Costa Rica.

When questioned about the small grant of $5,000 received by the Costa Rican EPP to construct a gravity fed water tank in the forest preserve, Mr. Tercero, the EPP Chairperson, did not have any knowledge of the project although it is listed on the EPP Country Profile for Costa Rica. The impression was, that although the grant came from the EPP program, it had actually been arranged by the Costa Rican subcommittee dealing with natural resource management programs, and that the local EPP subcommittee had not been involved.

All in all, the Costa Rican EPP program has not yet taken hold. The EPP is but one of fifteen Partners programs in Costa Rica. Activities attributed by NAPA/Washington to the EPP subcommittee, in reality, seem to be overlapping programs that have been initiated by other subcommittees. OFDA's Regional Advisor noted that the subcommittee's future plans involved recruiting people from the government and the Red Cross into affiliation with the EPP program. Since these people were already involved in the emergency preparedness field, he wondered what the advantage of this would be.

ANALYSIS OF EFFECTIVENESS

Three of the four EPP subcommittees investigated were not engaged in, or planning, activities making significant contributions to the state of emergency preparedness in those respective countries. Because of the limited scope of this evaluation (only four of nearly 60 EPP subcommittees were contacted) it would be unfair to the EPP program to make across-the-board conclusions about the effectiveness of the entire program. Nevertheless, based on the evaluation team's limited observations, generalizations can be made concerning the programs strengths and weaknesses. These generalizations are as follows:

Strengths:

- The program attempts to address less dramatic but widespread day-to-day emergencies such as fire prevention programs and emergency medical systems. In many countries, such emergencies are often responsible for the greatest annual loss of life and are generally not addressed by other disaster prevention programs;
- The Partners' program bypasses cumbersome and ineffectual bureaucracies to work directly with first responders and community level organizations. Work in the Dominican Republic under the grant provides a good example of this;
- Partners' elicits significant U.S. altruism through volunteers with professional skills and in-kind donations. The EPP is able to involve many of the United States' best emergency management professionals in its activities;
- Partner's is able to respond quickly;
- EPP subcommittees, as far as they are organized and managed by inspiring and visionary leaders, are capable of becoming self sustaining to accomplish goals well beyond what would be possible using NAPA's limited financial support;
- The EPP efficiently assists OFDA with a wide variety of tasks throughout the region, e.g. administrating travel arrangements for consultants or arranging travel and per diem for trainees.

Weaknesses:

- EPP subcommittees suffer from the capriciousness inherent in volunteer management. Principally, the less efficient subcommittees are victims of their own poor planning and inconsistent levels of interest among subcommittee members and chairpersons;

- Three of the four countries in this evaluation had not clearly defined the problem upon which their interventions would be targeted;

- The program has not been closely monitored. In some cases, NAPA EPP Country Profile sheets were repetitious and unclear about actual program accomplishments. The information provided in the Country Profiles must be cautiously interpreted;

- EPP activities often evolve around, or include, government employees or professional members of disaster response organizations. This dilutes Partner's claim to be an organization concentrating its efforts on working with community volunteers;

- It is unlikely that the administrative costs of the EPP program can ever be sustained independently of OFDA funding;

- Regional training events are the only mechanism to share information between subcommittees in different countries. Skills acquired by one country are not systematically shared with neighboring EPP subcommittees and there does not seem to be any way to insure that the most appropriate U.S. professionals can be utilized in locations where the greatest need for their skill may exist.

In conclusion, the EPP appears to have established EPP subcommittees in each of its thirty-one Partner countries. However, this accomplishment has not proven sufficient to achieve the grant's purpose level objectives. Not all EPP subcommittees are active. NAPA/Washington indicates, however, that purpose level objectives have been achieved in Mexico, Brazil, Colombia, and Paraguay, countries which the evaluation team were unable to visit. Of those visited, the purpose of the EPP program has been achieved only in the Dominican Republic.

The proper functioning of the program depends heavily on the small EPP staff in Washington relating to a highly decentralized volunteer management structure in U.S. states and in over 30 countries. Not surprisingly, this has led to widely varied interpretations and understandings of what the EPP is to be, and large differences in efficiency among EPP subcommittees. It certainly leaves the design and implementation of specific EPP activities outside the management control of NAPA or OFDA. What happens, where, and with what effect is difficult to predict. Likewise, the quality of expertise from U.S. partnerships is difficult to guarantee.

A significant amount of EPP activities and travel grants seem to support the activities of host governments and other organizations having disaster preparedness programs, such as PAHO, PCDPPP, and the Red Cross. This may be an exceptionally efficient process for administering travel in support of OFDA-funded training activities. Such an administrative mechanism benefits OFDA and should be explicitly incorporated into future grants.

RECOMMENDED ACTIONS

- OFDA should review the objectives of this grant and consider restructuring it to permit identification of realistic and measurable objectives. This would include identifying a limited number of priority countries, as well as focussing on specific programs, such as community-based first responder training.

- Allow and encourage more interaction, including technical exchanges, between and among southern partnerships.

- Increased monitoring of field activities.

- A process should be formalized whereby Partners can assist in the administration of OFDA-sponsored training.

- Program strategies should be developed for each EPP subcommittee.

STRATEGIC IMPLICATIONS

- OFDA needs to more frequently visit program activities.

- U.S. emergency managers have relevant skills to bolster the professional competencies of their international counterparts.

CASE STUDY 17

DADE COUNTY

SUMMARY

Since 1985, the Department of Emergency Services of Dade County, Florida has received funding from OFDA to provide emergency management training and operational support throughout Latin America and the Caribbean. Services have included developing disaster plans, organizing emergency operations centers, providing communications assistance, and conducting in-country training of emergency response personnel. In addition, Dade County is on stand-by to provide international search and rescue services to support OFDA relief operations.

Dade County has been active in providing operational support for OFDA's relief operations including sending search and rescue teams to Armenia and Mexico City following earthquakes, and setting-up and managing an emergency communications system in the Caribbean following Hurricane Hugo.

Implementation of the activity through the Spring 1989 was marred by inadequate attention to the administrative and accounting aspects of the job. However, inspite of these problems, both the operational support and training provided by Dade County has always been delivered with a high degree of professionalism.

$646,515 FY 1985-1987

INTRODUCTION

OFDA has provided Metropolitan Dade County support for training and search and rescue activities since 1985, primarily in Latin America and the Caribbean (although personnel from the structural collapse group were also sent to Armenia). This case study focusses on Dade County's training activities related to disaster preparedness and mitigation. It is based upon a visit to Dade County Florida and interviews conducted in the course of other field visits to Jamaica, Peru, Costa Rica and the Dominican Republic.

OFDA ACTIVITY

Project Context

The geographical area for this case study is Latin America and the Caribbean whose combined population (excluding Puerto Rico and The U.S. Virgin Islands) numbers about 444,277,000 people according to the United Nations estimates for 1990.[1]

Disasters are well known to Latin America and the Caribbean. OFDA's summary of disasters since 1900 indicates that earthquakes alone have killed 169,260 and injured more than 200,000 people through the region. Another 13,780,659 have been affected with resulting property damage from these earthquakes totaling more than 11 billion dollars. In the last four years earthquakes have hit Chile, Ecuador, El Salvador, and Mexico; estimates of numbers of persons killed in the 1985 Mexican earthquake range between 8,766 (OFDA) and 10,000 (PAHO) with thousands more left homeless. In this century, volcanos have killed more than 63,000 people, injured another 154,000 and caused property damage of over one billion dollars. In 1985, Columbia's Nevado del Ruiz volcano erupted killing an estimated 21,800 (OFDA) to 23,000 (PAHO) people. Hurricanes are yearly visitors to the Caribbean. Hugo's recent attack left hundreds of thousands homeless and killed approximately 20;[2] one of the reasons more people were not killed was the early warning provided. In 1988, Hurricane Gilbert left hundreds of thousands homeless in Jamaica before continuing on to Mexico's Yucatan peninsula and hitting the city of Monterrey. Two months later, Hurricane Joan dealt a severe blow, sweeping from coast to coast throughout Nicaragua and hitting other Central American countries. Every year disastrous floods hit one country or another in this region.

PROJECT DESCRIPTION

Rationale

The Dade County involvement in training began in 1972 when the former coordinator, Doug Jewett, used the Heimlich maneuver on a choking child in Costa Rica. Mr. Jewett was then asked for and provided training for paramedics in that country. Over the years, OFDA had received numerous requests from Latin American and Caribbean countries for technical assistance, training and general emergency management assistance to be provided by Dade County. There were also requests of assistance for Dade County specialists through private and voluntary organizations. For example, the Dade County Fire Service sent fire protection specialists to Ecuador, Venezuela, Honduras, Jamaica, the Cayman Islands and Haiti. The Dade County Sister Cities program donated a reconditioned fire truck to the Cayman Islands. A program in Haiti was initiated by AID, but partly funded by the

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[1] United Nations. World Population Prospects: 1988. New York, 1988

[2] PAHO. "Effects of Hurricane Hugo", October 13,1989.

Government of Haiti, resulting in an improved airport disaster plan as well medical and fire fighting training for city and airport fire fighters. This planning and training effort provided increased cooperation among Haiti's emergency services personnel. As a result of these and other training efforts OFDA became interested in using these services in a more formalized manner. A proposal was submitted to OFDA from Dade County in July 1985, and a grant was awarded in September 1985. It was subsequently extended in 1987; the second grant is on-going.

Training Mandate

The training objective of OFDA support for Dade County is to: "continue the training and development of emergency managers and first responders throughout the Caribbean and Latin America, review existing Dade County emergency management training programs and provide lists of such programs for international participants...Specialized training can be developed as well as on the job training,...identify and train a structural collapse rescue team which will be available on short notice to be dispatched overseas to the scene of a disaster requiring search and rescue capabilities."

To carry out this mandate, there are 50 fire fighters on the structural collapse team who comprise the on-call rescue team and the training personnel. The Dade County staff are all trained as paramedics and have undergone intensive search and rescue training. The team is composed of people with strong backgrounds in light, medium, and heavy rescue equipment operation, hazardous materials, communications, airport crash fire rescue and elevated victim rescue among others. Training is conducted bi-monthly by members in their areas of expertise. OFDA supports in-service training activities for the team in conjunction with teams from Fairfax County, Virginia, Montgomery County, Maryland, the U.S. Dog team, and Rescue 40, a volunteer group. The Dade County Fire Department believes it learns every time it responds to a disaster overseas and attempts to incorporate those lessons into their training program.

ANALYSIS OF EFFECTIVENESS

The activity has passed through an extremely difficult period in its management. This aspect now seems under control. Because of the nature of its mission and the high degree of professionalism with the staff, attainment of the intended Outputs did not suffer.

Primary attention should now be paid to moving forwards greater realization of the portion of the Purpose statement which involves ". . . increase self-sufficiency of first responders and emergency managers in Latin America and the Caribbean."

Objectives and Components

GOAL: Reduce the impact of natural and technological disasters.

PURPOSE: Increase self-sufficiency of first responders and emergency managers in Latin America and the Caribbean, and develop the Metropolitan Dade County Fire Department's heavy urban search and rescue capabilities for deployment to international United States Government disaster relief operations.

OUTPUTS:

- Resource inventory -- lists of both training programs and local specialists available to assist in countries' preparedness and response needs.
- Training programs and materials developed.
- Equipment -- caches of equipment secured for use in disasters.
- Communications -- two satellite communications units (TCS-9000) as well as radios and communications equipment obtained for use in disasters.
- Coordination of major disaster responses from Dade County area and development of mass casualty plan for Caribbean.
- Conference Support -- logistical arrangements, interpretation in Miami.
- Dade County personnel attended conferences such as the National Hurricane Conference, the National Association of Search and Rescue Conference, and the Natural Hazards workshop.
- General Technical Assistance as requested by OFDA in areas of national plan development, emergency operations centers, public information and awareness, hazard mitigation, maintenance, hazardous material, and disaster contingency plans.

INPUTS: The first OFDA grant was in September, 1985 for $271,515. The grant was extended until 1988. In 1988 a new grant was awarded for $1,191,827 ($373,437.00 obligated as of 9/30/89). This grant continues until April 29, 1991. Dade county has supplied office space and pays the salaries of the rapid deployment teams unless a replacement is needed at a Dade County disaster. (Valued at about $31,000.00). Various USAIDs pay for some of the logistics for training teams. Some of the host countries or other private voluntary organizations also provide funds but no dollar figure was available.

Implementation Events

The project began on a rather loosely organized basis. Some funds were spent prior to AID's approval. (Letter from Alan G. Swan to Douglas Jewett, Dade County Coordinator, October 21, 1987.) The first coordinator was replaced in April, 1989. The new coordinator, Lt. Carlos Castillo, found it necessary to allocate substantial time to reorganize the Metro-Dade County Fire Department's Bureau of International Programs. Although Jewett was asked to leave by both the County and AID, he still participated in training the Dominican Republic airport fire fighters during August, 1989.

The former coordinator was not good at keeping records and most of the ones he did keep he took with him when he left, making it very difficult to evaluate the project under his leadership. Currently financial records are up-to date and reports are now regularly filed.

Early assessments of disaster preparedness and emergency needs were carried out in Costa Rica, Ecuador, Haiti, Honduras, Guatemala, Peru, Venezuela, Jamaica, Antigua, and Trinidad, but very few records of these assessments were kept in Dade County. Additional discussions have been held more recently with officials from Peru, Venezuela, Jamaica, Honduras, Dominican Republic, and Chile regarding future training needs. Dade County submits training plans and country needs to OFDA for their approval.

Dade County has available and has used the TCS 9000 satellite telephones for communications during disasters.

From 1985 to 1989 Dade County conducted approximately 13 training courses in English, Spanish, or Creole. These courses took place in Miami, Peru, Costa Rica, Ecuador, Venezuela, Dominican Republic, Haiti, Antigua, St. Lucia, Mexico, Trinidad and Tobago. Approximately 1000 participants attended these training sessions. Courses were adaptations of the Dade training program in fire fighting as well as search and rescue.

Training is much better done in the host country than in this country with a few exceptions such as the training held in Miami at the fire academy of Miami Dade Community College for a group of Costa Ricans involved in emergency preparedness and disaster planning. However, using local materials and equipment found in the host country is much more effective than showing the trainees technology which is not available in their country. The following is illustrative of the type of training given by Dade County:

- Search and Rescue: Workshops between one and three weeks duration covered rescue equipment and techniques, rescue from hazardous material, search and rescue in confined spaces, rescue from burning structures and extrication from crashed vehicles.

- Hazard Materials and Disaster Control: Respiratory protection, managing hazardous gases, liquids and chemicals, handling nuclear radiation incidents and bomb threats.

- Fire Seminar: Portable fire extinguishers, ropes and knots, rescue, fighting safety, communication, fire cause and determination, fire or emergency service instructor, aircraft fire protection and rescue procedures, fire service practice for volunteers and small communities.

Present Status

The second grant continues until 1991. The new coordinator is much better organized than the last and is also more responsive to OFDA's requests. Dade County will continue its rapid deployment team efforts as well as the overseas training activities. Current training plans involve a 2 1/2 year training program for first responders in Latin America and the Caribbean, lasting for two weeks each quarter. Topics to be covered will be hazardous materials, tactics and strategy, explosives and explosions, electricity, heavy rescue and extrication, disaster and mass casualty incident management, industrial fire hazards, nuclear incidents, oil and gas fires, fire prevention, media relations, stress management, public education, fire and arson investigation, high rise building fire fighting, shipboard fire fighting, in service training, advanced first aid and rescue for land and air vehicles.

There have been no evaluations to date. In fact, the project design lacked an evaluation component. Past training activities were not well documented as to the specific training curriculum used on a country by country basis. There are also no lists of participants.

The only detailed fiscal records in Dade county which could be located start with an expense work-sheet dated June 30, 1989. These records begin shortly after the date when the new coordinator was named. Of the $19,791.00 in travel funds expended between April and October, 1989, only $576.00 (3%) were spent on trips to train first responders. The balance was used to attend meetings regarding training of the rapid deployment team. Of the current grant funds available, 33% are designated as travel expenditures.

Country Situation: The Dominican Republic USAID/MDRO, Tom Cornell, felt that the training given by the Dade County team for airport emergency preparedness went far and beyond what was expected and he was very pleased with the quality of training.

Dade County also received high marks from the PCDPPP Disaster Coordinator, Franklin MacDonald, following Hurricane Hugo. He mentioned that the communications systems (Satellite phone network) set up by the Dade County team was professionally setup and proved very useful.

One of the OFDA regional coordinators says that the former Dade County coordinator "was a loose cannon but that the program never would have begun without him."

OFDA Relationship: OFDA currently appears to be closely monitoring this project. They encouraged the selection of a new coordinator this year. The new coordinator sends in quarterly reports. OFDA approves and or selects the countries for training.

Judging from the amount and type of meetings attended, the current emphasis seems to be more in preparing U.S. teams to assist and organize other countries disasters than training the personnel of other countries. The current coordinator appears to have gotten the program better organized and records more up-to-date.

RECOMMENDED ACTIONS

- OFDA should consider requesting an audit of the grant.
- Over time, the emphasis of the grant should increasingly shift away from operational support towards transfer of skills to build self-sufficiency among Dade County's international counterparts.

STRATEGIC IMPLICATIONS

- U.S. emergency managers and technicians have skills that are relevant to the needs of their international colleagues.
- Continued emphasis should be given to assisting other countries become self-sufficient in disaster preparedness and management.

CASE STUDY 18

PAHO PREPAREDNESS

SUMMARY

This grant was begun in 1981 to support PAHO's effort to develop emergency preparedness activities in the public health sector throughout Latin America and the Caribbean. Current PAHO activities related to disaster preparedness include: 1) support for preparation of the health related components of the national emergency plans; 2) training; 3) production of publications; and 4) promotion of the inclusion of material on disaster preparedness and response in the curricula of schools of medicine, public health and nursing. These activities are financed through funds provided by numerous donors, including OFDA and CIDA.

The EPP is an exceptionally well designed and documented program. The program's wide range of activities has undoubtedly improved the region's state of disaster preparedness and its capacity to manage disasters.

$2,367,719 FY 1981-1989

INTRODUCTION

In 1976 PAHO passed a resolution establishing a disaster unit to: (a) define the policy of PAHO; (b) formulate plans of action for various types of disasters; (c) inventory human and other resources available; (d) train personnel; and (e) prepare and disseminate appropriate guidelines and manuals.

The program that evolved as a result became known as the Emergency Preparedness and Disaster Relief Coordination Program (EPP). The EPP was designed primarily to identify and respond to the needs and requests of disaster prone countries. The program was initially supported by the Canadian International Development Agency (CIDA), which began funding in 1977. As the EPP evolved and demands for disaster related health management services increased, PAHO sought supplementary support from other donors. AID/OFDA responded favorably to an unsolicited proposal from PAHO in 1981. OFDA's entry into partnership with CIDA made it possible for the EPP to expand considerably. Both major donors have continued support until the present time.

For this case study, visits were made to the Dominican Republic, Jamaica, Peru, and Costa Rica. Additional information was obtained by reviewing background documents and through interviews at PAHO and AID/W.

OFDA ACTIVITY OR INTERVENTION

Project Context

The EPP operates throughout Central and South America and the Caribbean. Over fifty nations and jurisdictions with many different requirements and degrees of development are involved with the program. The estimated population of this area in 1989 is over 440 million people, excluding Puerto Rico and the Virgin Islands. Because of U.S. policy restrictions, Cuba and Nicaragua do not receive OFDA funds.

The EPP concentrates on health issues as they may arise in all the major types of disasters in the region; where it is not able to respond directly it draws heavily on the other offices of PAHO for assistance, (for example, in the case of epidemics).

Large numbers of people in the region are at risk to volcanos and/or earthquakes, particularly along the West Coast of Central and South America. Since 1900 earthquakes alone have killed 169,000 and injured over 200,000. Volcanos have killed more than 63,000 and injured 154,000 in this century. Hurricanes regularly devastate areas in the Caribbean and floods annually affect millions.

PROJECT DESCRIPTION

Rationale

The frequency of disasters in the region along with population growth and settlement patterns have left an increasing number of people living in high risk areas, thereby increasing concern about the pattern of injuries and deaths from natural and manmade disasters. Developed countries were being called on to respond in often chaotic circumstances to alleviate suffering. A key area of concern has been the ability of the health sector to respond quickly and efficiently to disaster situations. Clearly, if the capacity of local and regional authorities was further improved, it could make a tremendous difference in dealing with mass casualties, saving lives and reducing suffering. In this context, PAHO proposed to provide technical assistance in planning and executing health preparedness programs among its member states.

Objectives and Components

The EPP's objectives have remained fairly constant throughout the many grants it has received since 1981. The most recent PAHO grant agreement with A.I.D. states the objectives as follows:

- To promote the establishment or strengthening of a technical program in the Ministry of Health responsible for ongoing pre-disaster planning and coordination of relief activities of the health sector in case of disaster;

- To promote and support training for an effective health response to emergency situations;

- To stimulate cooperation between the Ministry of Health, other health organizations, NGO's, civil defense and the representatives of the international community both before and during disasters;

- To contribute to more effective international disaster responses.

The program is organized in eight distinct but interrelated components, each having its specific objectives, activities and budget. One component is primarily supervisory/administrative in nature; others are technical and deal with specific aspects of technical cooperation. These components are:

- Overall project management and evaluation;

- Education and training materials;

- Support of national programs;

- Mass casualty management;

- Training of environmental health professionals;

- Field assessment of health needs;

- Technological disasters;

- Cooperation with other regions.

Implementation Events

The first OFDA grant to support the EPP was awarded in 1981, and OFDA funding has been maintained since that time. From 1981-1987 OFDA contributions to PAHO were $1,482,719. The current A.I.D. grant, begun in 1987, has allocated $885,000 for the period from September, 1987 to September 30, 1989. The last CIDA grant began in 1988 and runs through June, 1990 providing a total of three million Canadian dollars. The previous CIDA grant was for the same amount. The overall EPP budget has been approximately $2,000,000 per year. Since 1981, OFDA support has totalled $2,367,719.

Dr. Claude De Ville has been the director of the EPP since its inception. PAHO maintains a core staff at headquarters to oversee the EPP, has designated coordinators in all member countries, and Regional Program Coordinators in Costa Rica and Peru.

ANALYSIS OF EFFECTIVENESS

Planning and Project Design

The EPP was developed and promoted by a small group at PAHO/W in cooperation with the organization's member states. Early support from CIDA allowed seminal activities to get underway. When OFDA responded favorably to the idea of joining the partnership with CIDA, a critical mass of program activity was reached, and the program attracted support from other elements within PAHO.

OFDA's decision to render support was part of its strategy in the Latin American region to identify a range of intermediaries capable of working in key sectors. Included were PAHO in health, Dade County in search and rescue, OAS in hazards analysis and mitigation and Partners of the Americas in local participation.

The EPP is an exceptionally well designed and documented program. The need for the program is clear and its general purposes and the nature of its many interrelated activities are clearly stated.

Implementation

Program reports and interviews indicate a solid record of achievement over the past ten years. PAHO staff, working closely with national governments and other inter-governmental and non-governmental agencies, have left few stones unturned in mounting a concentrated effort to change and improve disaster related health services in the hemisphere. The accomplishments include: creation of a data base of disaster articles; captioned slide sets; simulation exercises; films; special studies; an inventory of agencies able to respond to disasters; and dozens of special technical assistance initiatives. Large numbers of people have been trained in hundreds of courses mounted at all levels -- with community officials and local teachers, university-level instructors, in ministries of health and related government agencies. The result of these wide ranging activities has without a doubt, had a great effect on the region's degree of preparedness and capacity to respond to disasters.

The program appears to be well managed by its small staff at headquarters and its three regional representatives. In early 1989, an evaluation of the EPP was completed by INMANEX for CIDA. One conclusion of that study was that "the general impression of the program is that it is well conceived and run. The decisions and actions regarding the managerial and administrative structure are appropriate, and indicated an aware and active program management."

As MSI staff reviewed the program in Washington and in the field, they reached the same conclusion. The small, well-qualified staff of PAHO working on the EPP appeared to be resourceful and making a positive contribution to the ability of both nations and donors to respond to disasters.

The program appears to have been implemented in a flexible but firm manner throughout the region. The program's overall objectives are clear and

PAHO has managed to tailor the program to the unique needs of different countries and subregions. For example, in Costa Rica PAHO added an Emergency Program Administrator in 1985, Dr. Hugo Prado, and a staff consisting of an associate expert, an administrative assistant, a secretary, a computer specialist expert in desk top publishing and a driver. In addition, a long term (eight month) consultant is presently working with Dr. Prado. According to Dr. Prado, the primary role of this team is to "Central Americanize" the formerly general EPP effort. Naturally, Prado is able to work more intensively with his counterparts in the region than had been possible before the assignment of permanent staff to the subregion. In 1986 he began his own planning effort in each of his countries. Since then he has identified national counterparts in each country, put together a team of experts in the region upon which PAHO can rely for training at many levels, and succeeded in improving the preparedness of hospitals in the region.

The team in San Jose has also begun to adapt existing training materials and to create new training for use in the region. Although Prado was complimentary of PAHO materials already in use, he contends that their adaptation to local realities will make training, drills and simulations, and materials for schools ring truer for participants and increase effectiveness considerably. Another benefit of "localizing" materials is that host institutions thereafter consider them more their own.

Prado has also created three simulations (volcano, earthquake and flood), each of which include situations of the size and scope typical in the region.

In a similar fashion, Prado is working to get disaster considerations included in university level courses and into courses designed for training at the community level. Finally, Dr. Prado is working on a completely new course for Latin American with the assistance of the long term consultant. It is to be mainly a simulation and include group work with a minimum of formal lectures. The three week course, called "SPS 90," is an adaptation of a course organized and run in Europe by the International Committee of the Red Cross (ICRC), the University of Geneva and the World Health Organization (WHO). The course will focus on turning out medical personnel able to deal with epidemiology, nutrition, environmental health, communicable diseases and other situations likely to result from disasters.

Whatever local adaptations are being made of PAHO-produced materials, the fact is that PAHO has already gone a long way to produce materials of high quality for technical people as well as for the public. Technical publications, films, slide sets and other materials are available in quantity, covering most high priority disaster related health and medical issues. PAHO's film "Myths and Realities" contributed importantly to changing public and government attitudes about emergency assistance needs and delivery.

PAHO also provides a model for the efficient use of equipment and technology to enhance the effectiveness of the staff and the speed of response to requests for assistance. EPP publications are designed for multiple use and adaptations as described earlier. Computer records checked in the field showed a complete cataloguing of all expenses, training planned and completed, and names of all participants and contacts in the region.

Both the Costa Rica and Peru subregional offices appear well organized and busy. Dr. Luis Jorge Prado in Lima, PAHO's EPP representative for all of South America and his counterpart, Dr. Prado, who covers all of Central America except Mexico (which is covered by Washington), appeared exceptionally well informed about preparedness issues and activities throughout their areas of geographic responsibility. Both offices work closely with other donors active in the region. Relations between this staff and OFDA representatives are close and appear to be highly productive.

Interviews with persons knowledgeable about the EPP at AID/W and other disaster experts, praised the program as being of high relevance and quality. Technical and public education materials developed by PAHO were also acclaimed.

Sustainability

Although relatively expensive, EPP training has had a large multiplier effect which has significantly increased the disaster management capabilities of local officials. In addition, PAHO's public awareness efforts contribute to reducing excessive donor responses. This is important to professionalizing disaster response by: (1) reducing the quantity of relief supplies which so often overwhelm local distribution capabilities; and (2) to ensure that the kind and quantity of relief supplied do not create aid dependency or cause economic disincentives.

Because the EPP is both well managed and effective, it is likely to continue to attract financial support from numerous donors.

In conclusion, the EPP appears to be a worthy investment which is having a large effect on reducing injuries and averting deaths. The program is well designed and professionally implemented, and it will continue to be an extremely important tool for medical and health preparedness in the region in the years to come.

RECOMMENDED ACTION

- In order to assure continuation of EPP activities at current levels, OFDA, in coordination with other donors, should continue funding the program.

STRATEGIC IMPLICATIONS

- OFDA should consider using WHO, or other intermediary organizations of similar capabilities, to reduce disaster vulnerabilities in other regions of the world, particularly Africa.

CASE STUDY 19

PAN CARIBBEAN DISASTER PREPAREDNESS AND PREVENTION PROJECT

SUMMARY

The Pan Caribbean Disaster Preparedness and Prevention Project (PCDPPP) was conceived to improve the status of disaster preparedness and response in the Caribbean Region "through an inter-agency multi-sectoral project aimed at promoting disaster management and loss reduction initiatives." This has led to improved communications; both between disaster affected countries and relief agencies, and within the affected countries themselves. In addition, mechanisms were developed to insure the protection of development investments. Project outputs have included comprehensive national emergency management policies for each participating country and training of over 2,000 Caribbean nationals in disaster management.

The PCDPPP has significantly improved the disaster management capabilities throughout the Caribbean. This was demonstrably evident in the PCDPPP's management of relief operations following Hurricane Hugo. All of the countries affected by the hurricane had designated and trained disaster managers and a functioning emergency communications system. In addition, relief supplies were delivered in a timely manner and were appropriate for the needs of the victims.

$2,203,995 FY 1981-1986

INTRODUCTION

The PCDPPP was conceived to improve the status of disaster preparedness and prevention in the Caribbean region "through an inter-agency multi-sectoral project aimed at promoting disaster management and loss reduction initiatives." This activity has been, and continues to be, funded by numerous donors. Organizations that have contributed funding include: OFDA; the Pan American Health Organization (PAHO); the United Nations Disaster Relief Organization (UNDRO); the League of Red Cross Societies (LORCS); the European Economic Community (EEC); the governments of the United Kingdom, Italy and the Netherlands; the Canadian International Development Agency (CIDA); and modest contributions from the member countries. The single largest donor to the project has been CIDA. The on-going project began in mid-1981 and is located in St. Johns, Antigua.

The information to assess this activity was gathered through researching background documentation and from interviews with PAHO and OFDA staff and with the project's current director, Mr. Fra lin McDonald. Documentation reviewed included a 1985 evaluation conducted by Decisions Information Systems Corporation and activity documentation and reports.

OFDA ACTIVITY

Project Context

The project operates throughout the Caribbean but was conceived to principally benefit the English speaking Eastern Caribbean. Since its inception the project has retained this focus and has thus been concentrated on the region's English speaking nations, principally the Eastern Caribbean and Jamaica. The PCDPPP has a high degree of acceptance among Eastern Caribbean nations as evidenced by their continual willingness to contribute funding to the project. Although Cuba, Puerto Rico, and the Dominican Republic are all officially members of the project they have never contributed funding nor have they been more than marginally involved in PCDPPP activities. The Eastern Caribbean nations were perceived as being the countries that could benefit most from the project because they were the countries weakest in disaster preparedness and had the fewest resources with which to alter that predicament.

The region's vulnerability to disasters is reflected through the PCDPPP's own documentation:

> "Records dating back several centuries show that the Caribbean region has been struck by a steady succession of disasters. In this century the Caribbean has been affected by hurricanes (e.g. Barbados - 1955; Cuba, Tobago, Jamaica and Haiti - 1964; Dominica and Dominican Republic - 1979; St. Lucia, Haiti, and Jamaica - 1980; Dominican Republic 1987), volcanic eruptions (Martinique and St. Vincent - 1902; Guadeloupe 1976; St. Vincent and the Grenidines - 1979), earthquakes (Jamaica - 1907; Puerto Rico - 1918; Dominican Republic - 1946; Antigua - 1974), and floods and landslides most years in most countries."
>
> "These disasters have damaged housing and infrastructure, destroyed crops and killed thousands of people. The destruction caused by these events is magnified by the small physical size of the countries in the region and their vulnerable economies. The impact of a natural disaster can disrupt the administrative structure of an entire Caribbean nation if it is not prepared."
>
> "The destruction itself - and the drain on financial and human resources needed for recovery - repeatedly jeopardizes progress toward economical and social development of island states."

Prior to the inception of the PCDPPP several donors, including OFDA, were funding disaster preparedness activities in the region. However, the many smaller nations of the Eastern Caribbean were not receiving sustained assistance towards preparing for and responding to disasters. Most efforts prior to the PCDPPP focused on disaster response rather than on prevention and mitigation. The formation of the PCDPPP marked the Caribbean's first formalized regional approach to disaster preparedness and response.

Project Description

PCDPPP became operational in 1981 following a 1979 OFDA sponsored meeting in St. Lucia which was attended by approximately 100 participants involved with disaster preparedness in the Caribbean. The life of the project was originally intended to be 18 months and approximately 44% of the original 18 month budget was provided by OFDA. Other original donors to the project included the EEC, CIDA, and UNDRO. Various contributions have also been made by the participating countries. These contributions range from $1,500 to $15,000 based on a UN determination as to the member countries leading economic indicators. However, as noted earlier, some member countries have never contributed.

Although many organizations assisted in the project's design and implementation, it was OFDA's initiative and leadership that provided the main catalyst in creating the project. The project began under the auspices of the Caribbean Community (CARICOM) but has been managed by UNDRO.

Between 1981 and 1986 OFDA provided between a third and half of the project's annual operating expenses, making their total contribution approximately $2,203,995. OFDA terminated funding in 1986, only a few months after the EEC had withdrawn their financial support. PCDPPP's impression was that OFDA discontinued funding because OFDA's senior management no longer saw the continuation of the project as a priority. The project has since continued to function without OFDA funding and is now scheduled to be terminated in December, 1990.

Currently the main donors to the project are CIDA, Italy and the U.K. Lesser amounts of money are provided by UNDRO and the member countries. UNDRO makes up the contribution shortfalls of the member countries plus a modest grant which generally comes to about $50,000 per year. PAHO provides one staff person to the project and provides technical assistance and operational support but does not make direct contributions to the project. The Government of Antigua provides for the project's overhead expenses and its office building. Franklin McDonald, the project's current director, cites CIDA as being the most consistently reliable and significant donor to the project since its inception. The project's budget is spent on:

- project administration;
- staff salaries;
- training activities and related travel;

- equipment purchases for member countries (facsimile machines, modems, flip charts, and other misc. items);

- purchases of one HF radio per country and various VHF radios on an as needed basis; and

- small contracts for specific project support activities.

The needs of the region and activities of the PCDPPP are determined at a yearly meeting of the project's disaster coordinators. The disaster coordinators include PCDPPP staff, donor agencies, and a rotating representation from participating governments. After priority activities are identified and agreed upon, available funding is appropriated for each budget activity. Budgets have included line items for emergency management training, first aid training, radio operators training, technical assistance to prepare national emergency plans, and other related activities. Member countries may submit requests for technical assistance and equipment purchases to the project's Antigua office for consideration. Activities are also identified as a result of site visits by PCDPPP's staff.

Project implementation responsibilities are divided among three collaborating agencies: UNDRO is responsible for general preparedness and prevention aspects; PAHO is responsible for disaster preparedness in the health sector and; LORCS is responsible for disaster preparedness of the National Red Cross Societies and Non-Governmental Organizations, and for first aid training. Within the PCDPPP, both PAHO and the Red Cross operate with considerable autonomy. Both organizations respond to requests for assistance from the project's manager.

PAHO is responsive to the needs and requests of the member countries, provided the requests are approved by their PCDPPP representative in Antigua. This PAHO representative is responsible for administration of WHO activities throughout the region but identifies himself as PCDPPP staff. Most often, PAHO assists by providing technical assistance to host country institutions or by providing trainers to PCDPPP organized workshops. Since PAHO's Emergency Preparedness Program (EPP) assists in the development of national emergency plans for the health sector, their PCDPPP representative coordinates his activities closely with the ongoing activities of the PAHO/EPP (see Case Study #18).

Project Components and Objectives

GOAL: Save lives, reduce suffering, and reduce property losses due to natural events (disasters) in the Caribbean region.

PURPOSE: Through improved incident management abilities the participating countries should demonstrate improved self-sufficiency in responding to disasters. Specifically, this should lead to improved communications; both between disaster affected countries and relief agencies, and within the affected countries themselves. In addition, mechanisms should be developed that will insure the protection of development investments.

OUTPUTS:

1. Comprehensive National Emergency Management Policies for each participating country
2. Over 2000 Caribbean nationals trained in various aspects of disaster management
3. Training workshops and supportive materials
4. Public awareness events and materials distribution
5. A functioning emergency communications systems (inter-island HF radio network)
6. Inter-agency coordination within participating countries
7. Improved communications and coordination among donors, implementing agencies, and participating governments
8. Reduced vulnerability of public utilities, emergency services, and critical facilities
9. Hurricane shelter assessments
10. Vulnerability assessment of predominate housing types
11. Improved building codes and zoning practices
12. Hazard risk maps
13. Information documentation and newsletter

INPUTS:

1. From 1981-1986 OFDA contributed $2,203,994.
2. One PAHO staff person to coordinate PAHO activities in the region
3. UNDRO project manager
4. Participation of member governments

Implementation Events

The project's first manager was Paul Bell who left after 18 months due to difficulties in working under UNDRO's heavy handed bureaucracy (Mr. Bell is currently OFDA's Regional Advisor in Costa Rica). As an example of the difficulties, although Mr. Bell was the resident UNDRO manager he was not permitted to hire a project secretary without having an UNDRO staff person fly out from Geneva to conduct the hiring interviews. Following Mr. Bell's resignation the project continued to experience high management turnover, going through four managers in six years. In 1987 Franklin McDonald, who was then Director of the Jamaican Office of Disaster Preparedness, was asked to manage the project for a period of six months. McDonald has remained as the

Director since then and will until the project's scheduled termination in December 1990.

Mr. McDonald stated that the major issue he addressed after assuming management of the project was the extent to which project activities were demand driven rather then having a systematic process by which needs would be identified by PCDPPP staff. Mr. McDonald immediately placed the project's emphasis on preparing or strengthening member countries emergency action plans, and providing the technical assistance necessary to enable those plans to become operative. He stated that part of the early problem with unenthusiastic acceptance of PCDPPP's activities was that the project was not coordinating with high level government planners. Mr. McDonald has since reversed this trend and concentrated effort on convincing ministerial level officials of the importance of disaster preparedness. Due to this effort, he claims there now exists a favorable climate within the Eastern Caribbean for allocating resources towards disaster preparedness projects.

In 1985, under a $55,000 contract from OFDA, Decision Information Systems Corporation (DISC) completed a comprehensive evaluation of the PCDPPP. Although the evaluation identified several weaknesses in the project's design and management, the conclusion of the report recommended that the project's accomplishments were substantial enough to warrant slight revisions and continued funding. The DISC summary findings were as follows:

> "Despite the operational problems identified in this report the PCDPPP has contributed significantly to progress in the disaster preparedness area, although accomplishments in other technical assistance areas are relatively modest. However, overall project achievements to date seem reasonable in relation to the resources that have been received and the ambitious goals and objectives that have been set forth for the PCDPPP. A less tangible accomplishment, but nevertheless quite important, is that the project is well received by most countries and has engendered a significant degree of goodwill for AID/OFDA and other donor agencies. For this reason alone, continued funding at whatever level is probably advisable for AID/OFDA."

In 1986, within a year after this evaluation was completed, OFDA made a decision not to continue funding the project. This decision may have been based on the project's perceived poor level of management (as evidenced by high management turnover) combined with the fact that the project's objectives were vaguely defined and a project completion date did not exist. The project's original design called for activities to be completed in 18 months, but a series of subsequent proposals permitted the project to be periodically and incrementally extended. Following termination of funding, OFDA continued to regularly coordinate with PCDPPP management and continued to be supportive of its activities.

ANALYSIS OF EFFECTIVENESS

The basic conclusion of the 1985 DISC evaluation was that the project had "significantly contributed to progress in the disaster preparedness area." During the years in which OFDA funded the project it did not attain its potential level of effectiveness, however, it was still considered to have been more successful than not. Since OFDA terminated PCDPPP funding, Franklin McDonald has been hired as Project Director and the project now seems to have achieved its highest level of operational effectiveness since inception.

The project's design can be considered successful for two main reasons: 1) it initiated a regional approach to disaster preparedness and response in the Caribbean, and 2) due to OFDA's formulation and promotion of the project idea, significant funds were leveraged from other donors.

The regional approach to disaster preparedness used by the PCDPPP is a strategy having considerable advantages for the Caribbean. Unlike other parts of the world, the many small nations of the Caribbean will never be self sufficient in disaster preparedness and response. This is due to their limited financial and human resources. The PCDPPP addresses the issue of a scarcity of human resources by allowing countries to share personnel resources already resident in the region. This also helps to negate the high turnover rate that occurs among emergency management personnel in many Caribbean countries.

The regional mandate of the PCDPPP also promotes the sharing of prevention and preparedness strategies throughout the region. Since many of the countries are vulnerable to the same threats, particularly hurricanes, tragedies in one year's disaster can introduce lessons which will save lives in neighboring countries the following year. In addition, the same response management team continually builds upon expertise that can be repeatedly applied throughout the region.

In terms of leveraging funding, the project was successful in attracting new sources of funding after OFDA withdrew support. The UK, Italy, and the Netherlands all began funding the project only after OFDA ceased. CIDA has continued to fund the project since inception.

For the most part, the PCDPPP has achieved the goal and purpose level objectives it set for itself. The most dramatic proof of this was the improved disaster response that occurred following Hurricane Hugo. This improved Caribbean response capability can be directly attributed to the preparedness activities of the PCDPPP. This hurricane caused severe damage to numerous Caribbean islands including Montserrat, St. Kitts, Nevis, and Antigua. The response by the PCDPPP to Hurricane Hugo clearly demonstrated the value of disaster preparedness as evidenced by the following excerpts from a "Briefing of Interested Delegations Following Hurricane Hugo" presented at the United Nations on November 17, 1989.

- All 29 PCDPPP member states now have a national focal point/contact for disaster management. All of the islands struck by Hurricane

Hugo have national emergency organizations staffed by either part- or full-time personnel.

- Earlier in 1989 the PCDPPP provided technical assistance to St. Kitts/Nevis. This assistance facilitated improvements in the national disaster plan and led to an allocation of additional staff and increased resources for its national emergency system. The emergency system provided a focal point for warnings, mobilization, shelter management, damage assessment, the determination of emergency needs and the coordination of emergency assistance.

- In 1988 and 1989 the PCDPPP provided technical support and assistance to the Barbados UNDP mission in drafting guidelines for the collaboration of international and regional agencies in Barbados which are responsible for responding to disasters in the Eastern Caribbean. The UNDP/UNDRO Resident Representative in Barbados was able to use these guidelines in his coordinating role.

- The emergency communications system established by PCDPPP was heavily utilized during the Hugo emergency. It was used to obtain situation reports from within countries and to maintain operational contact throughout the PCDPPP disaster network. The rapid and appropriate response of regional assistance must be attributed, in part, to the regular flow of information through the system.

- The LORCS and PAHO/WHO training program for health and first aid ensured that all the needs for such personnel were met from within the region. Because of previous PCDPPP training in emergency planning for environmental health and water supply services, the local personnel were able to monitor water quality. Thus, in spite of severe disruptions in water supplies, contaminations and infections were kept very low.

- The advanced level of warning for Hurricane Hugo can be attributed directly to lessons learned by the PCDPPP subsequent to a similar operation following Hurricane Dean in August of 1989.

- Over 95% of the emergency relief supplies received in the stricken countries were appropriate and needed. This accuracy, in part, can be attributed to the results of the daily meetings to review needs. These meetings were coordinated and chaired by UNDRO/PCDPPP staff.

In its first real test since its inception, the PCDPPP demonstrably achieved its goal of improving the disaster management abilities of its participating countries. Also achieved was the specific purpose level objective of improved communications, both between disaster affected countries and relief agencies, and within the affected countries themselves.

In spite of the fact that the project can be considered successful, it would have been possible to have given the project more of an initial focus and a more defined set of operational procedures. To begin with the project's objectives were not clearly and specifically designed. The concept was excellent but details were lacking. These are shortcomings that were emphasized in the DISC evaluation and of which OFDA is well aware. To a large degree, have been corrected by the current project management.

Planning and management problems resulted from the project repeatedly keeping itself alive through a series of eighteen month proposals. No long range planning occurred and this resulted in management frustrations due to the continual uncertainty of the availability of future expenditures. And in turn, because the level of future funding was always uncertain, there was little impetus for undertaking long term planning.

The project's major future consideration in how its activities will be continued following its termination in December 1990. It is anticipated that the project will be drawn into an already existing Caribbean institution and given a permanent home. There is speculation that the project may be incorporated into the University of the West Indies in Jamaica.

RECOMMENDED ACTION

- OFDA should carefully monitor the status of the project in order to determine how its initiatives can be supported following the project's termination.

STRATEGIC IMPLICATIONS

- Planning and management problems are likely to result from the lack of a project termination date.
- Increased attention should be given to long-term regional planning and to defining specific objectives to be accomplished.
- The history and tribulations of the PCDPPP highlight the importance of a long-term commitment if institution building is to be achieved.
- Long-term objectives should be clearly stated and include indicators that will measure the achievement of those objectives.
- Conceptually, there is a strong case for addressing Caribbean disaster preparedness and response needs through a single regional management structure.

CASE STUDY 20

SOUTHEAST ASIAN REGIONAL PROGRAM FOR EARTHQUAKE HAZARDS MITIGATION

SUMMARY

The Southeast Asian Regional Program for Earthquake Hazards Mitigation was implemented in 1980 to document the seismic history and assess seismic vulnerabilities of the ASEAN nations. This information was then to be used to develop mitigation strategies and prepare building codes for vulnerable areas. The rationale for the activity was clear: earthquakes were thought to pose a significant regional threat but data to confirm this did not exist.

A series of books on the region's seismology was completed and is considered by experts to be comprehensive, accurate, and definitive. Although the project failed to bridge the gap between seismology and mitigation, it did produce the critical information on which future comprehensive earthquake engineering studies, architectural design criteria, and public awareness activities can be based.

$868,972 FY 1981-85

INTRODUCTION

The Southeast Asian Regional Program for Earthquake Hazards Mitigation was an OFDA-financed effort serving the Philippines, Indonesia, Malaysia, Singapore, and Thailand. The program was carried out from FY 1981 to FY 1985 by the USGS through a PASA. The institutional framework of the program was the Southeast Asian Association of Seismology and Earthquake Engineering (SEASEE), which was founded in 1980.

OFDA ACTIVITY

Project Context

Of the countries assisted by this project, Thailand and Malaysia are on the mainland of Southeast Asia and the Philippines and Indonesia are archipelagoes to the east and south of the mainland. These four countries contain the vast majority of the area and population of the six ASEAN countries; the other two, Singapore and Brunei Darussalam, are city-states. (Brunei Darussalam joined ASEAN after the completion of this project.)

Since its establishment in 1966, ASEAN has offered its member countries a framework in which technical, economic, political, social and military relationships have burgeoned. An extraordinary number and variety of public and private ASEAN-wide organizations have emerged during the oast two decades. Most of those that receive governmental funding come under the umbrella of one of the six ASEAN committees. The Committee on Science and Technology (COST) maintains contacts with organizations involved in the earth sciences.

The Philippines and Indonesia are by far the must vulnerable to earthquakes of the countries assisted by the project. In the Philippines, a 1976 earthquake/tsunami was estimated to have killed 6,000, and, between 1981 and 1986, three significant earthquakes resulted in 27 dead, 5,672 affected, and $740,000 in damages. Indonesia, which has three distinct earthquake belts, experienced an earthquake in 1976 which left 500 dead. The threat of earthquakes in Thailand, Singapore and Malaysia is much less than in the Philippines or Indonesia.

The SEASEE secretariat is located at the Philippine Atmospheric, Geophysical and Astronomic Services Administration (PAGASA), a unit in the Department of Science and Technology of the Government of the Philippines. PAGASA is the weather service of the GOP and has received a number of OFDA grants for Typhoon Warning (Case Study #11), public education (Case Study #12), and earthquake prediction. The Director of PAGASA, Dr. Roman Kintanar, is the Vice Chairman of SEASEE. A seismologist at PAGASA, Ms. Lolita Garcia, is Secretary.

The Indonesian participating organization is the Institute of Meteorology and Geophysics, in Bahasa, Indonesia, the Badan Meteorologi dan Geofisika, (BMG). BMG is a unit of the Ministry of Communications and has primary responsibility for monitoring weather and provides forecasting services to the Ministry of Agriculture and the Ministry of Public Works.

Like PAGASA in the Philippines, the BMG is no stranger to participation in disaster mitigation projects. It was involved from 1986-89 in a key activity of the UNDP/OFDA project, Strengthening Disaster Preparedness and Disaster Management in Indonesia (Case Study #10), and is accustomed to participating in complex multi-disciplinary programs such as an ongoing one concerning greenhouse gases and ozone.

The first seismograph was installed in Indonesia in 1908 and is still functioning as a museum piece. During the two decades after 1955, the Government of Indonesia (GOI) developed six seismic stations strategically located at high risk areas. Among the foreign aid to Indonesia in earthquake mitigation, especially notable was assistance from the Government of New Zealand (GNZ) during 1975-1977, through a project with BMG, the Ministry of Public Works, and the Institute of Technology at Bandung. The final reports of the GNZ project, completed in 1981, were among those used in the project which is the subject of this case study.

In Thailand, the Meteorological Department is the secretariat to the Earthquake Committee, which includes a wide range of professions and which is the participating organization in SEASEE. Thailand has made great efforts to forge links between seismology and structural engineering.

PROJECT DESCRIPTION

Rationale

SEASEE was originated in the context of the UNESCO/UNDP Regional Seismological Project for Southeast Asia (RAS/71/237), which was implemented in 1975-79. The project provided approximately $1 million in grants to the four earthquake-prone ASEAN countries; Indonesia received 14 seismic instruments, and the Philippines, Malaysia and Thailand also received instruments. The Preliminary Statement about SEASEE was made at the final meeting of the Coordinating Committee of UNESCO/UNDP project. The Association was founded the following year, in 1980.

Funding support by OFDA for the Earthquake Hazard Mitigation Program was initiated in February 1980 by a request for assistance from SEASEE to the USGS, which in turn requested OFDA support. The rationale for the project was clear; earthquakes were thought to pose a significant regional threat, but the information necessary to confirm this did not exist.

The 1976 earthquakes in the Philippines and Indonesia prompted the ASEAN Disaster Experts Meetings which began in the late 1970's. At their meeting in 1979, attended by an OFDA staff member, the experts expressed concern about the possibility of a major urban earthquake in Southeast Asia. At the time there was unprecedented urban development occurring and insufficient data upon which to determine the probability of such an event.

Objectives and components

Throughout the life of the project, the program's objectives did not remain static, but rather evolved, and were periodically modified, through process-oriented project design and management. Thus, the program developed through a series of successive funding proposals from USGS to OFDA. The simplest way to describe the program is chronologically.

In December 1980, OFDA negotiated a PASA with the USGS to conduct a feasibility and planning study to identify and determine the scope, location, logistical considerations and professional/technical personnel required to implement an ASEAN-wide program for earthquake hazard mitigation. The planning study had a budget of $37,849 and ran from January to March 1981.

The Report of the planning study outlined a scope of work comprising seven components, with starting and ending months, as follows:

- Strengthening the seismological network	0	36
- Review of historical activity	6	36
- Seismotechtonic program	0	24
- Hazard and risk evaluation	6	36
- Guidance in building code preparation	6	36
- Drafting and recommendations for national policy	24	36
- Educational and professional program	0	36

As initially designed, the main phase of the program was planned to last for 14 months and had a budget of $297,531. There were two distinct components: telemetry and risk assessment. The telemetry component was begun in September 1981, when the initial PASA was amended to add $157,531 and extend the project until 31 October 1982, in order to upgrade telemetry for better positioning of remote seismic stations.

The risk assessment component was implemented through a second PASA, signed at the same time as the first, with a budget of $140,400, to coordinate a technical assistance program from 15 September 1981 until 31 October 1982. The assistance was to acquaint government officials in the four countries with the techniques for conducting risk and hazard analysis, earthquake zoning, building and land-use formulation, and building design. This component included a three-week instructional program in Denver, which was held 21 June-7 July 1982.

In May 1982, the USGS PASA was amended to add $268,500 and extend the project for eight months, through 30 June 1983. The objective of the amendment was "to strengthen the [SEASEE] to accomplish the collection, mapping, analysis, cataloguing and publication of earthquake epicenter data for the Southeast Asia region for as long a period of record as possible." After 17 months of implementation, the total project budget had reached $604,280.

At the re-scheduled completion date, June 1983, the project was far behind schedule and budget. OFDA again amended the PASA to add $264,692 and 12 months to the project (through 30 June 1984), bringing the total budget to $868,972. The extension involved eight tasks, the main objective of which was to enable SEASEE to continue to compile data and put it in a suitable format for publication in English. The data to be collected included earthquake intensity, a catalogue of instrumental earthquakes in Southeast Asia, a volume of known earthquake focal mechanism solutions for the region, and the identification of seismic source zones.

During the month scheduled for project completion, June 1984, the project was extended for three months, then for another three months, and then for another six months, to June 1985. None of these extensions added cost to the project. Project activities were completed in mid-1985.

<u>Implementation</u>

As is typical of regional projects, the institutional and procedural mechanisms of the earthquake hazard mitigation program were complex. Under the terms of its PASA, the responsibilities of the USGS were to:

- Coordinate all activities;
- Provide technical and administrative advice to SEASEE and the participating governmental bodies; and
- Report progress periodically.

The USGS Project Manager, Mr. E.P. Arnold, was based in Denver. Most of his time in Asia was spent in Manila at PAGASA, with occasional trips to Jakarta, Bangkok and Kuala Lumpur.

The SEASEE secretariat, located in Manila, was responsible for local coordination and administration. The actual technical work of the project was performed by the four participating organizations. SEASEE is an official body with a charter that has been approved by the ASEAN Foreign Ministers and an Executive Board composed of the Director Generals of the meteorological services in the five participating countries. The formation of SEASEE began during 1975-79 with the UNESCO/UNDP Regional Seismological Project for Southeast Asia. However, in 1980, at the start of the USGS/OFDA activity, SEASEE needed to be provided with a new charter in order for it to receive USG funds. The charter was duly approved.

The annual meetings of the SEASEE Executive Committee were important for both project implementation and for SEASEE's identity. The meetings began in 1980. The 3rd and 4th meetings, held in November 1982 and November 1983 respectively, were the most important for the USGS/OFDA program. The Advisory Committee meeting of March 1985 marked the end of project implementation and SEASEE activities.

The main tasks actually undertaken by the project were the collection and compilation of data: earthquake intensity data; a complete record of instrumental earthquakes; known earthquake focal point mechanism solutions; geological information; and seismic source zones. The outputs of the project were a series of four books, one for each country, containing seismicity data, a historical listing earthquakes, and descriptions of the seismic source zones and the seismotectonic setting.

All four of the national volumes (numbers II through V in the Series on Seismology) were printed in Thailand. This appears to have been generally satisfactory, but it took more than 1 1/2 years for the books to clear through Indonesian customs causing one key official in the region to remark that "Indonesian bureaucrats are just impossible."

Task 5 of the PASA was to "Conduct a feasibility study of an earthquake alarm system using satellite telemetry." A small amount of telemetering equipment was provided and installed in each of the four countries. In Indonesia, one technician received some training. Unfortunately, the VHF transmitter could not be installed in Jakarta or near any major city because of conflict with other radio frequencies, so it had to be put in a remote area of East Java. The evaluation conducted by Dr. Ang states, "Telemetry system installed; no study performed on alarm system."

The books documenting earthquakes were initially considered a preliminary step to make it possible for each nation to do risk mapping. The long-term objective was to change building codes to mitigate earthquake damage. Only the books were completed; when OFDA funding ended in 1985, no country had undertaken risk mapping nor had building code changes been suggested or made.

The project provided short-term training in the ASEAN region and in the U.S. In 1984, in Denver, a USGS/OFDA course was organized for SEASEE and Pan

American countries. During the first half of 1985, OFDA issued two purchase orders to Dr. A. H-S Ang to review the technical documents that were the key outputs of the project, attend the Advisory Committee meeting held in March 1985, and evaluate the utility of the data compiled.

Present Status

At the SEASEE secretariat in Manila, the five volume Series in Seismology has been heavily used, according to SEASEE Secretary Ms. Lolita Garcia. All are out of print now, she says, and she has been reduced to photocopying relevant pages to fulfill requests. The Secretariat has kept "a few" complete sets, and Garcia thinks that OFDA has a few sets. The main users, according to her, have been earthquake engineers.

Officials in Indonesia and Thailand who had been involved with this project throughout its implementation gave virtually identical and surprisingly candid descriptions of the present status of SEASEE. Not only is the Association virtually dead now, they say, it would probably never have existed at all without financial support from OFDA.

The only project achievement still perceptible in Indonesia is Volume V of the Series in Seismology, which covers Indonesia. When he was interviewed in October 1989, the national focal point for the project, Mr. Soetardjo of BMG, considered the book to be useful because it reported all earthquakes in the country up to 1984. Previously, data on earthquakes were in Dutch and German. BMG collected the data from many sources and had it translated by the University of Indonesia Department of History. About 50 to 100 copies were printed; Mr. Soetardjo was not certain of the number, but he still had some copies in stock and thought that more were available at the SEASEE secretariat in Manila.

In 1989 Indonesia had 28 seismic stations, 14 of them purchased by the GOI and 14 from a UNDP-financed project. With a soft loan from France, BMG is establishing a seismic network which, when completed in 1991, will give an alarm of an earthquake to reach BMG within 15 minutes.

The national focal point in Thailand, Dr. Prinya Nutalaya, Professor of Engineering Geology at AIT, reported in October 1989 that the national volume on Thailand, Vol. II of the series, was often used by his students there.

ANALYSIS OF EFFECTIVENESS

Planning and project design

Dr. Ang's evaluation report on this project states, "As originally outlined in the report of the study program of 1981, the overall objectives of the program are well defined; the scope of the program should lead to results that would improve the capabilities of the ASEAN countries in the [sic] planning for seismic hazard mitigation.[1]" The Report found, however, that "There appears to be a tendency to add new tasks and objectives rather than maintaining a clear focus on the primary and original objectives in the project scope."

This project has made significant contributions to the scientific literature on the seismology of Southeast Asia, but it fell short of reaching practical achievements in hazard mitigation. Some of the possible reasons for this shortcoming are discussed in the section on implementation that follows. Here it should be noted that the design emphasized science and technology, and only incidentally involved disaster mitigation. It is not clear to what extent the strengthening of a professional association of earthquake experts was an intention of this project. If it was, it missed the mark in not recognizing the need for multi-year funding and initiating fund-raising activities for the organization.

Resource allocation

The MSI team did not examine in detail the question of expenditures by task. It was noted that a considerable cost was incurred for computer time at the USGS complex in Denver to prepare the data tapes and computer printouts from which the books were printed.

Implementation

The project's evolving objectives made it a difficult for OFDA to manage. Although the OFDA Project Officer was personally familiar with the issues and personalities and attended the annual SEASEE meeting in 1982, there seems to have been a reluctance in OFDA to hold the USGS to international standards of implementation. As the 1985 Evaluation Report noted, "prior to approving the proposed extension, with an additional funding of $269,175, AID/OFDA should have reviewed the technical progress and completion of the first year's work."

It is unclear what direction or supervision was given by the USGS to the Project Manager in the field, but the superficial evidence is that it was minimal. Dr. Ang's report found "the project management overestimated the efficiency and competency of the local seismologists, geologists and meteorologists and consequently grossly underestimated the time required to complete specified tasks." The lack of USGS supervision of this project is notable because the OFDA files contain numerous letters from the USGS Project Manager making excuses for the delays in completing tasks. Finally, 28 months after the initial deadline, OFDA resorted to hiring a consultant (Ang) to push the project to completion. Better USGS supervision would have obviated the need for OFDA to do this.

To compound these problems, USGS does not seem to have supervised the SEASEE secretariat closely, and the SEASEE secretariat does not seem to have properly supervised the national project activities. The Evaluation Report cited a "lack of close supervision and communication with the technical staff of the participating countries."

The consequence of these management problems was that the project ended up costing 2.8 times as much as initially budgeted and requiring 3.3 times as long to complete as originally planned.

Sustainability

Lengthy conversations with concerned officials in the Philippines, Thailand and Indonesia lead the MSI team to conclude that SEASEE was never a viable institution. However, when OFDA support began in 1980, the weaknesses of the institution may not have been perceptible, and important administrative changes within the participating countries have undermined the viability of SEASEE.

One set of problems with SEASEE is that it is an unofficial body which is officially recognized and composed of government officials. Although the Foreign Ministers took note of its charter, SEASEE is not under the purview of ASEAN, and the participating governments have not honored their annual obligations of $1,000. Moreover, the representatives to SEASEE are the Director Generals of Meteorology Departments, none of whom in 1989 either know or care much about earthquakes. Although in Indonesia the seismologists and meteorologists are still under one institutional roof, they have gone their separate ways in Thailand, and in the Philippines seismology has recently been put into the Institute of Volcanology and Seismology (PHILVOLCS). As far as we could determine, the only person in the ASEAN region who wants to keep SEASEE associated with the meteorological services is Dr. Roman Kintanar, the Vice Chairman.

Unfortunately, meteorologists tend to ignore SEASEE while professional seismologists feel alienated from the Association. SEASEE is seen in the Philippines as "captive of the meteorologists" and an exclusive club which is intent on keeping professional seismologists out. This was reported to the MSI team by Dr. Raymundo Punongbayan, Director of PHILVOLCS, who has been unsuccessful in his attempts to become a member of SEASEE. Indonesia has also experienced trouble because neither seismologists nor earthquake engineers have been interested in SEASEE.

SEASEE has been reduced to a series of meetings which happen when funding can be located. Its Executive Committee now meets once every two years; it has a plenary session only if funds are available. Dr. Punongbayan told us that the situation is so bad that UNESCO is now funding an organizing meeting for a new ASEAN organization for seismologists. The organizing meeting will be held in Manila in mid-1990. UNESCO plans to include New Zealand, the U.S., and Japan in this new network.

This project reflects the times in which it was implemented, the first half of the decade of the 1980s. Both OFDA and the ASEAN countries learned a great deal about hazard mitigation during and after this period. OFDA has since successfully made a major shift in Asia, away from projects implemented under PASAs, and toward projects implemented by local institutions such as PAGASA in the Philippines (Case Studies #11 and 12), IDMC in Indonesia (Case Study #10), and AIT/ADPC in Thailand (Case Study #21).

The Series on Seismology represents an extremely valuable contribution to the literature on earthquakes in the region. The books are considered by experts to be comprehensive, accurate and definitive.

The greatest failing of the project was that it did not bridge the gap between seismology and mitigation. However, were it not for the information gathered by the project, there would still be insufficient data upon which to base comprehensive earthquake engineering studies, architectural design criteria, and public awareness activities. Although SEASEE proved to be a poor choice as an implementing agency, the program did establish the scientific basis for future risk reduction activities.

The multi-disciplinary approaches that are the hallmark of the AIT/ADPC and the IDMC offer a framework within which the data produced by this project can be carried forward to meaningful vulnerability mapping and analysis and to a revision of building codes such as is under consideration in Indonesia. The climate is favorable.

We do not see any possibility of rescuing SEASEE from its eventual demise, but we have seen too many institutions hang on interminably to predict that demise in the immediate future. In the Philippines, despite the problems between PAGASA and PHILVOLCS, people on both sides of the political issue indicated a genuine need and desire for the resources necessary to carry risk mapping forward and to prepare a building code for the Philippines which could reduce the structural damage caused by earthquakes. The validity of the need is not in question.

RECOMMENDED ACTION

- In both Indonesia and the Philippines, the seismic information produced by the activity should be used to prepare building codes.
- Ms. Lolita Garcia reported in October, 1989 that SEASEE is preparing a request to OFDA to reprint the series on seismology. Despite the shortcomings of SEASEE, we recommend support for such a request.

STRATEGIC IMPLICATIONS

- Technology activities should be designed to bridge the gap between research and preparedness/mitigation.

NOTES AND REFERENCES

1. A. H-S Ang, Report on Evaluation of SEASEE Project EARTHQUAKE HAZARD MITIGATION PROGRAM IN SOUTHEAST ASIA. No date. Photocopy, p. 24.

CASE STUDY NO. 21

ASIAN INSTITUTE OF TECHNOLOGY, ASIAN DISASTER PREPAREDNESS CENTER

SUMMARY

The Asian Institute of Technology's Asian Disaster Preparedness Center (ADPC) was started with a core support grant from OFDA. It provides training, information and technical assistance for the entire Asia and Pacific region, with emphasis on the larger countries of Asia, particularly Philippines, Bangladesh, Thailand, and Indonesia.

The ADPC has made substantial progress toward long-term institutional and financial sustainability by adhering to a market orientation aimed at meeting the priority disaster management needs of national governments in the region and major donors. Many of the 307 alumni of the ADPC courses have subsequently conducted their own disaster management training courses, multiplying many-fold the impact of the Center.

$760,000 FY 1985-1989

INTRODUCTION

The Asian Institute of Technology (AIT), Asian Disaster Preparedness Center (ADPC) provides training, information and technical assistance for the entire Asia and Pacific region, with emphasis on the larger countries of Asia, particularly the Philippines, Bangladesh, Thailand, and Indonesia. Started in 1986 with a core support grant from OFDA that has grown to $760,000, the ADPC has made good progress toward long-term institutional and financial sustainability by adhering to a market orientation aimed at meeting priority disaster management needs of national governments in the region and major donors. Many of the 307 alumni of the ADPC courses have subsequently conducted their own disaster management training courses, multiplying many-fold the impact of the Center.

This case study is based on a visit to the ADPC and interviews of ADPC staff in Bangkok and alumni in Fiji, Jakarta, Bangkok, Dhaka and Manila. A total of 16 ADPC alumni from five countries were interviewed. Eleven of the interviewees were government officials and five were employed by NGOs. The 16 had attended nine different ADPC courses.

OFDA INTERVENTION

Project Context

Asia, as defined by the ADPC, extends from Afghanistan to the South Pacific and from Sri Lanka to the People's Republic of China. This vast area is home to half the world's population. Virtually all of the important types of disasters occur in Asia: cyclones; earthquakes; floods; drought; famine; refugee emergencies; environmental degradation; industrial accidents; and civil conflict. This list includes both sudden-onset elemental events and slow-onset "man-made" disasters.

The ADPC is unique in the region. Although a few national staff colleges have offered disaster management courses in recent years, at the time the ADPC was founded the only comparable organization was the Australian Counter-Disaster College (ACDC) at Macedon, Australia.

The Center is a part of the Asian Institute of Technology, an autonomous international post-graduate technological institute located in the outskirts of Bangkok, Thailand. AIT was founded in 1959 and chartered in 1967 by special legislation of the Royal Thai Government. All of AIT's academic divisions have some bearing on disasters and interact with the staff and curricula of the ADPC. They include:

- Agricultural & Food Engineering (famines);
- Water Resources Engineering (floods);
- Geotechnical & Transportation Engineering (earthquakes);
- Structural Engineering & Construction (wind-resistant structures);
- Industrial Engineering & Management (disaster management);
- Human Settlements Development (post-disaster settlements);
- Regional Computer Center (disaster simulation plans); and
- Asian Regional Remote Sensing Training Center (disaster prediction).

PROJECT DESCRIPTION

Rationale

The ADPC was established in January, 1986 by the Board of Trustees of the AIT, following requests from the countries of the region for international assistance in strengthening their disaster management capabilities and a feasibility study conducted by UNDRO. OFDA pledged a five-year startup grant, without which it is very doubtful that the Center would have been established.

The rationale for the ADPC was clear. Asia experiences every possible kind of natural and manmade disaster. With half the population of the world living in the region, the number of people who are actually or potentially vulnerable to death or injury is therefore very large. The advantages of establishing a regional institution to help countries prepare for and mitigate the effects of such events was obvious.

Project components and objectives

The mission, objectives, approach, target beneficiaries, and implementation plan of the ADPC are clearly stated in the project proposal that was submitted to OFDA and attached to the first grant, dated 5 September 1985. The proposal amounts to a business plan for the first four years of operations, projecting both capital and operating costs as well as revenue. A Logical Framework was not prepared when the Center and its program were being formulated, but a provisional schematic LogFrame, drafted ex post facto, would probably include the following elements:

Goal: Reduce loss of life and property damage resulting from disasters.

Purpose: Increase national capability and self-reliance in all aspects of disaster management, including preparedness, mitigation and relief.

Outputs of the ADPC were stated as proposed "aims" of the Center, approved as the Scope of Work. They were to:

- assist regional countries in formulating their policies and developing their capabilities in all aspects of disaster management;

- provide a regional training facility to assist government, non-governmental and private sector personnel in training for disaster management with particular emphasis on the training of trainers and the preparation of teaching material;

- undertake research of disasters common to the region with a view to improving ways of dealing with them;

- explore, develop and disseminate appropriate applications of modern technology to disaster management in the region;

- act as the regional focus for the collection, development, exchange and coordination of disaster-related activities;

- offer a facility for internships so that students studying for degrees in other academic programs can consider the applications of disaster management to their studies and include them in their theses;

- provide to customers the capability to perform detailed planning, and the testing of plans, for relevant disaster simulations with the support of Center expertise and simulation facilities, including the preparation of transportable, compatible computer programs; and

- provide data communication links to customers.

Inputs of the Center consisted of a building, staff, equipment, and operating funds.

The building, to include staff offices, model disaster preparedness center, exercise control center, library and classrooms, was estimated to cost $600,000.

The staffing requirements of the ADPC were initially foreseen as being one Director, one Research Coordinator, one Training Coordinator, one Systems Designer, up to two Experts, and up to several Consultants. The project design called for steady growth in staff size, from 36 person-months in year 1 to 84 person-months in year 4. Costs would be controlled through increased regionalization of the staff during the first four years, resulting in a 30 percent decrease in average cost per person-month during the life of the project. Total annual costs for project staff was projected to peak in year 3, at $375,000, and decline 6 percent the following year.

Equipment was projected to cost $500,000 over the first four years, of which $200,000 was for laboratory equipment and $80,000 for a standby power supply. Operating costs were expected to start at $100,000 during year 1 and grow to $250,000 in year 4, totalling $700,000.

Revenue was projected to start in year 2, at $160,000, and grow to $460,000 in year 4. Total revenue in the first four years was projected to be $940,000. Tuition fees for training courses were expected to be the major source of revenue.

Implementation Events

Since its start in 1986, the ADPC has concentrated its program in three areas: training, information, and technical assistance. Training consists of general Disaster Management Courses (DMC); specialized training; and support to national programs funded by host governments, in which a small "profit" goes to the ADPC.

The Center moved rapidly to start its core six-week DMCs emphasizing a multi-disciplinary approach, disaster simulation exercises, and interaction among participants. Two DMCs were held in the first year, and eight had been conducted by the end of 1989, the fourth year. Participants are required to:

- read a minimum of four books plus other daily readings;
- assemble an organized collection of disaster-related reference materials;
- prepare and present a national emergency review (as a national group);
- present a case study of a recent emergency operation;
- write an ADPC briefing paper on their organization; and
- write a theme paper on a disaster management topic of his/her choice.

In addition to the general Disaster Management Course, the ADPC has offered several courses on specialized subjects for particular audiences. One course on Improving Cyclone Warning Response (ICWR) was given to 18 participants; the course will be offered again late in 1989. In April 1987, ADPC co-organized with the Disaster Management Center of the University of

Wisconsin a workshop sponsored by the U.N. High Commissioner for Refugees (UNHCR) on Refugee Camp Management, with 43 participants. In June 1987 a workshop on Emergency Assistance Programs, sponsored by UNICEF, was held at AIT and co-organized with the University of Wisconsin.

The ADPC has also cooperated with national governments to organize training programs in selected countries. These include a course on storm preparedness in Vietnam, a workshop on disaster preparedness and response in Sri Lanka, and a workshop on seismic hazards mitigation in the Philippines.

The Center would like to be the resource for disaster information in the Asia and Pacific region. The Center has invited the International Development Research Centre (IDRC) to identify information needs and what can be done to meet them.

ADPC technical assistance has thus far concentrated on vulnerability analysis and mitigation through improved engineering and housing design. A major project is in the Philippines, where ADPC is assisting in the construction of $500 houses that will not blow away in typhoons. UNDP Special Programme Resources are presently financing a project that has already built 7000 houses designed by Prof. Gupta, an engineer on the ADPC staff. In January 1989, the Secretary of the Philippines Department of Social Welfare and Development wrote to the ADPC Director, "I am happy to inform you that the initial 450 units...withstood the effects of typhoon 'Unsang' and 'Yoning,' two of the strongest typhoons which visited the Philippines in 1988. According to our Weather Bureau these typhoons were packing 165 and 175 kph center winds."

OFDA's initial grant of $250,000 to enable AIT to start the ADPC was made in September 1985. The following year, in October 1986, another $250,000 was granted to the Center to carry it through an additional two years. In May 1988, a third grant, for $225,000, was authorized to strengthen and expand the ADPC program. Another $35,000 was added in September 1988 to fund the services of Mr. Everett Ressler on the ADPC staff.

OFDA evaluated the ADPC's progress before making the third grant. In 1987, Dr. K. Thirumalai of the Science and Technology Institute, Inc. was contracted by OFDA to recommend steps to enhance the ADPC program. His recommendations, given in a report in August 1987, were:

- emphasize country specific disaster support services;
- develop a long-term strategic planning document;
- organize a series of regional workshops;
- establish an ADPC Advisory Committee with internationally recognized individuals for providing operational, technical and program guidance and counsel for ADPC operations; and
- initiate steps to promote "Asian Decade of Disaster Preparedness."

The ADPC Director considers the Thirumalai evaluation to have been useful but the Center has not been able to follow up on all of the recommendations, particularly an Advisory Committee, because of the substantial costs that a Committee meeting would entail.

Present Status

ADPC Director Brian Ward said, "I feel the pattern of our work is on course, seeking to create a cadre which will form the nucleus of a national team. This worked very well in Vietnam, where AIT alumni have trained 129 officials in three courses within five months of their own training at ADPC. There is a hiatus in Sri Lanka. In the Philippines, there have been workshops organized by alumni."

... Alumni views...

Bangladeshi alumni. Mr. Ziaulhaq Mamun, Institute of Business Administration, Dhaka University, attended DMC-7. Mr. Md. Abdul Quddus, Assistant Secretary of the Ministry of Relief & Rehabilitation, attended DMC-4. Both participants praised the program and said that it has given them better understanding and better skills. Both would have liked it to last longer. In keeping with the emphasis on becoming a nucleus of a national cadre, Mr. Mamun organized and led his own course at the Institute of Business Administration, Dhaka University.

Fijian alumnus. Mr. Rajendra Prasad, the Principal Scientific Officer of the Fiji Meteorological Service and a key figure in the SPSSD/WS project (see Case Study No. 13), attended the first ADPC course on improving cyclone warning response (ICWR). The course was attended by 18 participants from 11 countries. His written report states, "I personally found the course very exciting and relevant... The lectures and discussions on warning systems were useful... Above all, the opportunity to participate and share views, ideas and experiences with some very prominent personnel in these fields was itself an unforgettable experience and a tremendous morale booster." When interviewed about the ADPC, Prasad said, "That was the first time we [meteorologists] sat with users of our warnings."

Indonesian alumni. Selection criteria for Indonesian participants have varied somewhat among the different courses. For the first Disaster Management Course, DMC 1, all candidates took an English examination. The selection of the two participants in DMC 2 was important because they are themselves trainers. In DMC 3, 4 and 5, the participants were recent graduates of disaster management training courses conducted by the Indonesian Disaster Management Center at the national and provincial levels (see Case Study No. 10, Indonesia: Strengthening Disaster Preparedness & Disaster Management). Indonesia has had problems in identifying people who can pass the English language test for admission to ADPC courses as knowledge of Dutch is much more common than English.

All six Indonesian alumni who were interviewed agreed that the course gave them a much better understanding of disasters. It allowed them to form a common integrated understanding of disaster management. All six pointed to a need for a mechanism of communication among the participants. On average, they had received one written communication from ADPC since completing the course. They suggested a newsletter or bulletin be circulated to foster communication and share news of new publications. They also noted that the ADPC had promised to bring the participants together again to discuss their field experience. Since this has not be done, the alumni assumed there was no money to do it. One alumna said, "We badly need written material, posters, etc. from other countries that have similar disasters, especially for public education."

In general, the Indonesian alumni found six week courses to be too short, considering four papers were assigned, and recommended the course be extended to 2 months. The field visits to refugee centers, where they learned about shelter, health and sanitation, and to the Bangkok flood control center were considered to have been useful.

The classrooms were considered to be good, and the accommodations were considered to have been adequate to begin with and to have been improved with the addition of TVs. The per diem allowance was so limited ($20 per day per student) that most found it better to share a room, at a cost of $11 per day per student, which gave each $9 per day for food and miscellaneous.

Asked what they would like to recommend to the USG, the Indonesian alumni suggested that there could be specialized training in volcanology, earthquakes and flood control.

Mrs. Sulianti, staff assistant to the Minister of Social Affairs and Administrative Officer for the Indonesian disaster preparedness and management project, attended DMC 1. She said that she learned a lot from the readings, discussions, and by the knowledge gained about other country's systems through the other participants. She expressed the opinion that the DMC courses became increasingly challenging as time went on.

Dr. Rusbidjono, Vice Rector of the Institute of Government Study, also attended DMC 1. He felt that the course enabled him to give better lectures and that he learned the importance of revising course content to meet the specific needs of students. He thought that ADPC should offer more specialized and comparative courses in various countries, for example, seismology in the Philippines. He expressed his need for increased access to quality literature on disaster management.

Mrs. Redjeki Budiningsih, the national head of training for the Red Cross, attended DMC-7. She felt attending only one general disaster management course was insufficient to enable her to organize the great variety of training the Red Cross sponsors.

Several of the participants requested money for their organization to purchase publications. Several are particularly interested in adult and mass education about disasters.

There were more than 20 trainers and guest lecturers in each course, but none were from Indonesia.

Filippino alumni. In 1987 the ADPC conducted a course entitled Aseismic Design and Construction of Structures in Manila for 30 students, all Filippino engineers. Mrs. Loretta Cortez, who attended, said it was a "very nice seminar. Everyone was so interested", but it would have been more useful if there had been greater emphasis on bridges (her field) and less on buildings. She would like further training on strong motion affects on roads and bridges.

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Mrs. Imelda Valeroso attended two courses, ICWR-1 and DMC-7. She reported that the ICWR course was extremely appropriate and of practical use to her in her daily work, but felt that more technically advanced courses would be more useful. Significant benefit came from student interaction and learning first hand what people in other countries do in disaster preparedness/mitigation/relief. She thought the courses were valuable more for attitude development and cross-fertilization than from a technological point of view.

Mr. Antonio Jegillos, who attended DMC-4, found the course valuable and relevant. He has subsequently been promoted beyond the level of district disaster manager, but did handle three major typhoon relief programs and the 1988 red tide program for GOP after his training. He has set up formal training for other Bicol-region NGOs based on the substance and methods of the AIT program. The training also resulted in the PBSP including hazard vulnerability in its development strategies. He prepared case studies of his post-AIT disaster management experienced for use by PBSP in its own internal training and its training of other NGOs.

Thai alumni. Mr. Apichat Todilokvech, Chief of the Training Section of the Department of Local Administration, attended DMC-5 and found it very useful for his present work, which is training firefighting teachers. During the past year he has organized firefighting training courses in 20 provinces with about 100 students in each course. To improve the ADPC courses, he suggested adding more information on flood and fire, which are the important disasters in Thailand.

Dr. Suring Chaitachwong, Asst. Chief of the Training Section of the Thai Red Cross, attended DMC-2. He said, "The course was very useful; it helped us a lot to upgrade our activities and to modify our program." The Red Cross plans to give training courses late in 1989, depending on the Kampuchea border situation, and has ordered materials from PAHO for this purpose.

ANALYSIS OF EFFECTIVENESS

Planning and project design

There is a fruitful symbiosis between the AIT and the ADPC. It is difficult to think of any other institution in Asia that would be more appropriate as the host for the Center.

There are a few aspects of the design of the Center that should be noted:

- the courses consistently emphasize local and national self-reliance;
- the creation of a multiplier effect is sought whenever and wherever possible;
- the courses are challenging; and
- international communication is emphasized.

Resource allocation

From the viewpoint of OFDA, the grants to ADPC are classified as emergency management institution building. Comparable OFDA-funded projects in this category have averaged about $366,000, which makes the ADPC grants total more than twice as large as the average.

Although the financial records of the ADPC were not reviewed in detail, it appears that expenditures have been more or less in line with the original projections in the 1985 business plan. The major deviation is that the ADPC occupies offices in two existing buildings and has not constructed its own building. This has meant that some of the highly specialized facilities have not yet been installed, for wont of both space and money. The lack of very sophisticated technologies may be a disappointment to some, but it has the decided advantage of keeping the ADPC more closely in tune with the technologies prevailing in most of the countries in Asia, where a reliable telephone and a personal computer represent a norm aspired to by many disaster managers.

Implementation

Implementation of the project has gone very smoothly, and now, at the end of its fourth year, the ADPC can be seen as a thriving but still young institution.

The 16 alumni who were interviewed in the preparation of this case study are certainly not a random sample; they are simply the people whom two visitors were able to contact, in person or by phone, in the midst of hectic travel. However, there is no compelling reason to conclude that their views do not broadly reflect those of all 307 alumni. Judged by this sample, the ADPC can safely be awarded high marks for motivating and increasing the understanding and skills of its graduates. All of those interviewed spoke warmly and positively about their experience, including those who studied in Manila.

Perhaps the most striking feature of the alumni interviews is how many of them want more -- more specialized courses, more contacts, and longer sessions. Many alumni -- far more than could normally be expected -- have, after graduation, successfully organized and led disaster management courses in their own institutions, using the approaches and materials from the ADPC courses. The "champion" among those interviewed, Mr. Apichat Todilokvech of the Thai government, claims more than 2,000 graduates from his post-ADPC courses.

Given the strategy of developing national capabilities and self-reliance through a cadre of ADPC graduates, the record of the first four years is very positive, and the training must be considered cost-effective.

But are the right people attending? In an interview about the ADPC, the MDRO in Bangkok, a former OFDA staff member, questioned whether the right people were being sent to the ADPC courses and noted that "disasters are not managed by Do-Gooders." He observed that ADPC alumni had not been involved in managing the relief operations following the floods in southern Thailand and that the army and police control assets in circumstances of relief.

The question of whether the right people are attending the ADPC courses is critical to the ultimate effectiveness of the Center. The answer is by no means clear-cut. On the one hand, the ADPC Director, himself a retired military officer, strongly encourages attendance by members of uniformed services precisely because in the real world they are likely to dominate civilians in certain types of relief activities. Many donors, however, have restrictions about funding military and police personnel, and, thus far, relatively few ADPC alumni are in uniform. On the other hand, a very high percentage of the alumni appear to be those in key positions to counter disasters. Since there are few institutions in Asia (or elsewhere) where civilians and military interact freely, it is not surprising that the ADPC is, like the AIT as a whole, predominantly civilian.

Having found so much that it praiseworthy, there is nevertheless one obvious deficiency, perhaps better described as a ripe opportunity. This is an alumni newsletter, publication of which was specified in OFDA's second grant, in October 1986. The alumni are crying for a newsletter in which to share experiences, learn of important new publications, and maintain their identity as disaster managers.

Sustainability

The ADPC is striving for a diversified financial base which would include a significant level of revenue from national governments in the region for disaster-related services. Between January 1986, when the Center opened, and 30 September 1989, total ADPC expenditures were approximately $1.4 million. This figure is somewhat distorted because it includes a small amount of travel and per diem expenses for course participants which the ADPC has been asked to process. The travel and per diem expenses which donors have paid separately to enable participants to attend the courses total approximately $250,000.

OFDA has thus far granted $760,000, or 54 percent of total expenditures. Clearly, without OFDA support the ADPC would operate at a vastly smaller scale or, more likely, not at all. The Center director and staff are very appreciative of OFDA for providing core funding which has been substantial but declining. The Director hopes to receive an additional core grant of about $125,000 next year and would like to have $100,000 annually for a few years after that. Some assurance of OFDA core support will enable the Center to undertake several small initiatives.

The ADPC has made concerted efforts to attract both core and program funds from diverse sources. In addition to OFDA, the Governments of Australia, Canada, Norway, UK, and Japan have made grants, as have the UNDP and UNDRO. Both the number of donors and their proportionate contribution is increasing.

The outlook is excellent for the ADPC to reach financial sustainability with no or minimal core grant support within a few years. The speed with which this happens, and the size the Center ultimately becomes, will depend on the willingness of national governments in the region, and donors, to enable the Center to make a "profit" on country-specific, disaster-related projects. The UNDP has played an important part in this by providing special program resources (central funds that are additional to regular country program funding levels) for some ADPC-implemented projects. The Center hopes that the success of these, such as the typhoon-resistent houses in the Philippines, will encourage national governments to use UNDP country program funds, and eventually national government budgets, for disaster mitigation projects.

In June 1987, an OFDA Mission Allotment of $37,078 to USAID/P enabled the Government of the Philippines (GOP) to provide a sub-grant to ADPC to conduct the Aseismic Design and Construction of Structures course in Manila. This is yet another example of the kind of donor support for country-specific disaster mitigation activities that will put the ADPC on a fee-for-services footing in the near future.

No evidence turned up during the preparation of this case study to suggest that the ADPC is anything other than an asset to the AIT. Its reputation, as evidenced by the candid remarks of its alumni, is fully consistent with the excellent reputation of the AIT as a whole. The institutional sustainability of the ADPC seems assured as long as adequate funding continues, and it is to be expected that the multi-disciplinary linkages among the academic divisions will continue to be strengthened by continued focus on disasters.

RECOMMENDED ACTIONS

- Although moving toward financial diversification, the ADPC needs, and fully deserves, continued but declining core support from OFDA. OFDA and USAIDs can provide support at the national level by funding individuals to attend training programs and by funding special activities and projects.

STRATEGIC IMPLICATIONS

- Training activities can attain a powerful multiplier effect by motivating and equipping participants to conduct their own training courses.
- There is a continuing need to develop training courses in the management of refugee camps and man-made disasters.
- Continuing emphasis should be given to enhancing local, national, and regional capacity to prepare for, mitigate, and respond to disasters.

CASE STUDY #22

HOUSING IMPROVEMENT AND VULNERABILITY REDUCTION IN THE SOUTH PACIFIC

SUMMARY

The case study examines a series of grants that assisted Pacific island governments in mitigating cyclone damage on the housing sector. The activity was comprehensively designed to assess vulnerabilities, improve housing codes, disseminate information on improved construction techniques and improve the disaster management capabilities of the region's governments. The grants were implemented through the East-West Center's Pacific Islands Development Program in collaboration with Intertect.

The activity generated great initial enthusiasm, but, in the end, failed to completely achieve its intended results. However, housing vulnerability assessments were completed as were cyclone mitigation guidelines. The main shortcoming of the activity was that the information it generated was not adequately distributed due to the lack of a sustained effort.

$301,219 FY 1981-84

INTRODUCTION

This case study examines a series of grants to the East-West Center and Intertect. Beginning in FY 1981, OFDA funded a collection of activities designed to reduce housing vulnerability to cyclones in a number of South Pacific nations, principally Fiji, Tonga and the Solomon Islands. This case study was based on field visits to Fiji and Hawaii, a documentation review, and discussions with OFDA staff.

OFDA ACTIVITY

Project Rationale

Asia is subject to virtually every type of natural disaster - earthquakes, floods, typhoons and volcanic eruptions. As OFDA's FY86 Annual Report states: "Close to 60 percent of the world's major disasters occur in Asia, a region with an immense population." There have been 83 cyclones in the South Pacific since 1900 and eight floods. These disasters have caused $2.241 billion in damage to property and killed 893 people. In Fiji alone, OFDA estimates the current incidence of cyclones is 1.2 per season. The most destructive aspect of cyclones are the accompanying high winds that can cause severe damage to buildings and property. Tropical cyclones are almost always accompanied by torrential rains that cause flooding and trigger landslides.

In each incident, housing is destroyed with the poor bearing the brunt of these effects. OFDA has done much to promote disaster preparedness in the South Pacific with investments to improve the capabilities that can reduce damage and save lives. One area of focus has been to reduce housing vulnerability.

Project Components and Objectives

This case study includes a grant to INTERTECT in FY 1981 and a subsequent grant to EWC/INTERTECT which spanned FY 1982 through FY 1984.

The FY 1981 grant was for work in Fiji, Tonga, Tuvalu and the Cook Islands to: (a) analyze housing and public building vulnerability in the South Pacific; (b) identify remedial actions to reduce vulnerability to earthquakes, cyclones and floods and (c) assess the Fiji housing reconstruction project. The total cost of this activity was $43,348.

The subsequent grant was part of a cluster of three activities which collectively were known as the South Pacific Disaster Planning and Training activity. These activities were funded between May 1981 and June 1986 at a total combined cost of $521,243. The case study addresses activities for which funding was obligated between FY 1981 and FY 1984 and totaled $301,219. Work was to be carried out in Fiji, Tonga and the Soloman Islands.

The three grants which comprised the South Pacific Disaster Planning and Training activity can be summarized as follows:

No.	Recipient	Main Objectives
1	EWC/Pac. Isl. Dev. Prgm. (PIDP)	- compile information on the impact of disasters and disaster preparedness/mitigation - present the information to host governments and donors - provide the basis for further study of coping with crises in the South Pacific
2	EWC/PIDP/ INTERTECT	- plan and conduct training workshops for government department heads and senior staff on housing vulnerability reduction - plan and conduct 1 demonstration project and development model - disseminate information
3	EWC/PIDP	- assist Pacific regional national governments in building a capacity in: (a) post-disaster impact assessment, (b) vulnerability analysis and identifying mitigation options, and (c) community preparedness

The inclusion of a housing activity within the South Pacific Disaster Planning and Training Framework represents an attempt by OFDA to develop a regional strategy. The main emphasis was on the need to increase awareness of the importance of disaster preparedness/mitigation within the region. At the same time that the concept was being promoted it was considered important to provide a tangible example (improved housing) of what might be done. Hence the conceptual link between the three activities.

Of greatest importance to the case study was the contract with the EWC and INTERTECT for work in Tonga and the Soloman Islands. Although a Logical Framework was not prepared when the activity was designed, a schematic version has been subsequently developed based upon available documentation (see page 22-4).

Implementation Events

The initial grant to INTERTECT produced most of what was called for in the scope of work. The vulnerability of housing and public buildings in selected areas of the South Pacific was assessed as was the Fiji housing reconstruction activity. OFDA records show that final reports were produced on the Cook Islands and Tuvalu.

Under the second grant PIDP/INTERTECT co-sponsored a disaster preparedness strategies workshop in Fiji in March 1983. A set of model programs was developed to be used as guides for developing mitigation programs. These were presented at the workshop and included models on: (a) agricultural development, (b) ecomonic vulnerability, and (c) housing vulnerability. Other topics included alternative strategies for making disaster preparedness needs and the state of preparedness in the region. INTERTECT also produced a number of papers which included practical guidance on how to improve or construct low cost housing to reduce the potential vulnerability of the inhabitants to the natural disasters common to a given area.

Present Status

The activities were completed in FY 1984.

ANALYSIS OF EFFECTIVENESS

The activity included information dissemination as a component. However, no allowance seems to have been made to fund the long-term sustained effort required for effective dissemination of the findings. Hence, initial enthusiasm generated in the workshops was not sustained.

There are several reasons why the concepts didn't take hold. First, as a region the South Pacific does not fare well in the competition for OFDA resources. With a relatively small number of isolated people, it is difficult to make a case for sustained support there as opposed to other parts of the world. Second, the isolated nature of the islands makes

SCHEMATIC LOGICAL FRAMEWORK
HOUSING IMPROVEMENT AND VULNERABILITY REDUCTION IN THE SOUTH PACIFIC

GOAL: Save lives and reduce injuries, property damage and the negative impact on socio-economic development caused by the destruction of homes.

PURPOSE: Assist Pacific Island governments with the preparation of education and training materials for reducing housing vulnerability as measured by a reduction in total and partial destruction of houses caused by comparable disasters before and after the activity.

OUTPUTS: To assist Tonga and the Solomon Islands in:

Disaster Mitigation

- Provide training in planning and implementation of disaster strategies for disaster management officials
- Conduct 2 problem oriented training workshops on reducing housing vulnerability
- Improve housing codes

Technology Transfer

- Improve knowledge of housing construction: planning and implementation of a demonstration project, including construction of a model house to train local staff and apply techniques learned in workshops

Institution Building

- Establish disaster management capabilities in national governments
- Develop a framework for regional cooperation
- Develop a training manual for national disaster operations
- Mount an information dissemination campaign

INPUTS: Agreement between OFDA, East West Center and INTERTECT totaling $257,871 as follows: 2 Grants and four amendments.

dissemination a difficult proposition. Third, USAID staff members have had ranging degrees of interest in the topic. Fourth, the incremental costs of building a better house are either a barrier to low income families or a potential drain on scarce governmental budgets which would be required to subsidize the difference.

Some interest was shown by the Peace Corps and IHAP but only marginal success was recorded. Recently INTERTECT has been asked by some of the governments in the region to coordinate another meeting on the topic in FIJI. However, if this renewed interest generates new funding, INTERTECT's prior work may have only limited relevance. This is because housing construction is now being undertaken using concrete blocks rather than traditional materials.

RECOMMENDED ACTIONS

- None. The project was complete in FY 1984. However, if housing is to be an important component of OFDA's Strategic Plan for the Decade, OFDA should see if the Fiji conference produces any signs of deeper interest.

STRATEGIC IMPLICATIONS

- Dissemination of new technologies, no matter what the level of sophistication, is a tricky and long-term proposition. The task deserves the full attention of planners and implementors.

CASE STUDY 23

GLOBAL AGRO-CLIMATIC IMPACT ASSESSMENT

SUMMARY

Between FY 1977 and 1985, OFDA supported a cluster of activities entitled Global Climatic Impact Assessment and Technology for Disaster Early Warning and Technical Assistance in the Developing World. The key USG agencies involved in the activities were NOAA and NASA. The project uses interpretation of satellite imagery to monitor crop production and predict food shortages. OFDA supported the research, development, testing and evaluation of technologies designed to permit greater lead time in famine warning. OFDA financial support ceased in FY 1985 and AID's Africa Bureau funded a separate project aimed entirely at Sahelian countries entitled Famine Early Warning Systems (FEWS).

During the period of implementation, OFDA recorded 107 droughts in over 44 countries. Clearly an activity intended to reduce such widespread effects of drought, famine and food shortages is a wise expenditure of money. In fact, the activity advanced the USG's capacity to report on and analyze climatic effects on agriculture production; it assured a steady flow of information could be available to decision-makers. The link between research and application, however, was not successfully forged. Greater emphasis on the needs of those who could actually apply the data to an action program would have enhanced the activity's impact.

$6,244,353 FY 1977-1986

INTRODUCTION

The relationship between climate and agricultural production is a pivotal one in every country in the world. In Western countries, billions of dollars can be made or lost due to fluctuations in agricultural production caused by the weather. In Third World countries similar fluctuations can make the difference between life and death to thousands of people. The impact of the climate/agriculture production cycle is shown in OFDA's Summary of Disasters which attempts to catalogue all disasters which have occurred outside the U.S. since 1900. It lists the following:

- 260 droughts which killed almost 8.3 million people and affected slightly more than one billion others;

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- 6 famines which killed almost 7 million people;
- 10 severe food shortages which affected almost 19 million people.

As recently as the early 1970s, estimates of consumption needs were often based on little or no reliable data. For example, in the immediate post-Independence period in Bangladesh, a standard of 16 oz/person/day was multiplied by the total estimated population to derive an estimated total consumption requirement. Expected total production was estimated based upon several "fly-overs" and the observations of local personnel on the ground. The difference between these two calculations was the basis for establishing food aid levels. Population estimates could have been off by 5-10 million, the consumption standard was not based on much empirical data and the production estimates were entirely "seat of the pants." However, this was the best which could be accomplished under the circumstances and between 1972 and 1974, almost $325 million was allocated to food aid programs based on the calculations.

During that same period, world food shortages were of great concern as food reserves in the Third World dropped to precariously low levels. Triage (or the lifeboat theory) of famine was a hotly debated topic, especially its implications for extremely unstable and vulnerable Third World countries. Within this environment, an increased appreciation of the need to monitor rainfall deficits and refine crop yield estimation techniques generated interest in the use of weather and remote sensing satellite imagery toward that end.

One of the earliest uses of satellite imagery was to provide short-term weather forecasts. However, in the early 1970s NASA and USDA collaborated in some attempts to predict the impact of weather on crops by taking operational weather data, calibrating it back to historical data and drawing inferences from the comparisons. The primary motivation at that time was to generate estimates of the Soviet grain crop. To accomplish this task multidisciplinary teams were assembled under a project called LACIE (Large Area Crop Inventory Experiment). Concern about the relationship between weather, crop yields and drought/famine heightened as a result of events in Bangladesh and the 1971-1973 Sahel drought caused the UN's Food and Agriculture Organization (FAO) to establish a Global Information and Early Warning System (GIEWS) in 1975. In 1976, LACIE undertook a pilot study to review the interactions of weather and a drought in Haiti which lasted from November, 1974 to May, 1975.

To monitor agricultural and environmental conditions, U.S. scientists and analysts have primarily used data from the AVHRR (Advanced, Very High Resolution Radiometer) sensor on U.S. civilian polar orbiting weather satellites and from LANDSAT, the land remote sensing satellite system. AVHRR data can produce a vegetation "greeness" index over large areas while LANDSAT's sensors provide more detail on smaller regions.

From a world food security perspective, the three U.S. Government agencies that make extensive use of satellite applications and data are the National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce, the U.S. Department of Agriculture (USDA), and A.I.D. NOAA is both a user and producer of satellite data, since it is the agency that operates the weather satellites. The international organizations with programs that affect world food security are two United Nations agencies: the Food and Agriculture Organization (FAO) and the World Meteorological Organization (WMO). The United Nations Environment Programme (UNEP) also plays a role in satellite monitoring. These international organizations use remote sensing data gathered not only by U.S.-launched satellites, but also satellites developed and maintained by the European Space Agency, France, Japan, the Soviet Union, and other countries.

OFDA ACTIVITY

Project Rationale

OFDA's interest in satellite imagery began in the late 1970's when it considered its potential contribution to world food security, especially how it might help alleviate the effects of drought in Third World countries. Operationally this meant: (a) shorten the time required to analyze data (which at the time was 7-10 days); and (b) lengthen the time to prepare for droughts or food shortages by improving analytical techniques.

For eight years OFDA supported the research, development, testing and evaluation of technologies designed to address the problems outlined above. OFDA financial support and program management ceased in FY 1986 and the Bureau for Africa (AFR) funded a separate project aimed entirely at Sahaelian countries entitled Famine Early Warning Systems (FEWS). This case study considers OFDA's activities and the transfer of the technology to AFR. It does not attempt to evaluate work done under FEWS.

Project Components and Objectives

Between FY 1977 and 1985, OFDA obligated $6.2 million in support of a cluster of activities entitled Global Agro-Climatic Impact Assessment Technology for Disaster Early Warning and Technical Assistance in the Developing World. (See Funding Summary.) The key U.S. Government agency involved in these activities was NOAA. The U.S. Geological Survey (USGS) the U.S. Department of Agriculture (USDA) and the Department of Defense (DOD) also cooperated. NOAA used remotely sensed weather satellite data, primarily from the GOES Satellite and the polar orbiting satellite AVHRR sensor on NOAA satellites and from Europe's METEOSAT to provide early warning of drought and food shortages. NOAA also used recorded rainfall ground data to recognize the onset of drought conditions.

Implementation of the activity involved the issuance of 13 Participating Agency Service Agreements (PASAs), 9 continuations/amendments, four no cost extensions and two mission allotments. See Annex A - Summary of Financing.

The Schematic Logical Framework shown on the next page summaries in a general way the breadth and scope of the activities undertaken. It was developed based on limited document reviews and discussions and is not an OFDA product.

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FUNDING SUMMARY

GLOBAL CLIMATIC IMPACT ASSESSMENT TECHNOLOGY FOR DISASTER EARLY WARNING AND TECHNICAL ASSISTANCE IN THE DEVELOPING WORLD FOR AID/OFDA

NOAA/NESDIS/ASSESSMENT AND INFORMATION SERVICES CENTER

Year Funded	Task	Funding Amount
FY 1977	Develop Carib Models	$115,000
FY 1978	Develop Sahel Models	92,000
FY 1979	Test Carib/Sahel	97,430
	Develop S/SE Asia Models	269,000
FY 1980	Develop Sub-Equatorial Africa Models	169,000
	Develop Latin America Models	285,760
FY 1981	Develop Climate-SST/Satellite Models	274,582
	Test S/SE Asia Models	90,366
	Begin Peru/Ecuados Tech Transfer	63,000
FY 1982	Test Latin America Models	78,616
	Develop Horn Africa Models	55,190
	Continue Climate-SST/Satellite Models	183,047
	Test Sub-Equatorial Africa Models	79,960
	Begin S/SE Asia Tech Trans.	109,373
	Develop South Pacific Models	88,385
FY 1983	Develop Global EW/Tech Transfer Part I	349,584
	Develop Global EW/Tech Transfer Part II	349,706
	Increase funding for Sub-Equatorial region	13,000
FY 1984	Develop Global EW/Tech Transfer Part III	1,325,573
	Agroclimatic Workshop on Drought Assessment (Mission Allotment)	56,680
	Purchase Computers, Southeast Asia	79,100
FY 1985	Sahel and Horn of Africa	2,000,000
		6,224,352

Initially models were developed to monitor weather fluctuations rainfall deficits and estimate their impact on crop yields in the Caribbean Basin (especially Haiti, Jamaica and the Dominican Republic) and the Sahel. Prior to completion of the activity, separate models were developed for the Caribbean Basin, South/South East Asia, Sub-Equatorial Africa, the Horn of Africa, Central and South America, and the South Pacific. Actual outputs varied according to specific regional conditions. However, in general they included:

- Development of historical data bases as reference points for future analysis;
- Development of a regional specific predictive models assessing weather/climate/crop yield relationships with emphasis on subsistence crops of particular interest;
- Production and dissemination of routine 10-day and monthly reports to interested organizations in the region (e.g., USAIDs, State, FAO and USDA);
- Intensified surveillance, analysis and reporting during periods of concern, especially prior to normal harvesting of food crops;
- Transfer of impact assessment technologies, especially those most relevant to the interpretation of data, statistical correlations and report writing techniques;
- Technical assistance and training/workshops.

The Agro-Climate Early Warning Program was based on weekly rainfall/weather analyses and climatic impact assessment models for more than 350 agroclimatic regions (i.e., regions which are generally homogeneous with respect to agricultural crops and climatic type). Regional rainfall estimates were determined from satellite analysis and ground station reports received through an international communications network. Satellite cloud data were used to improve the accuracy of precipitation estimates, particularly in those regions where weather data were sparse and unreliable. Weather data were then interpreted by regional agroclimatic indices which indicate potential crop production in relative terms. Finally, weather impacts and the potential for abnormal food shortages were forecast from these indices 30-60 days prior to harvest.

Agroclimatic/crop condition indices were based on derived climatic variables (e.g., soil moisture, plant water deficit and moisture stress) which directly determine the plant's response to environmental conditions, and hence to productivity. The selection of regionally appropriate indices was, in part, determined through the use of episodic event data. For example, candidate indices were qualitatively compared to the historic occurrences of crop failure, food shortages, drought, flooding and other anomalous weather/non-weather events as determined from reports, newspapers, and computerized data bases. Episodic data were also used to calibrate an index for a particular crop type by establishing a critical threshold associated with crop failure and/or drought-related food shortages. The

S
LOGIC
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GOAL: Increased food security

PURPOSE: Within each region assisted; reduce the potential impact of drought and famine by: (a) improving the reliability, timeliness, quantification and use of early warning assessments, (b) developing local capabilities to utilize the technology and (c) integrating climatic considerations into the planning process.

OUTPUTS: Assist nations in the Caribbean Basin, Central and South America, Sub-Equatorial Africa, the Horn of Africa, South/South East Asia and the South Pacific through:

1. Techniques Development	2. Information Flow	3. Technology Transfer
• Introduction of new hardware and software needed to develop, test, evaluate and modify weather/crop yield models	• Improved flow of information within the USG and from the USG to LDCs • provision of periodic special assessment of weather/crop yields	• Transfer of models to: – monitor drought/famine – provide weather information for farmers advisories – assist planners in fields such as agriculture, family planning, environment, etc. • develop indigenous human resources necessary to make effective use of technologies transferred.

INPUTS: Agreements between OFDA and DOC/NOAA totaling almost $6.7 million as follows:

13 basic PASAs; 9 continuations/amendments; 4 no cost extensions and 2 mission allotments to finance:

- U.S. based technical experts
- Technical assistance
- Research & development
- Equipment & supplies

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strengths and limitations of all available indices and models were collectively considered in the assessment process. A convergence of evidence techniques was used to make final forecasts and report results.

By 1985, monthly assessments of weather impacts on agriculture in general and crop conditions in specific were being made available to more than 70 developing countries. Whenever necessary, qualitative forecasts on the potential for drought-induced food shortages were made and monthly reports were updated weekly. There were two methods of distributing information. First, a bi-weekly or monthly cable was sent to U.S. embassies and USAIDs through four weather collectives. These cables were to be given wide distribution at each post. Second, a monthly report entitled Climate Impact Assessments - Foreign Countries was distributed by AISC primarily on a full subscription basis.

While conditional projections of crop yields could be made well in advance of actual harvesting, poor rainfall in the early season could be offset by beneficial rains later. Therefore, more accurate drought impact assessments could be made during the flowering and reproductive stage. Even at that later stage, assessments could provide:

- A 30-60 day projection on expected crop yields;
- A 60-90 day projected leadtime on late changes in local food crop market prices;
- A 3-6 month lead time on the potential for drought-induced food shortages in famine prone or chronic drought regions; and
- A 9-12 month projected lead time on the potential for civil strife conditions exacerbated by food shortages, famine and cross-border migration.

ANALYSIS OF EFFECTIVENESS

Regular forecasts of agricultural crop production were not a feature of the project. However, relative information on potential crop yields and its impact on agricultural production was provided indicating, for example, the potential for crop failure, the relationship between the expected crop and prior yields, etc. The activity was not designed to consider non-weather impacts on crop yield (pests, fertilizer application, etc.) or any type of year-to-year changes in acreage. The activity focussed on substance rather than commodity crops. In the Sahel, for example, where changes in agriculture practices are slow, this would not be too serious since weather may account for 60 - 80% of the annual changes in production but this number would be considerably less for parts of Asia and Latin America.

During the period of project implementation, improvements in assessment techniques and technology reduced reporting time, increased lead time and also improved spatial resolution and forecast reliability. This latter improvement permitted greater pinpointing of an area likely to be affected by drought: for example, throughout most of the tropics spatial resolution was dependent upon the area monitored by each rainfall station (an average of about 250 kms.). In Africa the resolution for drought detection was upgraded to about 100 km. through the on-going development of meteorological satellite applications.

It is difficult to determine the degree to which the assessments were utilized on the ground. Considerations which mitigated against full usage would include:

- The gap between the apparently sophisticated techniques and the local in-country skills required to interpret the data;

- Indifference at political levels to the threat of drought until it is too late to take appropriate actions;

- The interdisciplinary nature of the problem requiring decisions which cut across established bureaucratic boundaries; and

- Limited response capability to act upon the data.

One example would be Ethiopia where access to higher quality and more reliable data was not sufficient to avoid a famine. In general, however, reaction from end-users was good in the Sahel and mixed in Asia and Latin America. Unfortunately, members of the MSI teams who traveled on field trips found little or no recognition of the activity's past involvement in the countries or that it was based upon OFDA planning, funding and management.

The record of the activity is good when the measurements listed in the purpose statement of the Logical Framework are considered. The reliability, timeliners and quantification of early warning assessment was greatly improved as advances were made in the technology and OFDA specific interest helped accelerate that process. Training programs designed to develop local capabilities to utilize the technology were held, but their long term effect is difficult to measure. However, more than 200 decision-makers, technical experts and operators were trained in the technology and some 150 technical reports were published during the 8 year period. The early warning assessments were widely disseminated and used within the limitations mentioned above. Climatic considerations were incorporated into short term national planning in times of potential drought but less so during periods of normalcy.

Several other contributions of the activity should be noted. First, OFDA's funding contributed to the development and operationalization of techniques such as image processing and specific software packages essential to the activity which have been useful in a broader context. Second, the Early Warning activity helped overcome institutional barriers to cooperation within and among the U.S. Government, international organizations and LDC governments.

In 1988, the Club du Sahel, a multidonor organization that fosters cooperation between developed countries that are members of the Organization for Economic Cooperation and Development (OECD) and eight drought-prone West African countries -- Burkina Faso, Cape Verde, Chad, Gambia, Mali, Mauritania, Niger, and Senegal -- commissioned a study of satellite remote sensing (RS) of the Sahel. The report inventoried and assessed almost 50 remote sensing projects and drew lessons for the application of land remote sensing satellite technology to the Sahel countries. While the study was not limited to OFDA's activities alone, it provides insights which are generally relevant to this case study.

- Certain limitations are emerging: atmospheric phenomena lend themselves better to RS than do ground-level features; RS seems to be very useful in climatology, indispensable in pluviometry, less useful in crop production monitoring, although here vegetation indices are of some utility. Its utility in yield forecasting seems still more uncertain, and crop forecasting runs into major technical and economic difficulties in attempts to measure cropland acreage and discriminate between crop types;

- Use of RS data should improve in the near future: RS techniques in general are expanding fast, and progress is expected in the Sahel on the operational environment side (high resolution picture transmission receiving stations for NOAA data at the regional AGRHYMET center, telecommunications, microcomputers, etc.) and on the operations management side (training of specialists, on the job or through outside courses);

- The spin-off from RS will primarily benefit national and regional early warning systems, decision-makers in cropping and livestock sectors and, to a lesser extent, the agricultural statistics services. Nor should more specific applications be overlooked: floodland cropping, environment, locust control, and forest clearance are all fields in which satellite techniques are often the only ones practicable on the scale required for the Sahel's vast open spaces;

- It is not wise to try to use either RS or ground-based methods exclusively. More often than not the two techniques must be combined. The optimum role of each has yet to be established, however, and this demands experimentation and real cooperation between all those involved.

This was OFDA's single most expensive activity during the last decade. During the period FY 1979 through FY 1985; over 12% of all money spent on preparedness was allocated to this activity. This expenditure in support of a program activity intended to reduce the effects of drought, famine and food shortages was a wise expenditure of money. During the period of project implementation, OFDA recorded 107 droughts in over 44 countries. No other alternative expenditure of funds could be targeted to so many people.

The activity advanced the U.S. Government's capacity to report on and analyze the possible effects of weather/climatic impacts on agriculture yields. It also ensured that, if the early warning assessment material were understood and made available to appropriate decision-makers, countries would have more time and better information to plan for possible droughts, famines or food shortages.

However, the link between technique development and continuing applications should have been much stronger. Development and dissemination of the detailed scientific data seemed to be predicated on the assumption that those able to actually act would seek out, understand and use the data. Thus, detailed planning seemed to stop with production of the data. A design which put greater emphasis on the needs of those who could actually apply the data to an action program would have been more desirable.

TRANSFER TO AFRICA BUREAU

In mid-1984, the Sahel region was experiencing another famine. There had been several warnings and the early assessments were available through the OFDA. However, response was slowed by a variety of factors including a lack of donor coordination, political leadership, and bureaucratic delays. One factor seems to have been the lack of awareness of the Early Warning activity and/or the limited ability to translate the data provided into action. Surprisingly, in a report of a meeting of international experts at a 1985 Bonn Summit on the Sahel it was said:

> ". . . there should be better arrangements for monitoring crops and the access to food for vulnerable groups. This will require collaboration with Africa countries and international organizations to improve early warning systems and distribution of emergency food supplies. It also implies assistance to African Governments . . . to improve national and regional preparedness plans".

Thus, considerable pressure had built up to give the Sahel special and urgent attention. Transfer of the technology to the Africa Bureau was considered since existing OFDA funding to NOAA was scheduled to conclude in May, 1985. Prior to undertaking such an activity the Africa Bureau required that (BOSTID) The National Academy of Sciences (NAS) review OFDA's experience in working with NOAA and USAIDs. This was undertaken about the same time that NOAA was preparing and submitted a $8.6 million proposal to OFDA to continue its work. BOSTID's main criticisms of the activity were:

- Better project monitoring was needed;
- Crop production analysis cannot be done, only inferences can be made;
- The NOAA/AISC methodology for crop yield forecasting was as yet unproven and required further validation; and
- The processing and the presentation of the images could have been improved.

Some felt that the review applied academic rather than "real world" standards. However, the net effects of the review were: (a) a negative decision on the pending NOAA proposal; (b) a non-cost extension followed by conclusion of the remaining OFDA-NOAA PASA; and (c) modification of the approach by the Africa Bureau.

In a memo to Mark Edelman, AA/AFR, Julius Becton, Director of OFDA, said "I strongly endorse the logical next step within the Agency, strengthening the linkage between disasters and development, to transfer the systems operational basis and funding support to the cognizant regional bureaus for which services are provided."

This action was significant since it involved the transfer of an important and relatively complex technology from one part of A.I.D. to another. Understandably, the decision was not universally welcomed within OFDA. The concerns of those unhappy with the transfer included: (a) whether OFDA should be a "seed capital" organization or make a long term (some would say open-ended) commitment to certain key pivotal activities, (b) the loss of momentum as the existing program was reviewed and then reshaped according to the needs of the new users, thus sacrificing a worldwide constituency of users, and (c) the lack of a smooth process. While all these concerns had some validity, it seems that the interagency transfer model is an appropriate one which should be followed whenever possible.

FUTURE CONSIDERATIONS

OFDA continued to advanced fund advanced satellite imagery map processing using AVHRR since the end of this activity. The NOAA technology has improved dramatically with increased publication of detailed methodology and scientific results. Also, equipment costs have dropped, while software has become more user friendly and accessible in the LDCs. There has also been a proliferation of organizations and countries funding major programs in food security and satellite systems. These clearly build on the NOAA technologies. A partial list of such organizations/countries (excluding AID) is as follows:

MAIN PROGRAM(S) OF KEY PUBLIC SECTOR ORGANIZATIONS CONCERNED WITH FOOD SECURITY

Within the USG:	NASA	Analysis; MTPE; commercialization of satellite's (LANDSAT)
	NOAA	AgRISTARS, Joint Weather Facility (with USDA)
	USDA	Overall assessment of agricultural supply and demand through the FAS, ERS, NASS and WAOB
International:	FAO	GIEWS, ARTEMIS
	WMO	WWW; GARP WCP, RDP
	UNEP	GEMS, GRID

COUNTRIES OTHER THAN THE U.S. OPERATING SATELLITE SYSTEMS

European Space Agency	METEOSAT-1 and 2, MOP
Japan	GMS-1 through 4; MOS-1
India	INSAT 1B
China	Polar orbiting weather satellite
Soviet Union	METEOR
France	SPOT-1

The U.S. (NASA) is planning several satellites in the future that would produce data relevant to global environmental concerns, including food security. The most significant of these is U.S. participating in Mission to Planet Earth (MTPE), proposed as a 15-20 year program with a U.S. contribution of $15-30 billion. Within the next decade those countries already operating satellite systems will expand their capacity while others might be added tc the list.

In recent years, the interrelationships between hunger, poverty, and environmental conditions have become increasingly clear. As the world's population continues to grow rapidly, the need to understand the Earth's capacity to produce food becomes a key element in attempts to assure world food security. In this context, the need to better understand the conditions of the world's resources base is critical. Data available from satellite technology offer important opportunities to achieve an ongoing capacity to assess agricultural and environmental conditions, manage natural resources, and contribute to meeting food needs throughout the world.

Recent measurements of changes in the earth's atmosphere that are attributed to human causes have heightened the awareness that natural systems may be altered by activities occurring in distant regions. Understanding the functions of earth's natural systems, the kinds of changes taking place in them, identifying the causes of these changes, and understanding their impacts on practical concerns, such as agricultural production, have become increasingly urgent.

Should OFDA decide to give future emphasis to environmental concerns and their integration into disaster preparedness and development planning, various types of satellite imagery must be an integral part of any activity. However, OFDA's resources will be minimal compared to multi-billion dollar expenditures already planned. Thus, OFDA will become a user of existing products, analyses and programs rather than a developer of new technologies. This will require the identification of well defined, precise areas of involvement. Clearly, any future activity must give considerable attention to the links between data collection and its application to operationally significant problems by non-scientists.

RECOMMENDED ACTION

None. OFDA funding for this activity ended in 1985.

STRATEGIC IMPLICATIONS

- Links between research and application can be strengthened by comprehensive planning during the design of an activity.
- As links between hunger, poverty and the environment become more fully appreciated, satellite technologies will make an increasingly greater contribution to possible solutions.
- OFDA's resources available to be allocated to satellite efforts will be minimal compared to the multi-billion dollar expenditures already planned.
- Therefore, OFDA is likely to become a user of existing technologies rather than an influencer of their development.

CASE STUDY #24

CIRCUM-PACIFIC EARTHQUAKE AND TSUNAMI MAPPING: WORLD WIDE

SUMMARY

This activity was implemented by the USGS. Its main objectives were to develop and implement analytical techniques to determine the conditional probability for the recurrence of large or great earthquakes over the next 20 years. During the activity the seismic potential of 119 seismic gaps were examined. The Southwest Pacific region presently contains the majority of high probability gaps. High potential gaps near population centers include Jama, Ecuador and Southeastern Guatemala. Many segments of Central America are presently assigned intermediate probabilities but will become areas of high concern over the next 10-20 years.

Implementation went smoothly and the scientific data is presented in ways which can be extremely useful to national decision-makers. Unfortunately, OFDA has not disseminated the information in a way to ensure its integration into national and regional planning processes.

$458,961 FY 1984-1986

INTRODUCTION

Early warning activities consist of research, development, and application of technologies which enable disaster managers to anticipate disasters before they strike. OFDA supports disaster prediction and early warning systems research in five major areas: 1) drought and famine, 2) earthquakes, 3) severe storms, 4) tsunamis, and 5) volcanoes. Early warning systems use satellite-based telemetry and remote sensor imagery to monitor natural events and environmental conditions which can lead to disasters. The data enables policy planners and emergency managers to make decisions about evacuation and resource deployment when an earthquake or tsunami threatens. OFDA's efforts in early warning recognize the extreme difficulty related to actually predicting event leading to disasters. Thus, activities have emphasized the use of probabilistic forecasting techniques and hazards and risk assessment methodologies in lieu of prediction.

To mitigate earthquake damage, OFDA began a program in 1983 to support the development by the USGS of a prototype seismic event detector and data collection platform for early warning of earthquakes and volcanic eruptions. The three-part system consisted of a stationary sensor (seismometer) to register a seismic event, a micro-computer system to monitor the seismometer output, and a data collection platform to transmit the data to one of three U.S. Environmental Satellites. From the satellite, news of a seismic event is relayed to an earth station. This system was a first step in significantly improving worldwide seismic data collection defining seismic threats, and investigating the possibility of severe earthquakes in different regions.

Many analyses of earthquake hazards in the Circum-Pacific region are based on the seismic gap hypothesis. This states that segment of simple plate boundaries that have not ruptured in a large or great earthquake (see definitions below) in many decades are the most likely sites of future large or great events. Thus, for a segment of a plate boundary to be considered a seismic gap, it must have a history of prior large or great earthquakes and not ruptured in a large or great event in at least three decades. These are the 119 gaps examined during the course of the USGS work.

PROJECT DESCRIPTION

Rationale

Advances in the fields of seismology and geophysics have led to an increased understanding of the nature of large and great earthquake occurrences along simple plate boundaries. These advances have resulted in the development of long-term earthquake forecasts for specific fault zones.

One of the most seismologically active areas in the world is defined as the Circum - Pacific region. Between 1900 and the present, OFDA records show that 109 earthquakes in the Circum-Pacific region killed 324,129 people affected 14,103,757 more and resulted in $15.655 billion in damage. Also, 6 tsunamis occurred killing 3,406, and causing $50 million worth of damage. It is a broad and diverse area in which many seismic regions have relatively short recurrence times of 20-60 years compared to 100-200 year intervals observed at many other plate boundaries. The region includes:

- South America: (Chile, Peru, Colombia-Ecuador)
- Central America: (Panama, Costa Rica, Nicaragua and El Salvador, Guatemala, Mexico)
- North America: (California, Washington-Oregon)
- North Pacific: (Queen Charlotte-Alaska-Aleutians)
- Western Pacific: (Kamchatka-Kurile Island, Japan, Izu Bonin-Mariana)
- Southwest Pacific: (New Guinea, New Britain-Solomon Island, Santa Cruz-Vanuatu Island, Tonga-Kermedec Island)

Therefore, beginning in July, 1984 OFDA began funding the Comparative Seismic and Tsunami Threat Study in the Circum-Pacific Region entered into a PASA with the USGS for $126,236 to provide for the first year funding of a three year program which eventually was funded at the level of $458,961. The

USGS, a co-funder of the project, utilized recent advances in seismology and tectonics to produce a probabilistic ranking of the zones most susceptible to damage in the next 10 to 20 years and a summary of recurrence for each major seismic gap in the region. Specifically, the PASA with the USGS was for the:

- Development and implementation of analytical techniques to determine earthquake and tsunami potential;
- Preparation of maps and texts;
- Conduct of analytical surveys of video-image processing systems;
- Investigation of historic seismic repeat-time dates;
- Investigation of earthquake rupture processes; and
- Research of regional tectonic mechanisms.

The project took place over four years and resulted in more than 14 published articles in professional journals.

Objectives and Components

Based upon a review of existing documentation and interviews, a Schematic Logical Framework was constructed and is shown on the following page.

Implementation Events

Implementation appears to have proceeded smoothly. Within the first year, the possibility of using a video-image processing system was reviewed and it was determined that it could not meet the needs of the project. Work on other aspects of the grant proceeded from country-to-country.

By the conclusion of the work, a number of potentially very valuable documents had been produced. The seismic potential of 119 gaps around the region was studied. This material was used to develop:

- A regional map
- Seismic zone maps
- Conditional probability estimates by subduction zones (See Annex A for an example).
- Identification of the top seismic gaps i.e., those with ≥ 50% Conditional Probability for Recurrence between 1989-1999 and between 1989-2099.

The latter information deals with the potential for large or great earthquakes. Large earthquakes are defined as those having surface - wave magnitudes (Ms) of between 7 and 7-3/4 while great earthquakes are those events with Seismic moment - magnitudes (Mn) larger than 7-3/4. The southwest Pacific region, including the islands of New Guinea, Vanuatu, and Tonga, presently contains the majority of high probability gaps. High potential gaps near population centers presently include Jama, Ecuador and southeastern Guatemala. This list does not preclude large or great earthquakes occurring in other segments with lower probabilities, however. Many segments of Central America have gaps, that while presently assigned intermediate probabilities for the next 5 years, will become areas of high concern within the next 10 or 20 years. Annex B lists all of the high risk areas (i.e., ≥ 50%) conditional probability for recurrence during the period 1989-1999. The 30 highly ranked gaps shown in Annex C represent 1/4 of the total number of gaps studied. Many of these gaps are near urban centers and represent a potential future threat. Such information is invaluable to planners in any region of the world when spatial planning decisions need to be made involving any concentration of population.

In addition, the activity resulted in the publication of a many journal articles (See Annex D). These will contribute to the body of knowledge related to the assessment of long-term seismic hazard for the simple plate boundaries of the Circum-Pacific region.

Present Status

Work under this activity is complete. A final report was submitted to OFDA by the National Earthquake Information Center of the USGS.

ANALYSIS OF EFFECTIVENESS

Planning and Project Design

The activity was clearly conceived and well executed. Issues of institutional and financial sustainability were not relevant as USGS was simply required to produce a series of products and commission appropriate research. The relatively small investment seems to have been well spent and a quality product produced.

However, the one significant flaw was OFDA's failure to develop a plan for disseminating this potentially very important information. Apparently, little or no attention was paid to this issue during any phase of the activity's design or implementation. Such a plan could have:

- Established a strategy for dissemination which identified individuals inside and/or outside of OFDA who would be responsible for specific action;
- Identified key decision-makers, planners and scientists in affected countries to receive a summary of the study's findings; and
- Included letters to the U.S. Ambassador and USAID Director summarizing the possible implications in their country.

The current situation is due to the fact that a comprehensive approach was not undertaken during the design phase. Without remedial action being taken, the potential benefits of the activity will be lost.

RECOMMENDED ACTIONS

- Develop and implement a plan for the dissemination of the study's findings as discussed above.

STRATEGIC IMPLICATIONS

- Without a comprehensive approach to the design, monitoring, and evaluation, the full potential of an activity will not be realized.

SCHEMATIC LOGICAL FRAMEWORK
EARTHQUAKE AND TSUNAMI PROBABILITIES IN THE CIRCUM-PACIFIC REGION

GOAL: To reduce the future effects of earthquakes and tsunamis on deaths, injuries and property damage.

PURPOSE: To increase the analytical capacity and lead times to respond to a specific event and to integrate probability data on earthquakes and tsunamis with public and private sector planning.

OUTPUTS: To assist nations in South America, coastal regions of Alaska and the Aleutian Arc, and Southeast Asia in:

Techniques Development

- Hardware and software developed for manipulating large databases of seismic/tectonic information in preparation for production of a map of comparative earthquake potential
- Hardware and software developed to routinely determine the total energy (magnitude, moment, depth of occurrence and energy) of significant earthquakes
- A systematic method for gathering and analyzing tsunami data

Technology Transfer

- Develop reports with maps detailing the comparative earthquake zones
- Transfer video-image processing technology
- Assist in compiling and analyzing occurrences of earthquake and tsunami data
- Develop local capabilities in determining regional vulnerability and hazards analysis for disaster planning

Research

- Publication of scientific manuscripts intended to advance state-of-the-art knowledge.

INPUTS: Agreement between OFDA and USGS totaling $458,961 as follows: 1 Basic PASA and 3 amendments to finance U.S. based Technical Experts, Technical Assistance, Research and Development, Equipment and Supplies.

C. S. #24
Annex A

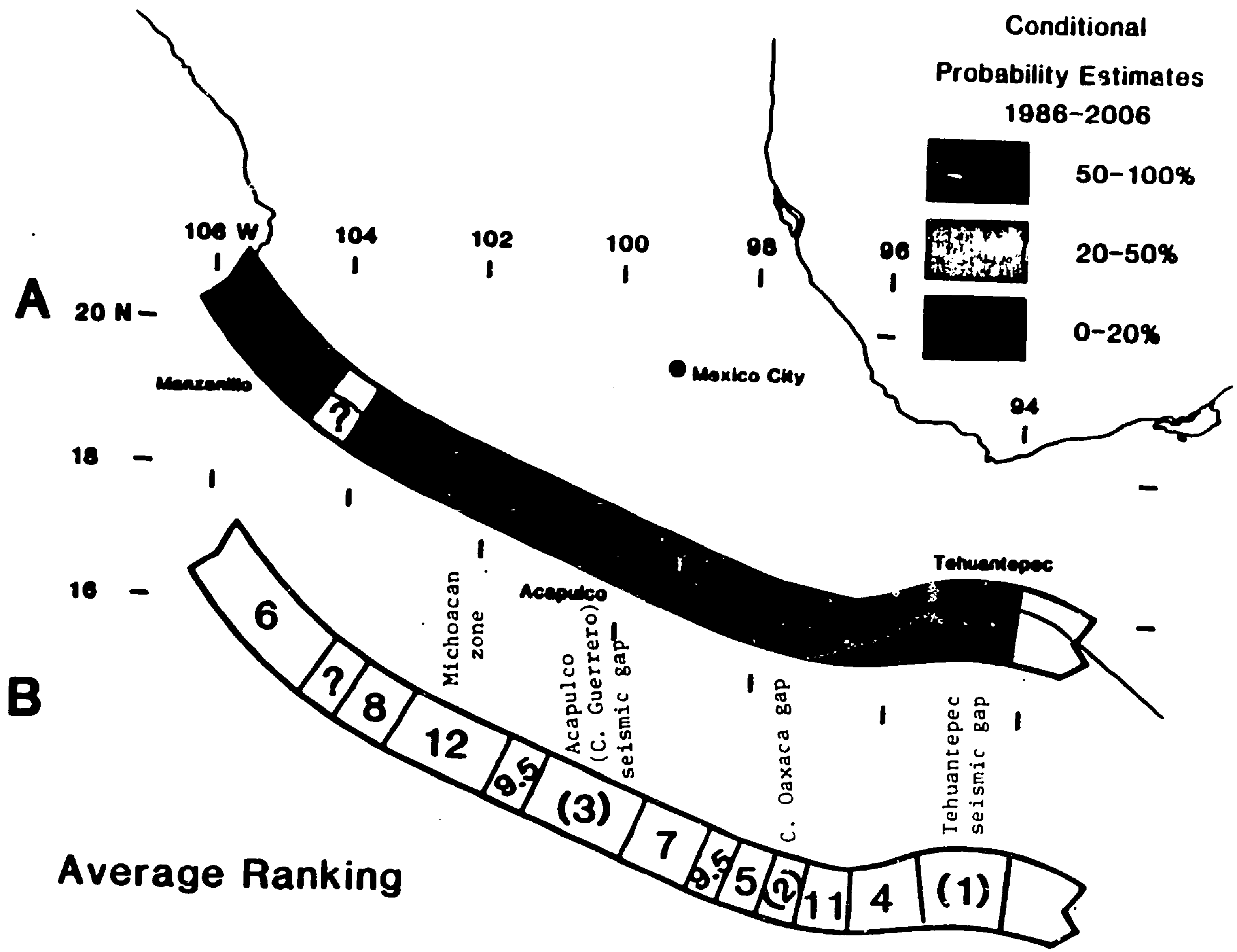

Figure 2. Ranking of risk from seismic gaps of the northern Mexican subduction zone.

C. S. #24
Annex B

Table 1. Top Seismic Gaps
Gaps with $\geq$ 50% Conditional Probability for
Recurrence During 1989-1999

	Location	Magnitude	Last Event	Probability
1.	Parkfield, California	m_b 6.0	1966	93%
2.	Delarof Is., Aleutians	M_S 7.5	1957	(85%)
3.	Vankolo Is., Vanuatu	M_S 7.5	1980	83%
4.	Jama, Ecuador	M_S 7.7	1942	(66%)
5.	S. Santo Is, Vanuatu Is.	M_S 7.1	1971	60%
6.	E. New Britain, New Guinea	M_S 8.0	1971	59%
7.	W. New Britain, New Guinea	M_S 8.0	1945	(58%)
8.	Central Tonga	M_S 8.0	1948	58%
9.	N. Bougainville, New Guinea	M_S 8.0	1971	53%
10.	S.E. Guatemala	m_b 7.5	1915	51%

Probability values in parentheses reflect less reliable estimates.

Table 2. Top Seismic Gaps

Gaps with ≥ 50% Conditional Probability for Recurrence During 1989-2009

	Location	Magnitude	Last Event	Probability
1.	Parkfield, California	m_b 6.0	1966	≥99%
2.	Vankolo Is., Vanuatu	M_S 7.5	1980	99%
3.	Delarof Is., Aleutians	M_S 7.5	1957	(98%)
4.	Nicoya, Costa Rica	M_S 7.4	1978	93%
5.	Jama, Ecuador	M_S 7.7	1942	(90%)
6.	E. New Britain, New Guinea	M_S 8.0	1971	92%
7.	S. Santo Is, Vanuatu	M_S 7.1	1971	91%
8.	N. Bougainville, New Guinea	M_S 8.0	1971	90%
9.	Central Tonga	M_S 8.0	1948	84%
10.	W. New Britain, New Guinea	M_S 8.0	1945	(84%)
11.	Santa Cruz, Vanuatu	M_S 8.1	1966	82%
12.	Loyalty Is., Vanuatu	M_S 7.2	1980	80%
13.	SE Guatemala	m_b 7.5	1915	79%
14.	Shumagin Is., Alaska	M_S 7.7	1917	75%
15.	Ometepec, Mexico	M_S 7.3	1950	74%
16.	C. Oaxaca, Mexico	M_S 7.8	1928	(72%)
17.	Guadacanal, Solomons	M_S 7.5	1988	71%
18.	San Cristobal, Solomons	M_S 8.0	1931	(71%)
19.	E. Oaxaca, Mexico	M_S 7.8	1965	70%
20.	Unimak Is., Alaska	M_S 7.4	1946	(67%)
21.	Fox Is., Aleutians	M_S 7.4	1957	(67%)
22.	Colima, Mexico	M_S 7.5	1973	66%
23.	West Oaxaca, Mexico	M_S 7.4	1968	64%
24.	Kamchatsky Pen., U.S.S.R.	M_S 7.5	1971	61%
25.	S. Valparaiso, Chile	M_S 7.5	1906	59%
26.	Papagayo, Costa Rica	M_S 7.5	1916	(55%)
27.	Tokai, Japan	M_S8.0	1854	(53%)
28.	Urup Is., Kuriles	M_S 8.5	1963	(52%)
29.	C. Guerrero, Mexico	M_S 7.8	1899-1911	(52%)
30.	C. Guatemala	M_S 7.9	1942	50%

Probability values in parentheses reflect less reliable estimates.

C. S. #24
Annex D

JOURNAL ARTICLES RESULTING FROM THIS PROJECT

Boatwright, J. and G. L. Choy, Teleseismic estimates of the energy radiated by shallow earthquakes: Journal of Geophysical Research, 91, 2095-2112, 1986.

Choy, George L. and V. F. Cormier, Direct measurement of the mantle attenuation operator from broadband P and S waveforms: Journal of Geophysical Research, 91, 7326-7342, 1986.

Choy, George L., Broadband body-wave analysis of the complex rupture process of the Samoa earthquake of September 1, 1981: Submitted to the Journal of Geophysical Research.

Choy, George L. and E. R. Engdahl, Analysis of broadband seismograms from selected IASPEI events: In press, Physics of the Earth and Planetary Interiors.

Langer, C. J. and W. Spence, Deformation of the Nazca Plate related to the gap-filling earthquake series of October - November 1974: Submitted to the Journal of Geophysical Research.

Mendoza, C., Source mechanisms of Colombia aftershocks using digital surface-wave data: Bulletin of the Seismological Society of America, 76, 1597-1613, 1986.

Nishenko, Stuart P., Seismic potential for large and great interplate earthquakes along the Chilean and southern Peruvian margins of South America: A quantitative reappraisal: Journal of Geophysical Research, 90, p. 3589-3615, 1985.

Nishenko, S. P. and R. P. Buland, A generic recurrence interval distribution for earthquake forecasting: In press, Bulletin of the Seismological Society of America.

Nishenko, S. P. and S. K. Singh, Relocation of the great Mexican earthquake of 17 January 1903: Bulletin of the Seismological Society of America, 77, 256-259, 1987.

Nishenko, S. P. and S. K. Singh, The Acapulco - Ometepec, Mexico earthquakes of 1907 - 1982: Evidence for a variable recurrence history: In press, Bulletin of the Seismological Society of America.

Nishenko, Stuart P. and S. K. Singh, Conditional probabilities for the recurrence of large and great interplate earthquakes along the Mexican subduction zone: Submitted to the Bulletin of the Seismological Society of America

Singh, S. K., L. Ponce, and S. P. Nishenko, The great Jalisco, Mexico earthquakes of 1932 and the Rivera subduction zone: Bulletin of the Seismological Society of America, 75, p. 1301-1313, 1985.

Spence, William, The 1977 Sumba earthquake series: Evidence for slab pull force acting at a subduction zone: Journal of Geophysical Research, 91, 7225-7239, 1986.

Spence, William, Slab pull and the seismotectonics of subducting lithosphere: Reviews of Geophysics, 25, 55-69, 1987.

CASE STUDY 25

VOLCANO EARLY WARNING AND DISASTER ASSISTANCE PROGRAM

SUMMARY

The Volcano Disaster Assistance Program (VDAP) implemented primarily by the USGS, was begun in 1986 to develop a volcano early warning disaster assistance program capable of providing rapid technical response to actual or potential volcano crises worldwide. Assistance includes on-site monitoring of volcanoes by crisis assistance teams, on-going mapping and analysis of volcano hazards, and analysis of threat information needed to determine the necessity for emergency evacuation.

VDAP has been quite successful in providing rapid and effective emergency technical responses to actual or potential volcano crises. Some progress has also been made in assisting a number of countries to train staff and build and equip facilities in order to better cope with volcano hazards. However, VDAP's objective of institutionalizing this capacity is far from fulfilled. OFDA, in coordination with other donors, should make long-term plans for moving further toward this objective.

$527,000 FY 1986-1988

INTRODUCTION

The Volcano Early Warning and Disaster Assistance Program (VDAP) was implemented by USGS under a PASA funded by OFDA. VDAP coordinates closely with host country agencies and international organizations such as Observatorio Volcanologicos de Colombia (OVC), Esquela Politecnica Nacional Autonoma (ESPONA, Ecuador), Instituto Sismologia, Vulcanologia, Meterologia y Hidrologia (INSIVUMEH, Guatemala), South American Regional Seismological Center (CERESIS), UNDRO, UNESCO and the World Organization of Volcano Observatories (WOVO).

There are four underlying premises to this review:

- First, time must be perceived in geological terms. Time perceived as months or years or decades needs to be replaced by centuries and millennia. Intervals between some volcanic eruptions humble the human sense of time. At the same time, of the approximately 50 eruptions annually, an average of two or three are explosive;

- Second, the effects of many volcanic eruptions extend far beyond those persons killed or injured as a direct result of the eruption. They also adversely affect economies and influence national and regional political change;

- Third, VDAP expeditionary efforts to mitigate volcano disasters may be effective in the short-term because of the expertise and mobility of the Volcano Crisis Assistance Team (VCAT), but carry the risk of failure because expeditionary teams are unfamiliar with the history of the relevant volcano, and sustained achievements require extended commitment; and,

- Forth, volcanologists can forecast eruptions with reasonable accuracy, especially when they know the relevant volcano. The science of volcanology today can forecast eruptions with reasonable accuracy and design effective plans for mitigation if there is on-going and long-term commitment to volcano observation, measurement and study. Failures in mitigation relate directly to poor preparation and unavailability of baseline data upon which to formulate relevant forecasts.

VDAP has a world-wide mandate, but focuses the circum-Pacific region in which 75% of the world's most dangerous volcanoes are found. This includes volcanoes in Central America, the Caribbean and South America: Mexico, Guatemala, El Salvador, Nicaragua, Costa Rica, Panama, St. Kitts, Dominica, Martinique, Colombia, Ecuador, Peru, Bolivia, Argentina and Chile.

OFDA ACTIVITY

Project Context

For millennia, the awesome explosions and outpourings of magma, ash and intense heat from the depths of our planet through the lithosphere, have wrought destruction to life and land and economies; and in some cases they have contributed to political and historical change.

Mt. Vesuvius buried Pompeii and Herculaneum and 20,000 citizens of the Roman Empire in 79 AD. The Krakatau blast in the Sunda Straight in 1883 sent shock waves seven times around the globe, created a tsunami 130 feet high, and expelled volcanic materials 50 miles into the stratosphere, reducing sunlight by as much as 20% on the earth's surface; an estimated 36,000 people died. The 1815 Tambora eruption on the Island of Java sent 36 cubic miles of materials into the atmosphere affecting weather in the northern hemisphere during 1816; an estimated 12,000 people died as the direct result of the explosion, and 70,000-80,000 died of starvation in the eruption's aftermath. And in our decade in the United States, after a quiescence of 123 years, Mount St. Helens' fiery 200 mile-an-hour horizontal blast leveled forests for 20 miles and a massive debris avalanche blocked and filled river systems, although fewer than 100 persons died.

In fact, the Mount St. Helens explosion introduced the worst decade of volcanic eruptions in our century since the 1902 disasters of Mont Pelee, Martinique; Soufriere, St. Vincent; and Santa Maria, Guatemala, in which a combined total of 36,000 persons were killed. Mount St. Helens in 1980 was followed by El Chichon in Mexico (1982); Galunggung, Indonesia (1982); Nevado del Ruiz, Colombia (1985); and the eruptions in Alaska in December, 1989.

Volcanology emerged as a modern science at the beginning of our century. In 1902, when T. A. Jaggar, an assistant professor of Geology at Harvard, studied the effects of destruction in Martinique and St. Vincent, he argued that short-lived or expeditionary study of volcanoes after eruption was inadequate to understand volcanic eruptions and mitigate their effects over the long-term. Today, with VCAT, short-term achievements are possible; but on-going and long-term observation, measurements and study are necessary -- before, during and after crises -- for sustained operational preparedness through host-country authorities.

Some think of volcanoes as "active", "inactive", "extinct" or "dead". The fact is that the terms are illusory. The Bandai volcano of Japan erupted in 1888 after resting quietly for 1,000 years. The Helgafell volcano of Iceland erupted in 1973 after an estimated 7,000 years of repose. Vesuvius was thought dead in 79 AD (it blew again in 1944), and Mt. Lamington in Papua New Guinea exploded in 1951, killing 3,000-5,000 people, having had no eruption in human memory.

Volcanoes are a product of heat generation, storage and transfer occurring beneath the earth and its atmosphere. The heat is generated through compression of materials and radioactive decay. The pressure and heat rupture the earth's lithosphere (crust), and theories of plate tectonics link earthquakes, fractures, volcanism and continental drift.

Generally, the major threat to life from volcanic eruptions is not lava. Almost all volcanic eruptions produce some forms of lava, and in some cases it can move at some 80 miles per hour, causing extensive property damage, avalanches and floods. Usually, however, lava moves ponderously. More deadly than lava, are ash falls which destroy vegetation, crops and poison animals. Ash falls can also cause human respiratory problems and change the chemistry of soils, lakes and rivers. Other threats from volcanoes include "rock bombs" or heated rock thrown into the air which threaten the immediate area of the volcano. Mudflows triggered by eruptions block or change rivers and swamp land; gases kill humans, animals and plants.

By far the greatest threat from volcanoes are mud- and pyroclastic flows, which caused 86% of the deaths between 1900 and 1986. Such was the disaster from Mt. Pelee in 1902 and a portion of the disaster at Mount St. Helens, which leveled forests for 20 miles and sent mudflows for 60 miles.

The paroxysmal event of an eruption is not necessarily weeks or months after the surface expression of an eruption. Of the 205 larger eruptions for which there are data, 45% had the paroxysmal event within the first day of the surface expression of an eruption; and half of those within the first hour. Volcanoes show premonitory unrest for a long time (usually two - 12 months), but there is often scant time for preparedness if there has been inadequate monitoring prior to the surface expression of eruption.

If compared to other natural or human made disasters on a global scale, volcanic and related hazards occur infrequently and affect fewer people.[1] However, in the period 1600-1899, more than 186,000 people died - an average of 620 per year; and in the period 1900-1986, there were 76,000 deaths - an average of 820 per year.

Worldwide, an estimated 360 million people - about 10% of the world's population - live on or near potentially dangerous volcanoes.[2] And as populations continue to increase, millions more are added to those at risk.

Seventy-five percent of the active volcanoes in the world encircle the Pacific in a great 30,000 mile horse-shoe: from Tierra del Fuego at the tip of South America, northward through the volcanoes of the Andes and Central America, the San Andreas Fault of California and the Cascade Mountains of America's northwest; westward through Alaska's Aleutian Islands and the Kamchatka Peninsula of the Soviet Union; and southward through the Islands of Japan, eastern China, the archipelagos of the Philippines and Indonesia to New Guinea and New Zealand.

The Ring is inhabited by millions of people, includes major food, mineral and industrial resources, and economic centers of trade and commerce. VDAP focuses its attention on the eastern perimeter of the Ring where an estimated 25 million people are at risk, directly or indirectly, from Villarrica in southern Chile, north to Colima in western Mexico, and eastward to the Caribbean and the high risk volcanoes of St. Kitts, Dominica and Martinique. VDAP's attention is on 66 of approximately 200 volcanoes in the area because of a recognized eruption recurrence interval or unrest in the recent past: Mexico (5), Guatemala (3), El Salvador (3), Nicaragua (8), Costa Rica (10), Caribbean (4), Colombia (8), Ecuador (7), Peru (8), and Chile (10). The absence of a volcano from the VDAP list does not assure a tranquil state; it could just as easily result from inadequate data or infrequent observation.

The following table lists the most dangerous volcanoes by name. VDAP is in the process of estimating people at risk, but preliminary data indicates that a minimum of 10.5 million people are directly at risk, in addition to potential economic losses.

---

[1] Tilling, Robert I., Volcanic Hazards, Short Course, New Mexico; American Geophysics Union, July 1989.

[2] Peterson, D.W., Volcanoes: Table 15.1, Active Tectonics, pp 231-246, Geophysics Study Committee, National Research Council, National Academy Press, Washington, D.C., 1986.

COUNTRY	HIGH RISK VOLCANOES	PEOPLE AT RISK
Mexico	Paricutin	Low
	Colima	100,000/city; 200,000/area
	Tacana	> 50,000/Mexico
	El Chichon	> 10,000
	Popocatapetl	Unknown
Guatemala	Tacana	> 50,000/Guatemala
	Fuego	Thousands
	Pacaya	> 10,000
	Santiaguito	Thousands
El Salvador	San Miguel	> 10,000
	Izalco	> 10,000
	San Salvador	1,000,000
Nicaragua	Telica	10,000
	San Cristobal	70,000
	Masaya	100,000
	Cerro Negro	Unknown
	Las Pilas	Unknown
	Concepcion	8,000
	Mombacho	30,000
	Cosiguina	> 100,000
Costa Rica	Rincon de la Vieja	~300
	Arenal	~900/hydroelectric
	Poas	30,000; ash could affect up to 1 million
	Irazu	30,000; ash could affect up to 1 million
	Turrialba	~5,000; ash could affect up to 1 million
	Platinar	3,000
	Orosi	~500
	Tenorio	~1,000
	Cacao	~500
Miravalles		~1,300; geothermal plant
St. Kitts	Liamuiga	> 22,000
Dominica	Micotin	~25,000
	Morne Patates	10,000-20,000
Martinique	Montagne Pelee	> 100,000
Colombia	Cumbal & Azufral	10,000-20,000
	Huila	400,000
	Dona Juana	10,000
	Purace	100,000
	Ruiz	> 50,000
	Tolima	> 150,000
	Galeras	~400,000

Ecuador	Pinchincha	- 5,000 (near field) > 1 million (Quito)
	Cotopaxi	> 150,000/economy
	Sangay	Low
	Cuicocha	~30,000
	Puluagua	~20,000
	Tungurdia	> 20,000; hydroelectric
	Revastador	Oil pipeline
Peru	El Misti	> 1 million:Arequipa
	Sabancaya	- 50,000/irrigation
	Coropuna	Thousands
	Huaynaputina	Unknown
	Ubinas	~55,000
	Chachani	1,000,000
	Pichu Pichu	1,000,000
	Soliniana	Unknown
Chile	Llaima	10,000
	Villarrica	10,000
	Guallatiri	Unknown
	Tupungatito	Thousands/Santiago & Medoza, Argentina
	Lonquimay	> 10,000/Chile/ & more Argentina
	Peteroa	Unknown
	Tolguaca	Unknown
	Lascar	Unknown
	Calbuco	Hydroelectric plant
	Osorno	Hydroelectric plant

It was because of Mount St. Helens, the biggest volcanic event in U.S. history, that the USGS upgraded the Cascade Volcano Observatory in 1981. A team was established to study St. Helens and between 1982-1984 ad hoc teams responded to requests for assistance to volcanic unrest in the Marianas (three times) and Papua New Guinea (two times). Approximately 20% of the equipment required for VDAP was purchased or developed during this time by the USGS. Additionally, the equipment and VDAP's present Project Chief were used to support training in Indonesia and Papua New Guinea under programs funded jointly by USGS and OFDA.

During 1985-1986 the equipment cache was increased to about 35% of required levels and an ad hoc team responded to a request from the Philippines to assist during the Mayon eruption. Another team developed and presented parts of UNESCO-funded courses for participants from the Philippines, Indonesia, Papua New Guinea and Costa Rica. Liaisons were established and maintained with volcanologists in these three countries and in New Zealand, Australia, Japan, Colombia, Chile, France, England, Germany and Italy. Priority was afforded Colombia because of the premonitory unrest and deaths and subsequent eruption at Nevado del Ruiz in 1985. In 1986 the formal VDAP and its VCAT component were established by the USGS with partial OFDA funding under the PASA.

PROJECT DESCRIPTION

Rationale

The scientific community has long known the potential risks posed by volcanic hazards - to life and economies adjacent to volcanoes, as well as potential regional and global impacts. But with infrequent volcanic eruptions in the lower 48 states and monetary constraints, U.S. policy did not give volcanic hazards elsewhere high priority. This changed with the St. Helens eruption in 1980 (which had been forecast in the 1970s), the foreseen 1985 eruption at Nevado del Ruiz in Colombia, and the eruptions of Krafla (Iceland), Soufriere (St. Vincent), Galunggung (Indonesia), El Chichon (Mexico), and Mayon (The Philippines). Each of those eruptions required services of scientific experts in volcanology to assist in response and mitigation efforts. U.S. assistance was requested by some countries. OFDA/USGS response was on an ad hoc basis and plagued by delays in identifying appropriate scientists, acquisition of appropriate equipment, administration and logistics.

Therefore, OFDA turned to the already established team at the USGS Cascade Observatory and, through the VDAP PASA, the VCAT team was supplemented by additional scientists for assistance to Latin America and the Caribbean. Amendment 1 of the PASA added funding specifically for Guatemala, and Amendment 2 modified the scope to include worldwide coverage for VCAT response subject to the availability of funds and personnel.

Most of the dangerous volcanoes are located in the developing world where technical and financial resources are inadequate to mitigate the hazards of eruptions. The priority afforded Latin America/Caribbean region was consistent with national interest and need -- there are no less than the 66 high-risk volcanoes listed above in the region which directly and indirectly could affect an estimated 25 million people.

Objectives and Components

This report describes VDAP's project components and their present status using the logical framework methodology. Briefly stated in narrative form, these are:

> Objective: to contribute to lowering disastrous consequences, in terms of human life and economic loss, of volcanic eruptions worldwide.
>
> Purpose: to establish sustained and self-sufficient facilities and programs to effectively cope with volcanic hazards.
>
> Outputs: an interagency volcano early warning disaster assistance program capable of providing rapid, efficient, appropriate and cost effective emergency technical response and assistance to actual or potential volcano crises.
>
> Inputs: co-funding by USGS and OFDA for five years, and USAID/Guatemala for two years; VCAT personnel; training; and equipment.

With respect to these components, there are two noteworthy factors. First, there have been changes to the project design. The original design included all of Central and South America and the Caribbean. In 1987 separate funding by USAID/Guatemala place the highest priority on the four major volcanoes in Guatemala. In 1988, the second year of implementation, in addition to Guatemala, priority was given to South America due to greater potential losses from mudflows from ice and snow-capped Andean volcanoes than risks from those of Central America and the Caribbean. And in 1988 the project's scope was expanded to apply VDAP capabilities worldwide. Second, the original design included "disaster management" as an output component. In December, 1986, memos from USGS to OFDA stated that VDAP had no disaster management capabilities and the component should be deleted.

The following table describes funding levels and status.

Original PIO/T	
Total 5 Year OFDA Funding Authorized:	1,174,000
Period 8/1/86 - 7/31/91	
5/30/86 PIO/T	277,000
Period funded: 8/86 - 9/87	
Amendment #1, 6/26/87 USAID/Guatemala	<337,940>
Period funded: 8/87 - 12/89	
Added Task 7: Guatemala	
Amendment #2, 4/88	250,000
Period funded: 10/87 - 9/88	
Added Task 8: Worldwide VCAT readiness	
Amendment #3, 5/89	200,000
Period funded: 10/88 - 9/89	
Subtotal OFDA Funding	727,000
Subtotal USAID/Guatemala Funding	337,940
TOTAL A.I.D. FUNDING TO 10/89	1,064,940
Balance OFDA Funding Authorized 10/89 - 7/91	447,000

The chart illustrates that the balance of funds authorized by OFDA are $223,500 per year for FYs 90 and 91. Because FY 89 funds were obligated in September, 1989 (end of the FY) and the project completion date is 7/31/91, it appears that the program is under-spending by at least one year.

Further, the Guatemala effort has received a non-funded extension to October, 1990, and may receive additional funding beyond 1990.

ANALYSIS OF EFFECTIVENESS

Planning and Project Design

Using the logical framework (see Annex A) as a methodology for analyzing the planning and project design, there is effective relationship between the input and output components. Whereas it appears that expenditures are behind schedule (see above), planned personnel and equipment levels have been achieved. Specific training workshops not identified in the project design, have been successfully implemented and there has been intensive on-going, on-the-job training, especially in the application and use of equipment.

However, the relationship between the output and purpose components has one significant flaw. The output component describes a program to provide "...emergency technical response to actual or potential volcano crises..." The purpose describes "...sustained and self-sufficient facilities and programs...in nations to effectively cope with their volcano hazards". VDAP's ability to provide emergency response does not lead to sustained or self-sufficient programs or facilities.

Although VDAP has successfully achieved its output as designed, there is no likelihood of purpose achievement. At the same time, Latin America's programs and facilities unquestionably have been and will continue to be enhanced; but not made self-sufficient and enduring.

Further, with Amendment 2 adding a worldwide scope, the output/purpose relationship is flawed for the same reason, and aggravated by limited personnel and funding resources. Present VCAT personnel and equipment would have difficulty providing even emergency response in other parts of the world and maintain their readiness and on-going program for Latin volcano hazards.

Resource Allocation

Resources of personnel and money for equipment purchases have been meticulously planned and allocated by VDAP to achieve the designed outputs within the limits of funding levels. There have been delays, however, in filling staff positions and acquiring equipment, which account for the under-expenditures noted above, but VDAP should rightfully take pride in VCAT's roster and equipment inventory.

There are striking inequities in the levels and distribution of VDAP funds in Latin America. Guatemala has been funded at roughly $170,000 per year as compared to $22,000 per year for each of the 11 other countries in Latin America and the Caribbean. Put another way, in gross terms, each of the four volcanoes in Guatemala have over $40,000 allocated; each of the other 62 volcanoes to which VDAP gives attention have less than $4,000. This is also true of east Asia: the Philippines and Indonesia. OFDA/USGS did provide assistance to these countries in the past, but VDAP has made no investments in either country. Hazards are endemic from high-risk volcanoes in both countries and the region.

VDAP's funding is short-term and crisis-oriented. As a single donor, OFDA's funds are inadequate funding for longer-term institution building and for the protection of previous investments. Two new observatories have been established in Colombia and Guatemala; assistance has been provided to Costa Rica and Ecuador's observatories; and training manuals have been introduced throughout the region. But on-going maintenance of achievements has not proceeded and there is deterioration of some accomplishments.

Meanwhile, many other donors are active in volcano work. The Swiss and Canadian governments (neither country has volcano threat), Japan, Sweden, France and Italy have funded volcano mitigation efforts in Latin America in excess of U.S. investments. Canada and Switzerland fund Colombia at $1 million/year and $3 million/three years respectively. Sweden provides $3.2 million/two years for Central America. A French, Italian, Swedish and Swiss consortium provides Guatemala with $2.3 million/three years.

Sustainability: Financial and Institutional

None of the national institutions supported by VDAP are sustainable without external personnel and funding resources. In fact, there is evidence of deterioration of past investments by VDAP in at least OVC. The issue of sustainability is directly linked to the design flaw described above. Building institutional and financial sustainability require more than the development of emergency response capability and longer periods of program implementation.

RECOMMENDED ACTION

- Review planned distribution of remaining VDAP funds to insure maximum coverage of at high risk volcanoes.

STRATEGIC IMPLICATIONS

- Short-term, crisis-oriented work needs to be supplemented by investments in institution building.
- Efforts to coordinate among the half dozen donors intensively involved in the volcano sector should be given high priority.

CASE STUDY 26

TRAINING

SUMMARY

Throughout the past decade, training has been central to OFDA's strategy of building the capacity of USAID-assisted countries to prepare for and manage disasters. Though not well documented, OFDA's extensive effort has resulted in thousands of participants trained, with efforts focussed on the Caribbean, Latin America, and Asia. Without question, OFDA-sponsored training has vastly improved the disaster management capabilities of numerous countries. The vast majority of training has been provided by grant-supported intermediaries including AIT/ADPC, Dade County, Partners of the Americas, PAHO, OAS, and PCDPPP (all of which were chosen for case studies).

In spite of the large numbers of participants trained, in general, this has been done in an _ad hoc_ manner. However, recently, OFDA's Regional Advisor in Costa Rica has made important progress toward creating a multi-year regional training plan. This effort in Costa Rica should be continued and refined and OFDA should create similar plans for other regions, particularly Africa. By creating plans to identify and then address training priorities, OFDA will improve its ability to build local disaster management capacities.

INTRODUCTION

The Training Case study presentation is divided into four parts: **Introduction, Findings, Summary, Recommended Actions, and Strategic Implications.**

In the development of the Training Case Study a series of key questions were posed as follows:

- How are training activities identified for funding by OFDA?
- Is there a strategy and master plan for training?
- What are the priority areas for training, and how are they determined?
- How are training activities monitored and evaluated by OFDA?

- Does OFDA have a list of participants?

- Is there a follow-up program for returned participants?

- What is the record for OFDA funded participants in terms of their performance in disaster management or the preparedness sector in their country?

- Are there any examples of a self-sustaining, in-country training capability in the disaster preparedness sector.

- What role do the USAIDs play in the training process for OFDA funded participants? Do they help in the identification of participants?

- Does any country have a long term institutional development program for the disaster management sector? Does OFDA encourage such an approach?

- Is training an integral component of all OFDA funded project activities?

- Where training has been a component in an OFDA funded project, what role has it played?

- What areas of training have been successful? What institutions implemented this training?

In search of answers to these questions, institutions in which training activities were an important dimension of OFDA's preparedness work were examined for the period FY1981 to FY1989. (See Findings.) These institutions include:

- Emergency Preparedness and Disaster Relief Coordination Program of the Pan American Health Organization

- Partners of the Americas: Emergency Preparedness Program

- Dade County

- Pan Caribbean Disaster Preparedness and Prevention Project

- Asian Technical Training Institute

- Indonesia - Disaster Management Center

- U.S. Forestry Service

- National Fire Protection Association

In addition to reviewing particular training programs mentioned above, the OFDA project management/monitoring system for training was examined as well as the training initiatives being promoted for the Latin American and Caribbean region by the OFDA Regional Advisor resident in Costa Rica.

Though it is impossible to place a total dollar value on the amount of training funded by OFDA since FY1981 or to determine the number of participants supported by OFDA, sufficient data is available to conclude that the training effort throughout this period represents a substantial undertaking.

Training activities include conferences, seminars, workshops, class room training, and on-the-job training activities. They are carried out in the U.S., regional institutional, host country and Third Country training environments.

OFDA's Training Mandate

The objective of OFDA in the preparedness realm, as stated in the FY1981 Congressional Presentation (CP), is to assist in developing an "Increased capability of foreign countries to prepare for, to prevent, and to respond to disasters." The training of indigenous personnel in both the private and public sectors in disaster preparedness related subjects has been one of the major undertakings of OFDA to address this objective.

FINDINGS

OFDA's Management of Training

Responsibility for the planning, implementation, and evaluation of the preparedness training activities is diffused throughout OFDA. Even when there was a full-time Training Officer, she operated through a staff officer responsible for providing general policy and guidance. Though the Training Officer's position is presently vacant and OFDA is in the process of recruiting a replacement, the management of a particular training activity undertaken by an institution funded by OFDA has usually been the responsibility of the officer most closely associated with the institution. The specific nature of the monitoring effort on the part of OFDA is a function of the nature of the agreement with the implementing institution. Hence a grant to the National Fire Protection Association would be managed in quite a different manner than a RSSA with the U.S. Forestry Service.

The OFDA record regarding who has actually been trained during the FY1981 through FY1989 period is incomplete. Though the development of a training data base was initiated in 1984, it has not been systematically maintained nor utilized. Thus, the utility of this data base is, in its present form, questionable. Formal procedures for its use do not exist, nor is there a system in place to insure the receipt of timely and standardized inputs from institutions performing training functions for OFDA.

Because of the inadequacy of the data base, OFDA is not in a position to assess the status of preparedness management and skills capability in any one country. This significantly limits OFDA's ability to develop a country specific plan for future training preparedness activities or to coordinate the efforts of institutions performing the training activities. The potential for duplication of effort in the preparedness training sector amongst institutions receiving support from OFDA, particularly in the Latin American and Caribbean region, is significant in the absence of a data base of participants that is shared with the training institutions and the countries receiving the training.

There does not appear to be a system in place to periodically review the training efforts supported by OFDA. The monitoring effort at best appears to be *ad hoc* in nature. Except for the PADCO evaluation of June 14, 1985 no formal evaluations appear to have been undertaken of training activities for the period FY1981 to FY1989 either as free standing training activities or as part of a larger undertaking.

In the Spring of 1985, as a part of the training evaluation exercise executed by PADCO, it appears that the Training Officer of OFDA attempted to assess USAID needs for participant training in the disaster management area. However, there is no evidence that this initial planning effort was sustained. At the USAID level there is little awareness of the training needs in the disaster preparedness area with the exception of those USAID's that may have experienced a dramatic disaster and therefore felt compelled to prepare for the next one. In those instances momentum may have carried through one performance evaluation cycle. Guidance to the USAIDs from OFDA relating to preparedness training has been infrequent and poorly packaged as seen in the "Training Compendium" developed by the OFDA Training Officer and sent to the USAIDs in 1988.

OFDA Training Initiatives in Latin America and the Caribbean Region

Under the leadership of the Regional OFDA Coordinator located in San Jose, Costa Rica, a series of training efforts are being designed to develop in-country institutional capability in disaster management over the long term. Previous training efforts that had been managed directly by OFDA were characterized by an *ad hoc* approach to curriculum development. There was no master plan or sense of direction, and the actual presentations were North American "owned and operated." Though the training efforts sponsored by OFDA in 1986 and 1987 represented a more professional approach to preparedness training, it was felt by OFDA's LAC regional leadership that these efforts had limited long-term usefulness.

Working with the U.S. Forestry Service, Paul Bell and his colleagues are in middle of a long term planning, analytical, and evaluative effort concerned with the development of training activities to be undertaken in the region. The essence of this effort is the building of skills relating to disaster management and the development of confidence in the leadership capacity of local and regional authorities to utilize these skills when disaster strikes. To date training activities have been executed in Costa Rica, Honduras, and Guatemala. It is important to point out that this seemingly important training initiative lacks a formal structure. The program direction and progress to date need to be documented in greater detail.

Institutions Performing Training Functions Funded by OFDA

Emergency Preparedness and Disaster Relief Coordination Program (EPP) of the Pan American Health Organization (PAHO):

Background: EPP as an operational entity started in 1977. OFDA has supported the EPP effort since 1981 with approximately $1.8 million of grant funds which account for approximately 20% of the operational budget of the EPP. The Canadian International Development Agency (CIDA) is the other major donor supporting EPP.

Training Mandate: The objective of OFDA support for EPP is to support PAHO in its effort establishing "a disaster unit with instructions to define the policy of the Organization, to formulate a plan of action for the various types of disasters, to make an inventory of human and other resources available, to train the necessary personnel, to prepare and disseminate the appropriate guidelines and manuals, to promote operational studies to meet the needs of the countries in disaster situations, and to ensure that this unit establishes effective coordination with the United Nations Disaster Relief Coordinator, the International Red Cross, and other international bodies providing disaster assistance." (Analysis of PAHO's Emergency Preparedness and Disaster Relief Coordination Program, Executive Committee of the Directing Council, March 14, 1989, p.2) To achieve these objectives EPP has undertaken a series of training activities primarily in the health sector.

Planning and Management Capability: Training activities designed to strengthen the human resource base in each country, primarily in the health sector are selected after a careful review by PAHO of the country's needs and PAHO's ability to address those needs. This analysis is reflected in the annual plan that PAHO prepares for each country that identifies the specific activities to be undertaken by EPP to address agreed upon objectives. Key individuals in the disaster preparedness sector are identified in each country and an updated list is periodically published and disseminated by EPP.

PAHO staff, short term consultants, and temporary advisors from host countries, implement training activities.

It appears that both the planning and implementing of the training activities is undertaken in a highly satisfactory manner.

Training Activities: EPP has concluded that the best strategy for developing human resources is on-the-job training and exposure to a broad range of actual problems. The technical content of the training focuses on the general health management of disasters and more specialized areas including the vulnerability of water supply, hospital disaster preparedness, and chemical accidents. The following is illustrative of the type of training supported by EPP:

- General Public Health Emergency Management: Workshops of up to five days are periodically repeated to develop a multi-disciplinary

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critical mass of trained professionals at the regional level. A typical workshop agenda includes types of disasters, their expected health effects, an overview of health management issues, and national and international coordination. This manner of training has reached an estimated 20,000 persons during the past 10 years. EPP's support is for technical materials and sharing local costs.

- Mass Casualty Management: In 1988, 35 courses were organized by EPP to improve skills in the management of mass casualties.

- Environmental Health: At least 15 specialized training activities were held in 1988 on urban water supply systems at PAHO Headquarters and in the field. Training materials, including several publications, have been developed on vector control following natural disasters.

- Chemical Accidents: The training is concerned with the management of multi-disciplinary teams to plan, mobilize, and coordinate responses to chemical accidents. Toxicological and epidemiological aspects are the concern of the Pan American Ecological Center located in Toluca, Mexico. Four national workshops were organized dealing with this material in 1988.

- Mental Health Following Disasters: Workshops dealing with the primary health care approach to mental health in the aftermath of disasters have been held in the Andean Region and other disaster prone countries.

Country Situation: USAIDs appear to have only minimal knowledge of EPP training efforts in the disaster preparedness area. PAHO field based personnel were extremely knowledgeable of country specific EPP efforts. There appeared to be a very strong relationship between what EPP reported regarding the development of field capacity in the health sector and what had actually taken place.

OFDA Relationship: OFDA appears to monitor this grant from a distance. OFDA has not undertaken a formal evaluation of the EPP activities.

Conclusions: After a slow start during its first six years, EPP has made excellent progress in implementing training activities concerned with disaster preparedness in most PAHO member countries. The leadership of the EPP office is excellent. EPP activities are well documented, and its list of publications in the health field dealing with disaster preparedness is impressive.

Recommendations: OFDA should explore ways with EPP to strengthen training activities concerned with technological and chemical disasters in anticipation of an increasing number of disasters in these areas. Currently PAHO does not have all the human resources with the appropriate skills to design and execute training activities in this area.

Partners of the Americas, Emergency Preparedness Program (EPP)

Background: The EPP began with an OFDA grant in 1984. Since then the EPP has received a second grant from OFDA making their total contribution to the program, between March 1884 and February 1990, in excess of $1.8 million. A third grant has recently been submitted to OFDA requesting that the program be continued for an additional three years. The project was designed to draw upon U.S. expertise in the fields of disaster preparedness and response. Individuals with the requisite skills provide volunteer expert technical assistance to their counterparts in Latin America and the Caribbean. In Washington, D.C. a full time disaster professional and a full time assistant were hired to manage the program.

Training Mandate: The purpose of the EPP is to expand and improve community-based programs of disaster intervention, preparedness, and emergency management in the 27 countries of Latin America and the Caribbean which are served by the Partners of the Americas. Specifically this is to be done by establishing direct professional and institutional linkages between Latin American and Caribbean countries and with states, counties, and municipalities in 43 U.S. "Partner" states to provide volunteer technical expertise.

Providing volunteer technical expertise is often, but not exclusively, provided through a training forum. Many of the EPP activities include workshops, exchanges with partner countries, and attending conferences and meetings.

Planning and Management Capability: Each of the 31 Partnerships in Latin America and the Caribbean have established an EPP subcommittee. Each EPP subcommittee has a counterpart subcommittee in their U.S. partner region, and all subcommittees have elected chairpersons. These chairpersons are responsible for identifying, planning, and executing emergency preparedness and prevention activities. All activities must be coordinated between, and approved by, both EPP subcommittee chairpersons.

The EPP subcommittees are managed entirely by volunteers. Administrative support may be available to these subcommittees through the local partnership organization, but this varies among partnerships depending upon the level of external assistance received through programs other then the EPP. Some Partnerships have permanent offices others do not. Direct program support is available through travel grants and small project grants administered and approved by the EPP Director in Washington, D.C. Only one travel grant may be received per EPP activity. Those traveling are expected to stay in housing provided by the host partnership (or pay for their own hotel), may not stay for less then ten days, and receive only $100 for total expenses incurred during a visit of ten days. Small grants may not exceed $5,000 and approximately six are dispersed per year within the entire EPP program.

Training Activities: Training activities are selected for a particular country by EPP subcommittee for that country. The following is illustrative of the type of training supported by the EPP program:

Jamaica:

Human Resource Development Activities:

- Sent one member to a course of toxic accidents in New York. This person later conducted training in Jamaica for chemical companies.
- Trained first responders in first aid.
- Conducted training in fire safety, training of trainers, and first aid for medical emergency community.
- Provided training to the Ministry of Health.
- Sent the former director of the Jamaican Office of Disaster Preparedness (OPD) to an earthquake hazards management course in New York. He later wrote articles on the subject for Jamaican newspapers.
- Two participants have been sent to FEMA courses in Emmitsburg, MD.

Public Awareness Activities:

- A New York Partners member from the Children's Television Workshop conducted a training activity for representatives of the Jamaica public television in developing fire safety programs for children. (No follow-up activity occurred.)
- Sent current OPD director to Washington to attend a meeting on "selling disaster preparedness". This led to the director conducting broadcasts on Jamaican public radio and placing articles in the newspapers concerning disaster preparedness.
- New York emergency preparedness experts came to Jamaica to review fire safety issues and promoted the use and awareness of smoke detectors through the private sector concentrating on insurance companies.
- Currently planning to produce a video on fire safety issues that will be shown on local television (seeking funding from Jamaica private sector including Shell and Esso).

Dominican Republic: Training activities to date have been in the areas of CPR, Basic Trauma Life Support, and Advanced Cardiac Life Support. There is a clear intention to achieve a multiplier effect with these training activities, and this approach seems to be meeting with success.

Country Relationship: Local USAIDs knowledge of the EPP activities was minimal in countries where OFDA staff were not resident. In the

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Dominican Republic, the MDRO was not aware that OFDA was contributing funding to the EPP.

OFDA Relationship: OFDA has not closely monitored this grant and, to a large degree, seems to be unaware of its actual accomplishments and shortcomings.

Conclusions: The level of effort and the quality of performance varies significantly among EPP subcommittees. The less efficient subcommittees are victims of their own poor planning and inconsistent levels of interest among subcommittee members and chairpersons. Because of this some countries are involved in numerous training activities while others are not involved in any.

However, the program offers the potential to achieve well beyond the level of effort contributed by OFDA. EPP subcommittees, once organized and managed by sound leaders, are capable of accomplishments well beyond what would be possible using the financial support provided by OFDA.

Recommendations: Specific training activities need to be identified and consolidated into a training plan for each partnership where an EPP subcommittee exists. In addition, records should be kept which clearly document what training has been conducted and who has received training.

Dade County

Background: Since 1972 the Dade County Fire Department has been involved in training as well as search and rescue operations in Latin America and the Caribbean. Prior to funding the Dade County effort, OFDA received numerous requests from Latin American and Caribbean countries for technical assistance, training and general emergency management assistance. There were also requests for assistance from Dade county specialists through private and voluntary organizations. OFDA began supporting Dade County Fire Department training in 1985.

Training Mandate: The objective of OFDA support for Dade County is to: "continue the training and development of emergency managers and first responders throughout the Caribbean and Latin America,review existing Dade County emergency management training programs and provide lists of such programs for international participants...Specialized training can be developed as well as on the job training,...identify and train a structural collapse rescue team which will be available on short notice to be dispatched overseas to the scene of a disaster requiring search and rescue capabilities". To achieve these objectives Dade county has undertaken training in disaster preparedness for airports, hazardous materials fire emergencies, and search of rescue.

Planning and Management Capability: The project began on a rather loosely administered basis. There were very few records for the beginning years. Currently financial records are up-to date and reports are now regularly filed. Early assessments of various countries emergency needs were carried out in Costa Rica, Ecuador, Haiti, Honduras, Guatemala, Peru, Venezuela, Jamaica, Antigua, and Trinidad. Additional discussions have been held with officials from Peru, Venezuela, Jamaica, Honduras, Dominican Republic, and Chile regarding future training needs. Presently the system is that a USAID will request OFDA to have Dade County implement a training activity. There are more requests for Dade County training than funds available to support training. Past training activities do not seem to be well documented as to specific training curriculum used.

Future training plans involve a 2-1/2 year training program for first responders which would last two weeks every quarter. Topics to be covered would be hazardous materials, tactics and strategy, explosives and explosions, electricity, heavy rescue and extrication, disaster and mass casualty incident management, industrial fire hazards, nuclear incidents, oil and gas fires, fire prevention, media relations, stress management, public education, fire and arson investigation, high rise building fire fighting, shipboard fire fighting, in service training, advanced first aid and rescue from land and air vehicles.

Training Activities: Dade County believes that training is much better done in country than in the U.S. with a few exceptions. Some training was done in Miami at the fire academy of Miami Dade Community College for disaster planning. Dade County feels that using the local materials and equipment is much more effective. The training is generally for first responders to disasters--usually civil defense and fire fighting personnel.

Between 1985 and 1988 13 training seminars were conducted in Peru, Costa Rica, Ecuador, Venezuela, Dominican Republic, Haiti, Antigua and Trinidad. Participants attending these seminars totaled over a thousand people. Courses were adaptations of the Dade County fire fighters training program as well as search and rescue.

The following is illustrative of the type of training given by Dade County:

- Search and Rescue: Workshops between one and three weeks duration covered rescue equipment and techniques, rescue from hazardous material, search and rescue in confined spaces, rescue from burning structures, extrication from crashed vehicles;

- Hazard Materials and Disaster Control: Includes respiratory protection, managing hazardous gases, liquids and chemicals, handling nuclear radiation incidents and bomb threats.

- Fire Seminar: Subjects include portable extinguisher, ropes and knots, rescue, fire fighting safety, communication, fire cause and determination, fire or emergency service instructor, aircraft fire protection and rescue procedures, fire service practice for volunteers and small communities.

Country Situation: The AID/MDRO in the Dominican Republic felt that the training given by the Dade County team for airport emergency

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preparedness went far beyond what was expected, and was pleased with the quality of training.

OFDA Relationship: OFDA encouraged the selection of a new coordinator this year. The new coordinator sends in quarterly reports. OFDA approves and or selects the countries for training. There has been no formal evaluation of the project.

Conclusions: The program coordinator for Dade County is directing a well organized training program. Record keeping appears satisfactory as are communications with OFDA. The current emphasis appears to be more on readiness to operationally assist other countries rather than training for personnel in these countries.

Recommendations:

- OFDA should play a coordinating role in the training given by Dade county to avoid a duplication of training activities offered by other institutions.

- OFDA together with Dade County, should develop a greater sense of priorities for Dade County involvement.

- More emphasis by Dade County should be placed in continuing to help other countries become knowledgeable in disaster preparedness. Dade County has teams of bilingual trainers who should continue to train host country personnel in fire and other disaster preparedness activities including search and rescue.

Pan Caribbean Disaster Preparedness and Prevention Project (PCDPPP)

Background: PCDPPP was designed to improve the status of disaster preparedness and prevention in the Caribbean region "through an inter-agency multi-sectoral project aimed at promoting disaster management and loss reduction initiatives." PCDPPP became operational in 1981 following a 1979 OFDA sponsored meeting in St. Lucia which was attended by approximately 100 participants involved with disaster preparedness in the Caribbean. Between 1981 and 1986 OFDA provided between a third and half of the project's operating expenses, making their total contribution approximately $2,203,995. Other donors to the project included the EEC, CIDA, and UNDRO. Various contributions have also been made by the participating countries. Since 1986 the project has functioned without OFDA funding and is now scheduled to be terminated in Dec. 1990.

Planning and Management Capability: The needs of the region and activities of the PCDPPP are determined at a yearly meeting of the project's disaster coordinators. The meeting is attended by donor agencies, PCDPPP staff, and a rotating representation of the participating governments. After priority activities are agreed upon the available funding is allocated to the identified activities. A fixed amount is appropriated for each identified activity. Member countries may submit requests for technical assistance, training, and equipment purchases to the project's Antigua office for consideration. Projects may be also identified during site visits by PCDPPP's staff.

Currently, training activities are identified in a satisfactory and systematic process. This process allows significant contribution by the countries that are to be the recipients of the training activity. No formal mechanism now exists for the PCDPPP to influence OFDA in its decisions regarding Caribbean activities.

Training Activities: The following is illustrative of the type of training supported by the EPP program:

- Comprehensive Emergency Management Training
- Training of Local Emergency Radio Operators
- Training Workshop for Community Coordinators
- Construction Industry Workshop
- Oil Pollution Simulation Exercise
- Hazardous Chemical Spills Workshop
- Search and Rescue Workshop
- Mass Casualty Planning Workshop

A 1985 evaluation of PCDPPP stated: ". . . since the project's inception in 1981 approximately 147 discreet assistance activities have been performed. These activities essentially fall into four categories: technical assistance; training of nationals; surveys and assessments; and preparation of training materials. Of these categories, training and technical assistance are by far the most prevalent of PCDPPP activities. However, because of severe data limitations, it is difficult to estimate the amount of services delivered -- even in terms of the number of technical assistance days provided, for example. Similarly, available estimates of the number of participant trainees is also limited. The project director, Franklin McDonald estimated this number to be 2,000 as of 1989.

Country Relationship: It does not appear that USAIDs in the Caribbean region are knowledgeable of PCDPPP training activities.

OFDA Relationship: Since OFDA discontinued funding the project in 1986, they do not have direct input into the management of the PCDPPP. Nevertheless, OFDA does continue to support, coordinate and communicate with the project director on a routine basis.

Conclusions: The project has contributed to an increased state of disaster preparedness in the Caribbean, and to a large extent this has been the result of its training activities.

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Recommendations: OFDA should consider leading an exercise to determine what the training requirements are for the Caribbean Region and assist in developing a plan to systematically address those needs. This effort should be closely coordinated and supportive of PCDPPP programs.

Asian Institute of Technology/Regional Disaster Preparedness Center (ADPC)

The work of the ADPC, and OFDA's support for it, is described in more detail in Case Study No. 21.

Background: The Asian Disaster Preparedness Center (ADPC) is a part of the Asian Institute of Technology (AIT), an autonomous, international post-graduate technological institute located in the outskirts of Bangkok, Thailand. The ADPC provides training courses for the entire Asia and Pacific region, with emphasis on the larger countries of Asia. Started in 1986 with a core support grant from OFDA that has grown to $760,000, and attracting a comparable level of funding from other donors, the ADPC has made good progress toward long-term institutional and financial sustainability . Many of the 307 alumni of the ADPC courses have subsequently conducted their own disaster management training courses, multiplying many-fold the impact of the Center.

Training Mandate: Training is the most important of three areas of ADPC concentration. The other two areas are information management and a range of technical and engineering issues.

Training. (1) Disaster Management Courses
(2) Specialized training
(3) Support to national programs funded by host governments, with a small "profit" to ADPC

The ADPC disaster management courses cover virtually all of the important types of disaster phenomena in Asia: cyclones, earthquakes, floods, drought, famine, refugee emergencies, environmental degradation, industrial accidents, and civil conflict. This list includes both sudden-onset elemental events and slow-onset "man-made" disasters. The ADPC is unique in the region; probably the only comparable organization is the Australian Counter-Disaster College (ACDC) at Macedon, Australia.

ADPC is seeking to create a cadre which will form the nucleus of a national team. This worked very well in Vietnam, where AIT alumni have trained 129 officials in three courses within five months of their own training at ADPC. There is a hiatus in Sri Lanka. In the Philippines, there have been workshops organized by alumni.

Planning and Management Capability: The training courses are organized and conducted by a core ADPC staff of trainers supplemented with eminent Resource Persons from Asia, Europe and North America.

Training Activities: The ADPC moved rapidly to start its training program, the core of which is its Disaster Management Course (DMC) that emphasizes a multidisciplinary approach, disaster simulation exercises, and interaction among participants. Two DMCs were held in the first year, and eight had been

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conducted by the end of 1989, the fourth year. ADPC has developed and conducted specialized courses, including "Improving Cyclone Warning Response," "Refugee Camp Management," and "Emergency Assistance Programs." ADPC has also organized training programs in selected countries: Storm Preparedness in Vietnam, a workshop on disaster preparedness and response in Sri Lanka, and seismic hazards mitigation in Philippines.

A total of 307 people had graduated from ADPC courses in the first four years, and many of them were themselves master trainers who organized disaster management courses in their own countries or in their own fields of specialty.

Country Situation: It would be expected that there would be considerable variation in the specific situations of individual countries in a region stretching from Afghanistan to the South Pacific and from Sri Lanka to the People's Republic of China. All of the large USAID missions are apparently knowledgeable about the Center, and AID- or USAID- funded students have come from Bangladesh, India, Sri Lanka, Malaysia, Philippines, Singapore, Indonesia, Thailand, Papua New Guinea, Fiji, and Vanuatu.

OFDA Relationship: OFDA has monitored its grant series carefully, and the ADPC has been conscientious about keeping its major donor informed of its activities and plans. In 1987, OFDA contracted Dr. K. Thirumalai of the Science and Technology Institute, Inc. to recommend steps to enhance the ADPC program. His recommendations, given in an August 1987 report, were considered useful by ADPC management, which has nevertheless not been able to implement all of them, primarily for cost considerations.

Conclusions: The ADPC has succeeded in attracting high calibre people to its courses and motivating them highly to multiply its effects.

Recommendations: OFDA should continue to provide core financing of the ADPC in accordance with past discussions and informal understandings. This would involve grants of approximately $125,000 for FY 1991, $100,000 for FY 1992, and continued, but declining, core support thereafter.

Indonesia Disaster Management Center (IDMC)

Background: The Indonesia Disaster Management Center (IDMC) is a facility located in Jakarta and operated by the Department of Social Affairs of the GOI. The main center building consists of an auditorium, several small rooms suitable for training, a few offices, a library, and a radio room. Dormitories for out-of-town trainees are located on the compound. The Center was established in 1986 to provide office space for personnel associated with a just-started UNDP/OFDA project entitled Strengthening Disaster Preparedness and Disaster Management in Indonesia. That project, which ended in 1989, required active cooperation among five major ministries. The Center was initially intended as a specialized common ground where personnel from the various ministries could meet on neutral territory; it was not intended to become an institution with a strong separate identity. However, this has happened to such an extent that the project quickly became known as "the IDMC project."

Training Mandate: The UNDP/OFDA project had five immediate objectives, the first of which involved training:

> To improve the disaster management capabilities of key inter-departmental staff in Indonesia's natural disaster emergency organization... at the national, provincial and regency levels by means of an integrated disaster management training program...;

Planning and Management Capability: As Indonesia has moved toward the forefront of Asian countries in disaster preparedness and management, a key issue has been how to integrate and coordinate the plans and activities of individual ministries and departments. The IDMC has not attempted to supplant the planning and management responsibilities of line and staff ministries but rather to bring senior staff members together to work out definitions of resources and procedures. Training programs were developed on the basis of these.

Training Activities: Output 1 of the UNDP/OFDA project, an integrated disaster management training syllabus and a program of instruction on cross-sectoral disaster management, was achieved through training for 371 people.

At the national level, there were 38 graduates of one course, including participants from all concerned departments and NGO members of the National Coordinating Board for Natural Disaster Relief (BAKORNAS PBA).

At the provincial level (there are 27 provinces in Indonesia), for disaster management core staff there were 78 graduates of two courses, including participants from all concerned members of the Provincial Board for Natural Disaster Relief (SATKORLAK).

At the regency (there are 450 regencies in Indonesia) and municipal level, there were 255 graduates of eight courses.

Country Situation: Indonesia experiences a large number of natural disasters. Simultaneously with this project, OFDA was funding assistance to Indonesia in volcano monitoring (Case 9) and funding two regional projects in which Indonesia was participating: Earthquake Hazard Mitigation/SEASEE (Case 20) and the AIT/ADPC (Case 21).

OFDA Relationship: Relations are very good among the parties in this project-OFDA, USAID/Jakarta, UNDP, UNDRO, and the GOI. The OFDA Project Officer and the USAID Jakarta MDRO both provided active management oversight and attended the annual Tripartite Reviews.

Conclusions: An independent international evaluation team found in 1989 that the IDMC had developed a well-structured, far-reaching training program which encompasses all echelons. Self-reliance and community participation were enhanced. Of the five project objectives, training proved to be the most successful.

Recommendations: The intention of OFDA to continue financial support for a second phase of this project is endorsed. Further training, especially in the provinces, is needed. The second phase project should set up a firm education and training program that would be used by sub-districts and villages.

<u>United States Forest Service (USFS): Disaster Assistance Support Program (DASP)</u>

Background: Prior to 1985, OFDA funded activities with the United States Forest Service (USFS) on a case by case basis. In 1985, OFDA awarded a Resources Support Services Agreement (RSSA) to USDA's Office of International Cooperation and Development (OICD) to contract for USFS's expertise in agriculture disaster assistance. This agreement led to the establishment of a natural resources-related Disaster Assistance Support Program (DASP) within USFS's International Forestry Staff. To date, total obligated funds through March 31, 1990 to DASP has been $3,258,664.

Training Mandate: The objective of OFDA support for USFS is to initiate and backstop a disaster assistance program in fields which USFS has a preeminent expertise such as wildfire fighting, flooding, landslide hazard analysis, and locust control efforts. The agreement "supports activities which have been requested by, or anticipated from, participating disaster-prone countries. The activity will be primarily technical assistance, but will also include organizing special technical workshops and training." Program objectives include the following:

- Provide support in prevention, preparedness, and operations planning for natural resources-related disasters.

- Strengthen disaster planning and training for OFDA, USAIDs, and host countries.

- Provide OFDA with the capability to identify and access natural disaster-related technical experts and disaster management specialists.

- Assist in the planning and coordination of workshops, conferences, and publications that promote effective disaster prevention, disaster preparedness, and disaster management.

- Augment the disaster relief efforts of OFDA, USAID missions, and host countries with technical experts and disaster management specialists on a short-term basis.

To achieve these objectives, DASP has undertaken a series of training activities primarily in management of wildfire and other natural disasters.

Planning and Management Capability: USFS's training activities, designed to improve the preparedness and response of organizations to natural disasters, are identified in planning meetings between key staff members within OFDA's Operations Division and USFS. USFS maintains an office at OFDA in which two staff members work full time. While training activities are generally identified by OFDA, occasionally

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USAIDs also ask for assistance, and an Annual Workplan is developed by USFS and submitted to OFDA for approval. The Annual Workplan is periodically amended to reflect new or priority activities. Periodic reports on the status of USFS activities are submitted every two to three months to all managers at OFDA, AID bureaus and OICD.

Project activities are accomplished by DASP staff and other specialists who are recruited for short-term assignments in the United States and overseas. In addition to Forest Service personnel, other agencies, consultants, and private individuals with disaster management experience may also be recruited for assignments.

It appears that although the planning of activities seems to be done on a somewhat ad hoc basis, USFS undertakes the implementation of the training activities in a highly satisfactory manner as reflected in participant evaluations and trip reports.

Training Activities: DASP has concluded that the best strategy for developing disaster management capabilities is on-the-job training, train-the-trainer seminars, and disaster simulations. The technical content of the training is on the general operational management of disasters (coordination and management of disaster relief efforts) and more specialized areas including wildfire suppression, water purification and flood mitigation. USFS has also maintained a roster of 2500 technical experts by country and by training area to assist OFDA in emergency management. The following is illustrative of the type of training carried out by DASP:

- Wildfire Suppression: This course has been offered since 1983 and has been conducted in Argentina, Chile, Mexico, Venezuela, Ghana, and Indonesia as well as in the United Sates training over 200 participants. The course is designed to teach basic fire suppression skills and improve self-reliance through "train-the-trainer" seminars. As a follow-up to classroom activities, fire service personnel from other countries are integrated in on-the-job training assignments with U.S. crews. Mexico has trained over 1600 participants following the train-the-trainer course.

- Operations Management: This course was designed and developed for worldwide participants and uses emergency management principles, case examples, and simulations to improve the management of disaster relief efforts. Participants include U.S. managers and host country counterparts, and international donors.

- Instructor Training: Designed to improve instructional skills, this course is conducted for individuals at OFDA who have training responsibilities.

- Locust Operational Guidance: Designed a book on how to control locust infestations and conducted two workshops in Senegal.

Country Situation: The USAID knowledge of USFS training efforts appears to be good particularly in Latin America where there are Regional Advisors.

OFDA Relationship: Although an evaluation was scheduled to be implemented in the third year of the RSSA, it has not yet been done. It appears that because the training activities undertaken by USFS have been generally successful, OFDA does not attempt to exercise great control over the content of the courses. Participant evaluations are conducted at the conclusion of each training activity, and comprehensive trip reports are written by the implementing organization. However, these reports don't appear to have great influence on subsequent funding by OFDA. As one USFS spokesperson remarked, "OFDA feedback on the training activities is generally subtle."

Conclusions: USFS's training activities are of excellent quality.

Recommendations:

- An evaluation should be conducted to ensure that training activities are having the desired effect on host-country preparedness and self-reliance.

- A closer monitoring of reports and data analysis should become a priority to ensure that training needs are being met and an overall training strategy formulated to ensure that no duplication exists between USFS, NFPA and Dade County.

- USAIDs should be made more aware of USFS training activities so that opportunities can be taken advantage of.

- With the Forest Service's expanded authority from Congress, USFS should be able to augment and compliment AID programs in the future. USFS sees a need for developing inter-agency disaster management systems and would like to expand indigenous national disaster response capabilities for all kinds of disasters. They envision training mid-level disaster managers that can handle managing disasters as well as having the capability of linking into other international actors and disaster systems. These options should be reviewed at the policy formulation level of OFDA.

National Fire Protection Association (NFPA)

Background: The National Fire Protection Agency (NFPA) as an operational entity started in 1896. OFDA's cost-sharing grant with the NFPA started July 1, 1984 on a 35% NFPA and 65% OFDA basis and in 1986 went to 25% NFPA and 75% OFDA. OFDA's share of total obligated funds to date through November 30, 1989 is approximately $624,000 while NFPA's share to date has been $156,000. NFPA is an association with 53,000 members world-wide including firemen, fire chiefs, commercial builders, and government officials. NFPA trains approximately 5,000 to 10,000 participants annually of which OFDA's portion is 500 to 1,000 per year.

Training Mandate: The objective of OFDA's grant to the NFPA is to provide fire prevention information, technical assistance, and fire-related emergency response expertise to disaster-prone countries. The training portion of NFPA's grant is to provide technical assistance in developing countries through workshops, seminars, and conferences dealing with fire preparedness, disaster mitigation, and fire protection codes and standards. NFPA assistance may be provided in conjunction with leading Latin American fire protection associations. NFPA also administers technical training programs for international visitors in the U.S.

Planning and Management Capability: NFPA utilizes its world-wide contacts to assist OFDA in its efforts to coordinate with local government agencies in fire and related disaster mitigation programs. In addition to its affiliate office in Latin America, NFPA has located a senior training manager in Singapore to liaise with NFPA members and to provide OFDA with a resource person for response to emergencies, technical assistance and training.

Training activities to strengthen technical capacities in fire safety and prevention in disaster-prone countries are identified in two ways:

- NFPA members in developing countries may appeal directly to NFPA/Washington for assistance and are then recommended as an activity to OFDA under their cost-sharing grant.

- OFDA requests NFPA's assistance in activities identified internally or through USAIDs.

At the time of grant renewal, a proposal is submitted by NFPA outlining a scope of work for the period to be covered by the grant. Grant proposals have been submitted approximately every 12 to 24 months. Short reports are written at the conclusion of each training activity. In an attempt to collect data on the magnitude of NFPA's training effort, it was clear that no systematic method was in place to determine the number of people trained by country or the number of training seminars carried out by NFPA. The NFPA spokesperson indicated that reports were sent to OFDA, and it was assumed that it was OFDA's responsibility to keep accurate records.

NFPA staff, short term consultants, and temporary advisors from host countries conduct the training activities.

Training Activities: In the early years, 1984 and 1985, fire training courses were held in the U.S. for participants from developing countries. These courses were primarily to familiarize participants with state-of-the-art technology in fire suppression. While these courses were for the most part popular, NFPA found that they were not cost-effective because of the costs involved in bringing participants from all over the world to the United States. In addition, because the groups were not homogenous, training was difficult to target. Therefore, in 1986 NFPA and OFDA began to carry out training seminars overseas, and efforts were made to adapt training materials to individual country settings. NFPA now concentrates on this kind of an in-country training program. The following is illustrative of NFPA's fire safety and preparedness courses:

- **Fire Management Training:** Training workshops average 3-5 days or may include several seminars over a period of months. A typical workshop agenda includes: in-country preliminary training and development of rescue and recovery procedures; special equipment and procedural training. All participating fire service organizations are invited to train with a National Fire Service in the U.S.

- **Fire Safety:** The program includes technical seminars on subjects such as fire safe building design, industrial fire safety, fire department organization and management, risk management, case studies, standards for fire protection, and operation of fire services during disasters.

Country Situation: USAID knowledge of NFPA training courses appears minimal. At the beginning of the grant with NFPA, the USAIDs were sent a cable advising them of NFPA's capabilities in training. However, it appears that there is a lack of awareness and lack of interest on the part of USAIDs to take part in NFPA's preparedness agenda except to occasionally nominate local participants for conferences held by NFPA in the U.S.

OFDA Relationship: OFDA appears to monitor this grant from a distance. There is little evidence that trip reports are read by OFDA or that recommendations from NFPA are taken into account and responded to in terms of follow-up for long term training activities. In addition, there appears to be a lack of understanding between OFDA and NFPA on the overall third-country training objectives. According to the Project Officer at NFPA, OFDA takes a short term, shotgun approach responding to immediate training requests while NFPA often recommends more follow-through activities.

Recommendations:

- A better communications channel needs to be established between NFPA and OFDA and in turn the USAIDs on follow-through recommendations made by NFPA to reconcile the differences regarding training objectives. There should be someone at OFDA who reviews the evaluations and reports prepared by NFPA.

- A system should be established to insure that there is no duplication of training with Dade County and the USFS. Apparently USFS is mostly concerned with wild land fires while NFPA and Dade County capabilities are in urban fires.

- With urban population increases in developing countries there is an increasing potential for fire disasters. Long term strategies in fire prevention and preparedness should become a priority within OFDA's future training programs with NFPA.

SUMMARY

The magnitude of training funded by OFDA is considerable. Significant training activities have been undertaken in the LAC and ANE Regions. Though there has been training activities conducted for the AFR Region, these efforts have been modest.

In practically every development preparedness intervention funded by OFDA, training had the potential for playing a significant role though the magnitude of resources allocated may have been small. In every project examined, project personnel recognized the importance of training as an important dimension in their project.

In-Country Institutional Capacity

Explicit in the documentation concerned with providing a rationale for preparedness activities supported by OFDA is the support for training activities designed to promote an in-country institutional capacity to address the proper management of disasters. It is generally acknowledged in OFDA that training is the vehicle to develop indigenous personnel to constitute the institutional fabric to manage disasters and mitigate their effects. However, planning and monitoring is not sufficient to allow this institutional effort to move forward with precision or efficiency. Country plans do not exist, neither OFDA or its agents know what the status of training is for any one country, nor do countries have plans to support a successful effort that would result in the creation of a permanent in-country capability in terms of indigenous personnel capable of performing disaster management.

Lack of Planning System

Though in general terms the objectives of OFDA have been periodically stated in a variety of formats and the thrust of the training activities undertaken support OFDA's objectives, the system of identification, planning, implementation, and evaluation of training activities by OFDA has been *ad hoc*.

Some of the individual contractors/institutions have developed well defined training programs grounded on carefully articulated objectives. However, many institutions receiving OFDA support are executing training activities without first establishing program objectives. A lack of objectives means that some institutions funded by OFDA are not effectively identifying and planning training activities.

Lack of Planning Capability by OFDA Supported Institutions

In many instances the institutions undertaking the training do not have a mechanism or system to adequately assess the training requirements for a particular country which is reflected in marginal training being undertaken.

Lack of Evaluation System

In most cases the curriculum of the training to be undertaken, the target population, training materials to be used, and cost effective training methodologies were all concerns that the training institutions selected by OFDA were addressing with a reasonable degree of concern. However, OFDA had no systematic way to evaluate performance of the training institutions with regards to these critical areas.

RECOMMENDED ACTIONS

- Improve the participant training data base by designing and requiring standard reporting procedures.
- All project activity design documents should identify training requirements as a specific concern.
- Identify regional training needs and develop plans to address those needs.
- Develop a system to monitor training activities.
- Require periodic formal evaluations of training activities conducted by OFDA-funded intermediaries.

STRATEGIC IMPLICATIONS

- The absence of training in Africa, juxtaposed against the continent's consistently large annual absorption of OFDA relief obligations, indicates a critical need to develop an extensive plan for African human resource development.
- To the greatest degree possible, training should be conducted in the participant's country, or a neighboring country within the region.

CASE STUDY 27

OFDA FIELD MANAGEMENT

SUMMARY

In 1984 OFDA began placing contract personnel in regional positions in order to better manage its activities. The subject of OFDA field management was discussed with USAID staff and host country representatives in nine countries, as well as five individuals who have regional field responsibilities.

OFDA contract field staff are well-qualified and have considerably increased OFDA's capacity to plan and provide training, technical assistance and represent OFDA well in a wide-range of situations.

The Latin American team (three in Costa Rica and one in Peru) is a model of the type of skills OFDA needs, whether via contract or order means, to properly plan and monitor OFDA's wide-ranging program.

INTRODUCTION

This case study examines some aspects of OFDA's system and procedures for overseeing non-relief programs and projects in the field. In many ways it is less formal than other case studies in the series. Rather than representing concentrated research, it is based on impressions gleaned by MSI staff from introductory interviews at OFDA/Washington, and discussions with a wide range of individuals while completing other case studies in the field. The subject of OFDA field management was discussed with USAID Mission staff and host country representatives in nine countries, as well as with one former Direct Hire employee with regional responsibilities in the South Pacific and five field staff presently on contract with OFDA.

OFDA ACTIVITY

Project Context

OFDA has developed a wide-ranging portfolio of non-relief projects in dozens of countries abroad. OFDA's overall program is not the kind traditionally operated by AID. The Office's principal and longest standing mission has been to provide immediate disaster relief when catastrophe strikes. To do this OFDA has been allowed to cut through "red tape" and has relatively complete freedom of independent action.

Later OFDA added to its principal mission the provision of support for disaster preparedness and mitigation activities.

Originally OFDA used a pragmatic set of arrangements to oversee the implementation of both of these missions. Essentially management of its overall program relied on a variety of human resources:

- OFDA's own Washington based staff;
- Mission Disaster Response Officers (MDRO) designated by USAID or U.S. Embassy officials, or other specialized USAID staff serving in countries or regions;
- Consultants, contractors or grantees.

In the mid-1980's, OFDA decided to complement the above resources by adding several field staff who would be directly under its operational control.

PROJECT DESCRIPTION

Rationale

In the early 1980's, most of OFDA's country-specific non-relief projects had little direct oversight by OFDA. Some field visits by OFDA staff were invariably made, although these were often infrequent, and brief. Often visits were occasioned by the exigencies of a relief effort and were only incidentally used to look in upon non-relief projects. OFDA also relied heavily on reporting by its many contractors and grantees such as universities, other U.S. government agencies, and intergovernmental groups such as PAHO and the OAS. In general, this trust seemed well founded. Reporting from such agencies was for the most part timely, informative and accurate.

OFDA could also rely to some extent on Mission Disaster Response Officers (MDROs). AID has long had a system of designating such an officer in each overseas USAID, although the person so designated always has other full-time responsibilities. However, preparedness and mitigation activities in a given country are not, as such, under the purview of the MDRO, who may or may not have disaster relief (much less disaster preparedness) training or be otherwise involved in any other disaster related activities.

None of these means provided OFDA with consistently reliable independent judgments and oversight of its activities. It also lacked a direct and easily maintained set of contacts with officials responsible for disaster related activities in the countries and regions in which it operated.

Clearly, as OFDA became more deeply involved in funding preparedness activities, some means to oversee implementation other than using MDRO's or other USAID staff (such as those in Engineering Divisions) had to be found. In addition, a great deal of OFDA's non-relief portfolio was not country-specific and involved several countries in a region or many countries worldwide.

Contract field staff were hired to enhance OFDA's capabilities to respond to disasters and more effectively involve OFDA in preparedness and mitigation initiatives.

Objectives and Components

Contract field staff have been given Personal Services Contracts (PSCs) which describe in some detail the objectives of their assignment and their duties. Many separate contracts are involved. Essentially they indicate that the objectives of the assignment are:

- to assist the country in which they reside ". . . in its efforts to strengthen capabilities for disaster preparedness and relief and in carrying out disaster related activities financed by the USG.";
- "Provide on a shared time basis similar assistance to other U.S. Missions [in the region], as determined by OFDA and agreed upon by said Missions."

Duties listed in these generally two-year and extendable contracts are quite specific. In the case of the contract for the employee in Peru, duties are described in nine paragraphs. The first seven deal specifically with Peru and emphasize preparedness. Included are undertaking assessments of local capabilities, establishing relationships with local counterparts and OFDA grantees, planning for upgrading preparedness including training and pilot projects, and providing technical assistance. The eighth paragraph directs that similar preparedness activities be carried out as time allows in other South American countries ". . . as directed by OFDA and approved by MDRO's and the receiving USAID Missions." The last paragraph discusses the employee's role in relief efforts in the case of disasters in Peru or other countries in the region.

Contracts for field employees are generally funded by the local AID missions on a shared cost basis with OFDA. For example, half the cost of the team of three in San Jose is borne by USAID/CR, and the remainder by OFDA. Costs for the services of the employee based in Fiji are shared on the same basis between OFDA and the Regional AID office there.

Implementation Events/Present Status

In the early 1980's, OFDA contracted to have a consultant establish a disaster team in Antigua. This short term work was the beginning of what became the Pan Caribbean Disaster Prevention and Preparedness Project (Case Study #19). A series of further contracts with the same individual, Paul Bell, eventually led in September, 1984, to his placement in Costa Rica as the first full-time OFDA field employee to respond to disasters and to provide oversight of non-relief activities. His title is Regional Disaster Advisor.

In 1986, two additional staff, Alejandro James and Ricardo Bermudez, were hired to work with Mr. Bell. This Costa Rican based team covered all of South and Central America until 1987. In that year, a fourth Regional Advisor, Rene Carillo, was hired and took up residence in Lima, Peru with responsibilities for most countries in South America.

At about the same time, OFDA also experimented with the part-time assignment of a regular AID Foreign Service Officer (Jim Schill) in Fiji. In September 1988, a full-time contract officer, Joe Chung, took up the position as Regional Advisor working out of the USAID Mission in Suva.

Asia never has had a similar officer, although OFDA has financed a Director for the Asian Disaster Preparedness Center in Thailand. His responsibilities do not extend into the region on the same terms as the Latin American or Pacific contractors. In late 1989, OFDA hired a contract employee to oversee some of its interests in Africa.

ANALYSIS OF EFFECTIVENESS

Planning and Project Design

Using a variety of means -- PSCs, purchase orders and mission allotments -- OFDA has managed to identify and put in place a number of highly qualified and responsive regional employees. Its capability to quickly mobilize response to disasters and to work closely with local, national and regional authorities concerned with the development of preparedness and mitigation programs is therefore augmented considerably. Decisions to place staff in the field were apparently based on: (a) the need as perceived by individual OFDA staff members serving in Washington; (b) AID restrictions on Washington staffing, budget and travel; and (c) the need for people on the ground to facilitate disaster relief responses.

In addition to emergency response, OFDA's mandate included the development and operation of major projects in preparedness and mitigation around the world. However, AID had no overall policy concerning how its Bureaus, regional offices or USAIDs were to relate to this non-relief component of OFDA's portfolio. OFDA never pressed to have such a policy established. OFDA projects and project management were left "out of the loop" of normal AID processes.

As a result, managing OFDA's non-relief portfolio became a matter of negotiating arrangements to get the job done by whatever means possible. The assignment of contract staff in the field was one aspect of this. Fielding such a staff was a tactical decision rather than part of an overall OFDA strategy or a wider AID policy.

For example, the team in Costa Rica initially looked into a problem project (Earthquake and Volcano Hazards Reduction, see Case Study #3), with no mandate to tend to all OFDA regional projects in the region.

The regional advisor in Peru was posted on a similar basis. In Peru the USAID Mission invited former Ambassador Robert Yost to visit to look into disaster issues. OFDA financed the early 1986 trip. Among other things, Yost found that if USAID/Peru was to tend to disaster mitigation programs it needed to make a special provision for staff. "Disaster planning and mitigation," Yost wrote, "thus constitute, willy-nilly, an *ad hoc* element to which USAID only turns its attention as demands and time permit. . . . The only way to do this [assist the Peruvians to develop planning and coordination capabilities] is to give consistent effort and support." Yost concluded, "Considering the potential for progress, and the lack of time and staffing within USAID Peru . . . assignment of a full time regional disaster coordinator is warranted."

Resource Allocation

OFDA did not consider methodically the costs of fielding field staff. Funds for support of these field elements were allocated using a variety of means and involving cost sharing by OFDA and others. For example, setting up and supporting the Costa Rica team involved twenty-eight separate financial transactions totalling $875,238 between 1983 and 1988. Not all of this was for salaries and upkeep of the team -- also included were travel and per diem expenses and the cost of developing training materials and reports. Similarly, the expenditure of $281,352 over two years for the advisor position in Peru does not seem to have been compared in any orderly fashion to other potential uses of the funds, or alternative means for accomplishing the same mission.

Implementation

By all accounts, having field staff keeps OFDA in much closer touch with its field operations than it was before. Regional Advisors resident in high priority missions and making regular visits to other countries provide OFDA with the eyes and ears necessary to monitor and manage its own activities and to stay in contact with all disaster related initiatives, local or international, whether financed by OFDA or not.

In the course of MSI's work on strategic planning, field staff demonstrated the value of having such knowledgeable people grappling with preparedness and mitigation efforts in the field. Where such advisors existed, the extent and substance of mitigation activities and issues pertaining to their design, monitoring and evaluation quickly became clear to visiting MSI consultants. Where MSI had to rely on MDRO's and/or other USAID staff members, they were able to provide only a tentative and incomplete picture of what was going on. This was due mainly to competing demands in their time or lack of interest.

It was also clear that despite regular communications between OFDA/Washington and its field personnel, many misunderstandings, or at least differences in opinions, occurred over the years and many still persist.

A major concern has been, as one regional advisor put it, "with the vagueness of OFDA's non-relief guidelines. There is no clear policy, set of definitions, expectations." Another advisor pointed to past investments in high tech as particular examples of where OFDA/Washington had, he felt, made unwise investments. He argued that OFDA could have greater effect with a more comprehensive, practical and inexpensive approach to preparedness, concentrating on building local self-reliance.

The relatively ad hoc manner in which the field units had been set up also left certain procedures and expectations unclarified. There was in some cases discomfort with being supervised by an employee in the local USAID while responding to a "boss" at OFDA Washington. Who then had the final say?

The PSCs had no clear provision regarding concerns such as: (a) performance evaluations, (b) access (or lack thereof) to the mail pouch, commissary etc. or (c) clearance for out-of-country travel. Naturally, there was also concern about job security given the uncertain and changing priorities of OFDA and the missions.

Reporting requirements were likewise unclear. Although OFDA had requested annual plans from some of its field staff, and the Latin American Division held annual planning meetings, generally reports were filed at the discretion of the employee.

As might be expected for contract staff, the Regional advisors have no formal authority to look at a project and say yes or no. They can, however, propose any project or travel, but essentially everything depends on approval from the USAIDs or OFDA/Washington. "We may or may not be asked for our opinion." Apparently, in some instances, regional staff were not queried about projects being considered by OFDA/Washington. Nor was it clear that they had been routinely provided with information about projects, particularly regional or worldwide projects, operating in their geographical areas of responsibility. No systematic plans for monitoring and reporting on ongoing preparedness or mitigation projects existed in the field.

Nevertheless, all field staff interviewed indicated that they felt they were working in an atmosphere, even if somewhat unstructured, of mutual collegial respect; they feel generally that they are being listened to.

In conclusion, members of the OFDA field staff are well-qualified and have considerably extended OFDA's capacity to manage its overseas activities. The Latin American "team" effectively combine skills and experience in disaster response with a capacity to plan and provide training, technical assistance, and project design oversight, and to represent OFDA well in a wide range of situations.

RECOMMENDED ACTIONS

- Workout details of contract terms and conditions for existing field staff, and insure expectations on the part of all parties are clear.

- Plan the use of field staff time to insure more consistent monitoring and reporting on OFDA's existing preparedness and mitigation investments, and follow-up on activities already off the books.

- OFDA/Washington should consider how to better link USAID Missions and regional offices to OFDA activities, and vis versa.

STRATEGIC IMPLICATIONS

- OFDA field staff are well-qualified and have considerably extended OFDA's capacity to manage its wide range of programs. The Latin American "team" (the three in Costa Rica maintain close relations with the Peruvian representative) has become a model for the kind of human resources OFDA must develop to further enhance its overall program.