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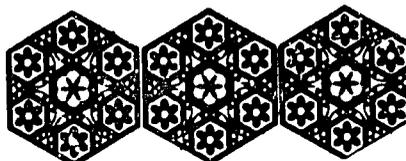
# South Asia Disaster Preparedness Seminar

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## Proceedings, Issues and Recommendations

New Delhi, India

January 23 - February 1, 1979



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## FOREWORD

Between January 23 and February 1, 1979, seventy-five dedicated persons from thirteen countries met in New Delhi to discuss disaster preparedness. Many diverse views were expressed during the meeting, but we all returned home knowing more about each other--our problems and our successes--than we had expected. We also returned home believing that we knew more about our own business, whether it was disaster preparedness or relief, than we had thought when we arrived; it had taken the free and open discussion of mutual interests to understand fully the importance and complexity of our jobs.

For several years, the Office of U.S. Foreign Disaster Assistance (OFDA) sponsored international disaster preparedness seminars in Washington, D.C., for disaster-prone countries around the world. It was increasingly evident that the burden of disaster management was too great to allow adequate treatment on a global scale. A regional approach offered a number of advantages. It would allow more officials to participate and they could share their mutual concerns. Participants could become familiar with their counterparts in neighboring countries and discuss regional solutions to common problems. Speakers and participants could address specific issues which were of interest to all.

The South Asia Disaster Preparedness Seminar was the first regional meeting sponsored by OFDA. It was not without those minor complications and irritations which mar most first efforts. And yet it served to accomplish its objectives, thanks to the support and cooperation of the participating countries, our host, the Government of India, and our colleagues, the Office of the United Nations Disaster Relief Coordinator and the League of Red Cross Societies.

I should note that this seminar was not intended to solve the disaster problems of South Asia. It was designed as a forum in which those problems and some potential solutions could be identified and explored. It will be a long time before ultimate solutions are implemented. I am extremely happy, though, that it was the concensus of those gathered in New Delhi that, together, we made a good start:

*Anne Martindell*  
Anne C. Martindell  
Director, OFDA  
Washington, D.C.  
July 24, 1979

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## II. INTRODUCTION

The South Asia Disaster Preparedness Seminar brought together government, Red Cross/Red Crescent officials and scientists from Afghanistan, Bangladesh, Burma, India, Nepal, Pakistan and Sri Lanka. Speakers represented the Philippines, the United Nations, the League of Red Cross Societies and the United States, as well as the participating countries.

It was abundantly clear that the nations of South Asia collectively held a wealth of disaster experience which can be matched in few places on the earth. Our primary objective in formulating the seminar was, then, simply to provide a forum in which this body of experience could be shared. Additionally, we wanted to stress the desirability of disaster prone nations maintaining independence from outside assistance, while recognizing the economies to be derived from regional cooperation and coordination of resources. Stressing the importance of planning and the benefits to be derived from disaster preparedness and prevention was obviously a high priority objective. Overall, we viewed the seminar as an opportunity to increase each participant's awareness of the scope and importance of his or her role in protecting people whose lives, health and property are threatened by disasters. Finally, we hoped to demonstrate that the potential for disaster mitigation is available to all, regardless of limitations on resources.

A generalized strategy was suggested for the discussion of each disaster type in the region. First, the problem would be investigated in terms of the mechanics of the disaster agent and the vulnerability it posed for populations. This would be followed by the identification of alternative solutions to the problem and the relative costs and benefits of each.

The degree to which we accomplished our objectives must be viewed in the perspective of our overall goal: to provide the people of South Asia better means of protecting themselves from disasters' effects. The seminar suggested various means. It is up to the participating countries now to demonstrate their continued interest in the pressing humanitarian concerns presented by disasters. This can be done only by reinforcing viable programs within the public and private sectors. The seminar was a beginning, not an end in itself.



### III. PROCEEDINGS

#### Meteorological Hazards -- Cyclones and Storm Surges

Dr. Neil Frank

Cyclones are among the most frequent and devastating natural disasters affecting South Asia. India experiences at least one major cyclone every year in the east and one every two years in the west. The December 1970 cyclone in Bangladesh killed over 300,000 people.

Dr. Neil Frank, Director of the (U.S.) National Hurricane Center, described a cyclone as a counterclockwise (clockwise in the southern hemisphere) low pressure system, also known as a typhoon or hurricane. The wind of a cyclone can exceed 150 miles per hour on the coast, decreasing in intensity as it moves inland. Inland flooding from rainfall affects lowland communities in the path of the cyclone, flash floods being a particular threat to life; however, ninety percent of the life lost during a cyclone is attributable to the storm surge or dome of water atop the tide. Where the eye of the cyclone touches land, a crest of water -- at times 25 feet high and 50 miles wide -- sweeps across the coast.

Cyclone prediction techniques are sophisticated, yet limited. The possibility of serious forecasting errors exists, and reasonable accuracy is possible only within twelve hours of the time a cyclone reaches a given area. During a 24-hour period, a cyclone may deviate more than 100 miles (during a 48-hour period more than 250 miles), from its predicted landfall.

Predictions are made on the basis of a variety of data gathered by ships, planes, satellites, and radar installations. The Bangladesh delegation recommended that stationary buoy radars and a stationary satellite be placed into operation in and over the Bay of Bengal. They also recommended that meteorological centers be established on a regional basis so that data can be shared and a coordinated reporting system be implemented. The program would be a joint effort involving Bangladesh, India, Pakistan, Sri Lanka and other concerned nations in the area.

Dr. Frank emphasized the importance of education programs to inform people about the cause and prevention of particular hazards, the meaning of warnings, and how to respond. Experience with minor storms or inaccurate predictions can give a false sense of security in a severe storm. Too often, disaster victims have ignored the warnings or taken fewer precautions than they could have taken. Warnings are useless if communities do not respond to the warnings.

## Meteorological Hazards -- Drought

Dr. Norton D. Strommen

Drought is a serious, recurring disaster threat in vast regions of South Asia. The effect of insufficient rainfall is to reduce the food production of a region which may be living perilously close to chronic food shortages. The magnitude of the impact of a drought is directly affected by the soil moisture, rainfall, and water resources available prior to the drought.

Dr. Norton D. Strommen of the (U.S.) National Oceanic and Atmospheric Administration (NOAA), discussed efforts to mitigate the effects of a prolonged drought (1975-1977) in the U.S. Using historical, agricultural, climatic, current meteorological data, crop-yield forecasts statistical techniques, comprehensive agricultural models were developed to provide guidance to farmers. New tools were developed to measure soil moisture deficits and to prepare 30-to-90 day forecasts of seasonal trends, thereby enabling researchers to estimate departure from normal precipitation, the additional precipitation required, and the probability of additional rainfall accumulations. Based on this information and these techniques, farmers received recommendations as to what and when to plant in the drought-stricken areas.

Although models cannot overcome the hazards of nature, they enable effects to be mitigated through contingency planning. In addition to recommending what and when to plant, these models enable forecasts of crop yields to be made approximately one month in advance, thereby providing the potential for an early warning of diminished food supplies and possible famine. Even in the absence of possible drought conditions, agroclimatic monitoring systems provide information on expected market conditions and can prove useful in land use planning.

## Hydrological Hazards -- The Monsoon Experiment (MONEX)

Dr. C. R. V. Ramon

In January, 1979, scientists from the Bay of Bengal countries, international organizations and other nations participated in the MONEX project sponsored by the World Meteorological Organization (WMO) and the Economic and Social Council for Asia and the Pacific (ESCAP). The experiment, as described by Dr. C. R. V. Ramon, the director of the MONEX program in India, explained the scientific and technological advances which have made the program possible and also spoke of the significant benefits which are expected to be derived from the project. Ultimately, it is hoped, the world will gain sufficient knowledge of the dynamics of monsoons to be able to gauge their direction, duration and effects and thus better prepare for the resultant flooding or for the lack of precipitation which may result from a poor monsoon season.

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## Hydrological Hazards -- Monitoring Flood Conditions

Mr. Warren Sharp

Mr. Warren Sharp, Director of the River and Reservoir Control Center of the U.S. Corps of Engineers for the Lower Mississippi Valley, described the means used for monitoring flood conditions on the Mississippi River and its tributaries. The system, which provides the analysis of meteorological and hydrological data at the Center in Vicksburg, Mississippi, uses a variety of technological tools which are relevant to South Asia. The Lower Mississippi Valley system collects and analyzes imagery from stationary and orbiting weather satellites. It also collects data from various instruments on the ground which transmit data regarding precipitation, river stage, rate of discharge and water quality. The data thus collected is analyzed by computer to determine hydrological conditions over a vast and flood vulnerable area of the central United States. The data collection and processing works in virtual "real time" which means that projections and forecasts are based on current information. Mr. Sharp, whose experience includes analysis of flood conditions in Bangladesh, has been instrumental in the conceptualization of a combined flood and cyclone warning system planned for implementation in Bangladesh.

## Geological Hazards -- Regional Seismicity

Dr. H. M. Iyer and Dr. D. K. Rakshit

According to Dr. H. M. Iyer of the U.S. Geological Survey in Menlo Park, California, the study of regional seismicity and global tectonics are important in understanding the mechanics of earthquakes. Seismology involves the study of geologic records of the past several thousand years, the analysis of geologic maps and records of past earthquakes (including fault lines and earthquake intensity) and the use of instrumentation to collect and disseminate information about earthquakes. Plate tectonics is the theory that the seven continents float on eight plates. The boundaries of the eight global lithospheric plates overlap earthquake fault lines and are seismically active areas.

Several centers in the U.S. compile information on earthquakes and seismic activity. These include the following: the National Earthquake Information Center in Boulder, Colorado; the U.S. Geological Survey (USGS); the National Earthquake Information Service (NEIS) and the U.S. Department of Commerce. Stations around the globe supply continuous information updates which are used to make earth maps and to conduct regional studies. The Worldwide Standardization Seismological Network has six stations in South Asia. This network, along with the Global Digital Seismograph Network, supplies data used to make seismicity maps, to determine locations of smaller earthquakes and to pinpoint the locations of earthquakes and fault lines. Portable stations monitor earthquakes and study aftershocks.

Research and development efforts by the USGS in seismicity are concerned with earthquake prediction and the conversion of data into engineering applications and hazard prevention legislation. The information gathered includes measurements of earth tremors, fault lines and secondary effects of earthquakes (soil liquefaction, floods from dam breakage, tsunamis, fires and landslides). Earthquakes are not just a research and development problem, but can be studied to evolve preventive measures to save both lives and property.

Dr. D. K. Rakshit, Principal Scientific Officer of the Department of Science and Technology, New Delhi, India, stressed the objective of promoting science in areas of national importance, such as natural disasters. The fact that India is a highly active seismic region underscores Dr. Rakshit's comment

that "Disasters in our more densely populated world mean a greater loss of life and property than in previous ages. For this reason, mitigation and prevention are even more important in this phase of mankind's history."

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Geological Hazards -- Earthquake Prediction

Dr. H. M. Iyer

Dr. H. M. Iyer of the U.S. Geological Survey in Menlo Park, California, stated that earthquake prediction is based on a combination of techniques; field observations, knowledge of seismic zones and geological data. He said that it is also important to know the overall ground conditions and the known geological faults. Several statistical tools can be useful in predicting earthquakes.

The probabilistic risk map is a tool based on seismicity and frequency of ground acceleration. Instruments are used to measure vibrations of a particular frequency instantaneously. These measurements, used in assessing the earthquake potential of an area, can be translated into earthquake-resistant building codes. Furthermore, they can be used to mitigate possible secondary effects of earthquakes (such as dam breakage).

Microzonation uses standard seismological techniques for earthquake prediction in small land areas. Information on soil liquefaction (a secondary effect of earthquakes) and ground acceleration is used to develop "micro" maps of earthquake risk areas.

Dr. Iyer stressed that the effectiveness of microzonation maps has not yet been proven. No data has been collected on earthquakes to test the validity of these maps. It was pointed out that it is necessary to refine the high frequency microseismograph and the oceanic microseismograph to diminish high frequency noise and to produce a clearer picture of local seismicity. Even though the validity of microzonation maps has not been established, they can provide precursory information on major shocks -- small shocks usually precede major shocks (known as foreshock). They may also be useful in examining slow changes in the geological structures of an area.

## Geological Hazards -- Landslides

Dr. Robert Fleming

Dr. Robert Fleming, Manager of the Landslide Hazard Reduction Program, U.S. Geological Survey, pointed out that landslides can be classified into three categories based upon the form of the landslide and its type of movement. The form refers to the kind of substance or material which is moving (rocks, blocks, debris, etc.). Types of movement include falling, sliding and flowing movement of unconsolidated material in continuous motion. The three basic categories of landslides, therefore, are the rock or earth fall, the rock or block slide and the debris flow or debris avalanche. The rate of movement can be charted for each of the three categories.

Dr. Fleming went on to discuss three notable conditions of a land area which may indicate a susceptibility to landslides: areas with slopes greater than 70°; areas in which there has recently been an earthquake; and areas with holocene deposits.

Prediction of landslides as a science is in the process of slow systematization. Dr. Fleming noted that landslide prediction technology already exists for application to single sites. Such an approach is now being applied to the Los Angeles area of California. One inroad towards prediction is susceptibility mapping. Information about recurrence, combined with the knowledge of an area's vulnerability, can be valuable in making decisions regarding land use or evacuation in the event of a landslide.

Certain types of landslides can be predicted more successfully than others, particularly rockfall avalanches. Landslide prediction will develop optimally when it is possible to integrate technology with systematic land use management. Certain accepted procedures and technology for making landslide predictions exist. Prediction efforts now benefit from such technological devices as remote sensors (most useful in limited areas), high-altitude research or critical point/critical area studies. These procedures and technologies would be more effective if they were used within a larger framework — an overall system providing for proper land use management. Within such a system, legislation would be enacted, specifying land use and land management regulations. Regulations should be enforced and specific, systematic data should be collected to document developments and changes in land conditions.

Summing up, Dr. Fleming stated: "We are on the threshold of the ability to provide effective landslide prediction. But that ability will not be realized until a strategy is developed to coordinate existing prediction technologies into a system and research monies are made available for developing new prediction technologies to supplement that system."

## Environmental Hazards -- Deforestation

Dr. David Striffler and Dr. David Thorud

Dr. David Striffler, Professor of Watershed Science at Colorado State University, stated that rapid deforestation is becoming a potential disaster in many countries because of the ever-increasing demand for firewood — other sources of energy being too expensive (or otherwise unavailable) for the ever-growing population in developing countries. Other factors that contribute to deforestation include the increased tendency to clear marginal lands for settlements and agriculture, logging practices that do not replace the trees removed, erosion from over-grazing, fires, road construction, and surface mining. The tragic consequences of deforestation in the Himalayas, particularly in Nepal, was revealed in a provocative film "Firewood", produced for the United Nations Environment Program (UNEP).

Dr. David Thorud of the U.S. Forest Service described both the on-site and off-site effects of continued forest depletion. On-site environmental consequences include the following:

- Eroded and compacted soils which have a greatly reduced capacity to absorb and hold precipitation and snow melt;
- Increased surface runoff during precipitation events or snow melt due to shallowness of soil and reduced ability to retain moisture;
- Accelerated surface erosion and landslides;
- Sedimentation transport from watersheds to flood plains and downstream reservoirs;
- Decreased capacity of watersheds to supply the needs of man -- firewood, crops, forage and fodder for livestock.

Off-site environmental consequences cited by Dr. Thorud include the following:

- Downstream channel sedimentation/siltation;
- Reduced ability of flood plains to control runoff waters;
- More frequent and more severe flooding;
- Reduced agricultural productivity of downstream flood plains due to undesirable sedimentary deposits;
- Reduced usefulness of reservoirs for water, recreation, fishing and flood control.

## Environmental Hazards -- Land Use Management

Dr. David Striffler and Dr. David Thorud

Using the deforestation problem in the Himalayan mountain range as an illustrative example, Dr. Striffler explored possible solutions to the preservation of a balanced ecosystem and a high quality of life for the inhabitants of areas threatened by unstable natural conditions and damaged by the land use activities of the resident population. Dr. Striffler pointed out that reforestation can help to correct the erosion, runoff, flooding and siltation by providing forest coverage of the land and increasing the absorptive capacity of the soil for water. Forest areas are needed for fuel, livestock grazing, agriculture and habitation. Development of alternative energy sources for fuel and resettlement of the population can contribute to a solution. Education and the instilling of a conservation ethic are longer-term aspects of the solution. Both Drs. Striffler and Thorud agreed that the most effective solution seems to be the integrated watershed management approach, which results in a balance between protection and land utilization.

Dr. Thorud posed several questions for consideration by the assembly: How much does deforestation contribute to the high water runoff? Where should money be invested for corrective purposes — meteorology, upland watershed afforestation, warning systems? He then suggested that the engineering and structural solutions by themselves would not help siltation and flooding (e.g., dredging, damming, etc.). Reforestation will help improve the quality of the land and reduce runoff. But one must also consider the use of the watershed area. Is it being used for forestry, crop production, habitation and/or livestock grazing? The integrated watershed management approach deals with the whole system and all uses of the land.

There are both physical and social justifications for such an approach. Physically, watershed runoff is created by the net integrated effect of all land use practices and the activities in the watershed. If correctional efforts are made relative to only one activity and not to others, the results may be a worsening of the situation rather than improvement. From a social perspective, an attempt to relieve pressure on land by reforestation and conservation efforts may apply unbearable pressures on the local community who have been dependent on the forest for firewood, construction wood, fodder and livestock

grazing. An abrupt interruption in the lifestyle of the indigenous community would result in severe social and cultural dislocations. "Offsetting provisions" need to be made during the transitional period when new trees are being planted and while they are maturing. Such provisions are also necessary to gain local cooperation, without which the afforestation efforts would fail. These provisions would also relieve pressure on the remaining land set aside for agricultural use.

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Environmental Hazards -- Afforestation Efforts

Dr. David Thorud and Mr. Nara Bahadur Thapa

Dr. David Thorud of the U.S. Forest Service expressed hope for the restoration efforts in South Asia based upon the following facts:

- many areas have biological and soil recovery potential;
- governments are increasingly aware of this complex problem;
- the indigenous people are more aware of the situation;
- there is increased legal basis for reforestation; and
- international assistance organizations are giving increased priority to soil and water conservation programs and to reforestation.

Requirements for an effective program of integrated watershed management include:

- a cadre of professionals in soil and water conservation and forestry, extension agents and village technicians to work with the indigenous communities;
- government infrastructure to implement the program;
- adequate facilities such as nurseries; and
- land reclamation and restoration methods.

Dr. Thorud also mentioned the possibility of including the following aspects of reforestation in the integrated watershed management scheme: improved crop plants for food; irrigation for crops; improved community water supplies; and better livestock management. The need for reconsidering the benefits and costs of agricultural terracing as part of such a program was also stressed.

Benefits from such an integrated approach, include more fuel and fodder trees, more trees for construction, improved farming practices and production, better livestock management, and the generation of capital from the sale of wood products.

Examples of reforestation successes cited were those of South Korea, the People's Republic of China and India. Dr. Thorud used these examples to demonstrate that developing countries, besides receiving international and bilateral assistance, are increasing their own capabilities to cope with this complex problem of afforestation. Mr. Nara Bahadur Thapa, Chief of the Nepalese delegation, described the afforestation program which Nepal has developed. The Nepalese program promotes different types of forests:

- state forests;
- individual forests (a person can apply for help to develop his own forest); and
- contract forests (industry can negotiate land contracts to develop forests over a fifty to sixty year period.)

## Health and Civil Concerns

Air Commodore Dr. P. Dharmaraju

Dr. P. Dharmaraju, Director of Civil Defense (Medical) in India's Ministry of Health and Family Welfare, encouraged participants to develop preparedness plans for civil strife, fires, and health emergencies -- as well as for other disasters. At a minimum, procedures should be established for mobilizing forces to restore order and activate emergency medical services as soon as possible after the outbreak of civil strife. In India, this is achieved in part by the fire and police forces in collaboration with the Home Guards. After order is restored and emergency medical services are rendered, forces should remain mobilized to maintain order and assist in the restoration of stability. It is important that any preparedness plan for civil strife include procedures not only for mobilizing, but also for demobilizing emergency forces and for general normalization of the society.

Fires pose a major threat in South Asia. Some countries, Burma for example, have already prepared plans that deal with this specific threat. To the extent that the secondary effects of fire (e.g., deforestation) contribute to other disasters (e.g., flooding), preparedness plans should deal with those secondary effects as well.

It was suggested that health emergencies be considered in the context of particular disasters rather than considered as disasters of their own. Dr. Dharmaraju stated that disaster preparedness is the responsibility of each state government within India. The central government, however, assists each state through the Central Disaster Relief Coordinating Organization and deploys manpower and supplies directly to local areas in times of need. If the effects of a disaster deplete national resources, assistance is sought from international agencies.

Dr. Dharmaraju noted the importance of individual states developing their own disaster preparedness plans, in view of the diverse disasters to which each area is prone. In general, such plans should identify procedures for raising the level of understanding among the populace about likely health hazards, the need for safe drinking water, and proper sanitation in the event of a disaster. Such plans should also address the need for manpower, supplies, emergency maintenance and medical services, and emergency communications throughout the period from initial warning to reconstruction. Key points include the following:

- Mobile medical teams should be staffed, equipped and coordinated before disasters occur. Reserves can be drawn from medical colleges, hospitals, the Home Guards and Civil Defense.
- Essential supplies should be stockpiled, including medicines, dressings, vaccines, stretchers, blankets, and field sanitary equipment. Also needed are vehicles to transport victims and for general service (e.g., ambulances and four-wheel drive vehicles). Supplies and vehicles should be located in areas where they can be readily activated.
- Disaster preparedness plans should anticipate the need to identify and/or construct emergency shelters for displaced persons, select sites for and construct emergency medical centers, provide alternate sources of power and water, and assure access to remote areas.
- Preparedness plans should also ensure effective communication and coordination at all levels among all departments, including relief organizations, to avoid duplication or omission of necessary relief.
- Once a disaster occurs, the first step is to evaluate immediately the degree of damage to determine which plans to enact.
- Following an assessment, emergency medical care should be administered with priority given to those most likely to survive.
- The third step is to attend to the need for adequate sanitation to prevent epidemics. Facilities and procedures must be available to assure supplies of food and water that are not contaminated, disposal of wastes, and control of pests which carry disease.
- In addition, care should be taken to identify and treat suspected cases of malnutrition among children and expectant or nursing mothers.

Dr. Dharmaraju concluded his comments on disaster preparedness plans by emphasizing the need to rehearse and test all aspects of the plan through periodic simulation.

## Mapping Techniques and Satellite Applications

Mr. Charles Vermillion and Dr. Wolfram Drewes

During the past thirty years, there have been dramatic improvements in the potential to assess an area's vulnerability to disasters, the effects of disasters, and alternatives for rehabilitation. In the 1950's aerial surveys and topographic mapping were the principal techniques for evaluating population densities and the location of resources, bridges, tunnels, hospitals, etc. These methods were also used to map the effects of droughts, landslides, volcanoes, floods, earthquakes and cyclones. In the 1960's, the time required to assess vulnerability and damage was significantly reduced and mapping techniques were otherwise improved with the advent of infrared and magnetometer surveys, lasers, and satellites. The beginnings of a worldwide satellite system can be traced to 1963 when it became possible to transmit data from space to earth without delay. The original program involved only three countries. Today, over 120 countries participate, using 800 ground stations for receiving data, relaying data, and regional data exchange.

By the 1970's, computerized photointerpretation of multispectral data from satellites offered the capability of producing a composite map and statistical analysis of land areas by categories (e.g., soil moisture, salinity, vegetative patterns). Combined with the computerized process to improve the level of image detail, the analysis of multispectral data is facilitating efforts to detect faults, reclaim arid land, estimate crop yields, and improve land use planning and management. Other satellite applications include measuring cloud and sea surface temperatures, determining snow melt and cloud movement, tracking cyclones, locating forest fires, and oil spills, identifying fishing areas, and forecasting droughts and floods.

Although satellites and the automation of the mapping process have added an entirely new dimension to vulnerability analysis and disaster preparedness, it is important to keep in mind that satellites' capabilities are limited and must be complemented by other technologies and procedures. Weather satellites can pinpoint the location of a storm, for example, but reconnaissance aircraft must fly into the eye of the storm to gather additional data (e.g., wind speed and barometric pressure) before changes in the storm's location and intensity can be

accurately forecast. Satellites can provide preliminary information for an estimation of agricultural inventories, but field work is also required since satellite sensors may not distinguish between soil moisture and crop moisture or between one crop and another.

Dr. Wolfram Drewes, a Senior Resource Planner at the World Bank, stressed the importance of utilizing the full potential of these new techniques for assessing threat, vulnerability, damage, and alternatives for land use planning and rehabilitation. He noted that the World Bank has compiled a resource book on vulnerability studies which have been conducted throughout the world, and encouraged each country to update the information in this publication.

Mr. Charles Vermillion, as a program manager at the U.S. National Aeronautics and Space Administration, has been instrumental in the development of a weather satellite imagery receiving station in Bangladesh. Mr. Vermillion related the high technology of storm path analysis with the very down-to-earth needs of communities to be warned to take protective measures. He reiterated Dr. Frank's statement that satellites are simply one tool, along with radar and cyclone tracking aircraft, for providing indications of storm threat. Each technique has its own benefits and complements the others. Unless the forecasts are translated into life-saving warnings at the local level, however, they serve little purpose.

## Agricultural Modeling

Dr. Hugh Brammer

Dr. Hugh Brammer of the Food and Agriculture Organization, resident for several years in Bangladesh, discussed the use of modeling techniques for mitigating disasters. To develop models for crop yield forecasting, four types of information are necessary:

1. historical agricultural data (including soil types);
2. crop calendars;
3. crop types and planting practices; and
4. historical meteorological data.

When the models were first developed, they were often unreliable since unusual environmental circumstances such as early or late seasons were inadequately considered. Now, however, effective models provide Bangladesh farmers with crop planting and harvesting guidelines for millet, corn, cowpeas, and wheat. Models also help avert potential agricultural disasters by providing information which allows longer lead times for the formulation of contingency plans.

Data for models include historical and current climatic information such as precipitation, aridity, and temperature. Statistical analysis of satellite data provides supporting information to buttress the model. In a model used to determine wheat yields in Oklahoma, for example, when observed data fell outside the acceptable range of deviance for the model forecasts, the cause — crop disease — could easily be determined.

## Disaster Preparedness in the Countries of South Asia

Throughout the Seminar, delegates discussed features of the disaster preparedness plans and procedures in use in their countries. Some of the features of the plans and procedures are described below:

### Afghanistan

Disaster preparedness planning in Afghanistan is undertaken by the Red Crescent Society as an auxiliary to the government since there is no official plan in effect. When a disaster occurs, the governor of an area sends a report to the Operations Directorate in the Office of Emergency Preparedness (Office of the Prime Minister). The report and corresponding recommendations are submitted to the Director of the Office of Emergency Preparedness and then to the Prime Minister or President for action.

Some long-term projects are now underway, with the cooperation of several ministries. The Office of Emergency Preparedness is planning for stockpiles in disaster-prone areas. There are plans for irrigation and flood control through construction of embankments and implementation of multi-use hydrological projects. A five-year plan for afforestation in the province of Baktia has begun with support from the Federal Republic of Germany.

A Directorate of Training has been established under the Office of Emergency Preparedness to teach disaster prevention methods generally; to train administrators at various levels in disaster preparedness and prevention; and to disseminate information through publications, television, and radio.

### Burma

Burma's laws relating to disasters are not yet integrated into specific disaster legislation or a disaster plan. The Director General of Relief in the Relief and Resettlement Department (Ministry of Social Welfare) is responsible for pre-disaster planning and relief operations. The Relief and Resettlement Department conducts courses and engages in various community preparedness activities. Burma has a plan for fires, their major hazard; but for other disasters such as cyclones and floods, the planning and operations are improvised. Activities are underway, however, to adopt a more integrated form of disaster preparedness legislation by 1981.

In the event of a cyclone, warnings are broadcast from military and civilian radio stations. A central government task force is created, including medical and Red Cross personnel. The administrative structure is hierarchical--from the central government, to the state governments, to the townships.

### India

The major issue facing India is whether the central government should play a greater role in disaster preparedness. The central government presently issues guidelines, undertakes research and surveys, provides matching financial assistance to the state governments, and calls upon the Armed Forces to assist in times of disaster.

The seven Financial Commissioners of India formulate the successive Five-Year Development Plans. The most recent report stressed a more active role for the central government in disaster relief operations and management. It suggested a return to the arrangement in effect until 1974 under which the central government filled 75% of the gap between resources requested by a state government after a disaster and those available locally (the other 25 percent being provided by the state).

To minimize abuses by state governments, procedures were revised in 1974 to discontinue outright grants. Relief assistance is based on a state's population and vulnerability. Advance Plan Assistance is related to long-term development--irrigation works, dams, water management. It is an attempt to meld relief assistance with preventive measures and productive work. Employment programs, such as "Food for Work," give jobs to drought and flood victims, providing them with income while they construct flood embankments and other long-term preventive structures. The drawback to the 1974 revisions, particularly the Advance Plan Assistance and the Employment Generating Scheme, has been that they are not effective in time of disaster. The central government still has the responsibility to give food and other assistance during the calamity. The Finance Commission is recommending a return to the pre-1974 methods, but with greater control over damage and need assessment.

If a disaster occurs to which a state is not fully capable of responding, a multi-disciplinary central government assessment team visits the affected state to survey the damage--at the invitation of the state. Based on its assessment, the team reports to the central government and then makes a formal request for assistance.

Additional Secretary Mukherji made the following recommendations:

- establish a World Natural Calamity Fund for research, community preparedness and preventive schemes for developing countries;
- establish regional storehouses worldwide for relief and rescue purposes during calamities;
- encourage the use of appropriate technology (e.g., satellites);
- train management personnel in disaster preparedness and relief;
- institute flood insurance programs and establish disaster loan programs at concessional rates; and
- cooperate regionally on land and water management to reduce, for example, deforestation in the Himalayas and the flooding and siltation of the Kosi River.

The cyclones of 1977 and 1978 caused Tamil Nadu great loss of life and property, prompting measures to be taken to prevent or mitigate disasters in the disaster-prone districts on the coast of the Bay of Bengal. Passage of the Town and Country Planning Act provided for an analysis of the vulnerability of the entire state, the establishment of warning systems, training programs, the production and distribution of manuals on disaster prevention, and the establishment of disaster units. The rationale for Tamil Nadu's preparedness activities is that disasters impede economic development, and that efforts to overcome disasters need to be continuous and multidisciplinary.

Planning and preparedness activities in Tamil Nadu are coordinated by the Emergency Relief Organization. Significantly the Chairman of the Emergency Relief Commission is Tamil Nadu's Chief Minister. Components of the Tamil Nadu plan include:

- identification of vulnerable areas,
- identification of the needs and resources,
- a plan to administer and coordinate agencies,
- a communication system and command center,
- a reporting and warning system,

- training,
- emergency services,
- coordination of internal and external resources, and
- annual review and revision of preparedness plans.

### Nepal

Nepal has a central disaster relief committee, headed by the Home Minister who presides over the national committee and the district commissioners. Nepal's national program of disaster relief organizations extends through every level and every district. At the village level there is a committee for disaster relief headed by the chairman of the village assembly.

Presently, efforts are concentrated in relief measures, but some progress is also being made in soil and water conservation, afforestation, and land use management. Development plans, which include provisions for times of disaster, are now being formulated at the village level. Regional centers train people in different technical jobs so that the local people can manage their own projects. Experts at the regional centers act as extension agents and provide the villages with help in formulating plans.

In each district, the government has a unit of engineers, soil conservationists, medical doctors, nurses, health specialists, and experts in agriculture who work together to solve the problems of the district as a whole. Nepal's multi-faceted program to counteract the effects of deforestation was described.

### Pakistan

In 1970 Pakistan created the Disaster Preparedness and Relief Cell in response to the devastating cyclones that year in East Pakistan (now Bangladesh). Its function is to coordinate disaster planning and relief operations at the district, provincial and federal levels. The Disaster Preparedness and Relief Committee is headed by the Minister of Finance who is responsible for the allocation and coordination of resources.

Disaster preparedness plans originate at the district level. They are coordinated by the Director General of the Disaster Preparedness and Relief Cell and district and provincial authorities. The provincial plan is formulated by the Relief Commission of

the province, again with assistance from the Director General. The federal plan is formulated by representatives of the ministries concerned (e.g., railways, communications, water) with the assistance not only of the Director General but also technical experts.

Measures to prevent disasters include dredging rivers, constructing embankments, and synchronizing the release of water behind dams to prevent flooding. Considerable resources are also devoted to improving meteorological and flood forecasting facilities.

To compensate farmers for crop losses as the result of flooding, the Disaster Preparedness and Relief Cell pays the interest on loans to farmers for seed and fertilizer.

### Sri Lanka

Sri Lanka presently does not have integrated legislation or a plan for disasters. The Ministry of Social Services is responsible for any widespread emergency, including disasters. Under the new constitution, approved in 1978, district ministers are responsible for each district. Government agents act as their secretaries. Presently, coordinating committees are appointed by the Executive President in times of disaster, as in the cyclone of November 1978.

The Coordinating Committee for the 1978 cyclone was based in the capital city of Colombo where all the functions responding to the disaster were directed. Every ministry was represented. Although coordinating bodies have been useful in the past, the government believes a national disaster plan is necessary. It is envisioned that coordination would take place in the capital from which direction would be sent to the district ministries, and in turn to the provincial administrators, for implementation.

Cyclone preparedness programs in Sri Lanka are constrained by the reluctance of people to leave their homes after a warning is issued, the difficulties of disseminating warnings to migratory people, the lack of knowledge and use of cyclone-resistant housing designs and materials, and the need for better forecasting and coordination of relief operations.

## The Philippines' Experience

Colonel Victor Pagulayan

Since 1954, the Ministry of National Defense has been responsible for disaster response in the Philippines. The Office of Civil Defense was created within the Ministry of National Defense to coordinate public and private institutions' efforts to protect the civilian population in times of emergency. The functions of the Office of Civil Defense include:

- developing disaster preparedness plans and policies;
- estimating manpower, material, and fiscal requirements;
- allocating resources;
- educating the public and disseminating information on disaster response; and
- implementing the Civil Assistance Program.

In 1978, the National Disaster Coordinating Council (NDCC) was created to strengthen control over disaster preparedness in the Philippines. The Chairman of the NDCC is the Secretary of National Defense; the overall coordinator is the Executive Secretary; and the Council is composed of other Department Secretaries, the Budget Commissioner, the Assistant Executive Secretary, the Presidential Arm on Community Development, the Chief of Staff of the Armed Forces, the Secretary General of the Philippines National Red Cross, and the Administrator of the National Civil Defense Administration. At the national level, all departments are assigned responsibilities related to their normal functions. The National Disaster Control Center (NDCC) is divided into the Planning and Operations Sections, the Intelligence and Disaster Analysis Section and the Resource Section. Planning incorporates the technical services of seismologists, meteorologists, medical doctors, engineers, and economists.

There is a hierarchy of 12 Regional Disaster Coordinating Councils, 72 Provincial Councils, 60 City Councils, 1400 Municipal Councils, and 42,000 Barangay Councils. The Barangay Councils receive the NDCC's foremost attention.

The Disaster Preparedness Plan provide for auxiliary fire and police protection, emergency transportation, communication and warning systems, medical, welfare and other services. The NDCC

coordinates government agency and private organization efforts in providing advance warning of impending emergencies. There is also extensive training for volunteers.

The Emergency Broadcast System integrates government and private facilities for emergency communications. The Philippines has a vigorous public information program, which is assisted by all the media. Disaster preparedness techniques are taught in the schools. Community preparedness information is also distributed to families directly.

During the five days immediately after a disaster, the Philippines Red Cross conducts relief operations; after that period the government continues relief and rehabilitation operations. Supplies are dispersed through eight Commodity/Resource Centers. Periodic meetings are held to review operations to identify successes and deficiencies and to propose changes.

## Issues and Resources -- The Disaster Plan

Mr. James Buttimer

Mr. James Buttimer of Cresap, McCormick and Paget, Inc., a management consulting firm in Washington, D.C., presented a working draft of an illustrative national disaster plan. The plan was developed in an attempt to incorporate the planning efforts of several nations into universal guidelines. Elements of the plan include a statement of its concepts and objectives, a description of regulatory requirements and organizational structures, and the identification and delegation of responsibilities. An essential feature of the model disaster preparedness plan is that specific responsibilities would be distributed and coordinated among agencies and organizations with the appropriate experience and resources, thereby reducing the possibility that services are duplicated or not provided when needed. A related feature of the model plan is that detailed procedures for declaring a state of emergency, issuing public warnings, appropriating funds, and mobilizing resources are established in advance.

The illustrative plan establishes the structure and function of a National Disaster Assistance Organization (NDAO) which has overall responsibility for ensuring adequate national disaster preparedness and for coordinating disaster assessment and relief operations.

The responsibilities of the NDAO include:

- coordinating government, private and international organizations for disaster preparedness;
- mobilizing and allocating resources;
- initiating research to improve techniques for assessing threat and vulnerability;
- designing systems to forecast potential disasters and to warn, educate and otherwise prepare the public; and
- establishing assessment capabilities and a control center to coordinate disaster relief.

The Director of the NDAO would be a minister in the national government and would also serve as Chairman of the NDAO's National Disaster Committee (NDC). The NDC would consist of all other ministers with responsibilities that may be affected (e.g., public health, defense, interior, communications) and technical experts concerned with specific disasters or relief operations. The Committee is to identify the country's disaster preparedness requirements and review and approve the detailed preparedness plans proposed to meet those requirements. The Committee must also formulate its own contingency plans for damage assessment, search and rescue, relief, and rehabilitation operations. Additional responsibilities include updating plans and coordinating plans among the agencies and organizations represented. Actual emergency operations would be directed by the NDAO Director, with assistance from a permanent staff, until warning, search, rescue, and relief operations were completed and public health and safety were restored.

For the plan to be effective, there must be a governmental commitment to an adequate level of disaster preparedness, high level government leadership, and provisions for funding. Additionally, there must be extensive community involvement and continuous reevaluation of the plan in response to changing needs and resources.

Following Mr. Buttimer's presentation, participants offered a variety of comments regarding disaster plans. Delegates from several countries underscored the importance of drafting and implementing a national plan that identifies and coordinates responsibilities in advance. Others, however, expressed doubt that a detailed plan could be sufficiently flexible to assure a quick, effective response with a minimum of procedural constraints. With respect to some of the political and legal considerations of preparedness plans, attention was called to the implications of declaring a disaster to selectively benefit a certain segment of the population or, conversely, refusing to declare a disaster for considerations of sovereign independence or other reasons -- which effectively denies outside assistance. The need for legislative authorization and senior-level governmental support for a national plan were also discussed.

Other comments are perhaps best expressed in the following questions:

- How can the responsibilities among ministries be balanced in the plan so one ministry will not feel dominated by another?
- Is it appropriate to have a national plan that is disaster specific or a plan that addresses all disasters?
- Is it reasonable to suppose a minister will be able to dedicate the necessary attention to disaster preparedness, given competing responsibilities?
- Can a plan effectively integrate the inputs of both the public and private sectors, as well as bilateral or multilateral assistance?
- Can a plan reduce the time required to attend to procedural details, reduce the duplication of effort, and maximize the use of resources?

Another concern expressed in the context of the model plan focused on who should do the planning. Should the planning be done at the top, with order sent down to the community? Or should the community be involved with the formulation of plans and, if so, to what extent? Nepal has opted for the grassroots-up approach, with the village panchayats playing a major role in planning. Pakistan considers the input from disaster victims at the community levels (district) in making their plans. In Pakistan, the district authorities work closely with higher authorities and with the community to make disaster plans. In the Philippines, the 42,000 barangays have the foremost attention of the Civil Defense Operations Center. In Burma, orders are issued from the central government and are implemented at all levels, but the local elected township authorities are involved in the planning process. The Indian state of Tamil Nadu involves village leaders in formulating all aspects of the disaster preparedness plan.

Issues and Resources -- Disaster Preparedness Legislation

Mr. Robin Morison

Mr. Robin Morison, Chief of the Asia and Pacific Section for the United Nations Disaster Relief Office (UNDRO), addressed the question of whether or not to formalize disaster preparedness plans by enacting legislation. Specifically, three types of legislation were discussed:

1. Enabling legislation

- a. to establish the authority and executive elements to coordinate public and private, state, federal and international disaster preparedness activities;
- b. to identify the conditions for declaring a disaster and the powers and procedures to be in force in times of a disaster;
- c. to establish a disaster warning and communication system; and
- d. to support the disaster preparedness work of existing institutions.

2. Compensatory legislation

- a. to reimburse funds expended by private organizations or individuals while rendering authorized disaster assistance;
- b. to limit the legal liability and to compensate for the injury of volunteers engaged in authorized disaster relief efforts;
- c. to establish financial and administrative arrangements for post-disaster reconstruction.

3. Land use legislation

- a. to identify areas of greatest vulnerability; and
- b. to prevent or mitigate disasters by establishing and enforcing building codes and land use planning based

on systematic analysis of vulnerability. This may entail the resettlement of people and/or the discontinuation of traditional agricultural practices.

In response to a delegate's expression of fear that legislation might be followed by legal and administrative entanglements, Mr. Morison responded that the question is not whether to legislate, but whether to formulate detailed plans and procedures. Since it is the government's responsibility to protect life and property, it must be able to declare an emergency and invoke special powers. At the very least, it must establish the authority to warn and evacuate citizens, to mobilize resources, and to coordinate disaster-related activities. If the necessary legislation is enacted and plans and procedures are established before a disaster strikes, measures to mitigate the effects of an actual disaster can be undertaken without delay.

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Issues and Resources -- Resources for Preparedness

Colonel Victor Pagulayan

Colonel Victor Pagulayan, Administrator of the Philippine Office of Civil Defense, Ministry of National Defense, outlined the elements of the program employed in the Philippines to prepare, mobilize, and allocate resources to prevent or mitigate the effects of disasters:

- Training personnel who in turn train elected officials;
- Conducting public information campaigns;
- Incorporating the study of natural disasters into the school curriculum;
- Conducting drills;
- Establishing a network of institutions capable of forecasting earthquakes, cyclones, epidemics, air crashes, and oil spills;

- Using all available means, including sophisticated instruments and people with extrasensory perception, to predict potential disasters;
- Making school buildings evacuation centers;
- Establishing an emergency broadcast system, capable of issuing warnings on a regional basis;
- Integrating all communications systems to assure alternative means of communication if one means should fail;
- Coordinating public and private, local, regional, national and international efforts;
- Stockpiling materials that may be required during and after a disaster;
- Soliciting clothing and other essential items from communities;
- Allocating funds (at both the national and provincial levels) for rehabilitation; and
- Assessing and improving disaster preparedness plans and procedures.

In conclusion, Colonel Pagulayan stressed the importance of maximizing the use of internal resources to achieve national self-reliance, with each community and organization offering its own expertise and resources, regardless of how limited they may be.

Subsequent discussion focused on the need to improve and exchange training materials and techniques, to conduct an inventory of resources, to stockpile materials, and to exchange disaster preparedness information and expertise within and among the countries of South Asia.

## Issues and Resources -- Community Preparedness

Mr. B. Rajagopal

To a great degree, disaster preparedness is a function of community preparedness. Immediately before, during, and after a potential or actual disaster, each community usually has to depend on its own resources. Thus, community participation in all aspects of disaster preparedness — from planning to reconstruction — contributes significantly to the overall level of national preparedness.

Mr. Rajagopal, Joint Director, State Town Planning Directorate, Tamil Nadu, India, discussed community preparedness in terms of some of the major issues:

- establishing a warning system;
- developing training programs;
- implementing fiscal planning;
- using the results of vulnerability studies to manage land use;
- stockpiling and mobilizing resources;
- providing emergency shelter, medical care, and sanitation;
- compensating persons for losses; and
- protecting and restoring public utilities.

One especially noteworthy achievement of Tamil Nadu has been the initiation of a program to construct an anti-cyclone community shelter within one kilometer of every vulnerable hamlet. Thirty-two shelters have been funded; two are completed; twenty-five are being constructed. The circular shelters are from 2.5 to 13 meters above high tide, depending on the severity of the storm surge in the area. Each shelter includes an office area, a central cooking area, water supply, storage, bathing, and sanitation facilities. The second floor is a large dormitory and the roof is a helicopter landing area. Between October and December, the shelters are available exclusively to provide refuge from cyclones. Otherwise, the shelters are used as community centers. The scale model provided well illustrated salient features of the construction program.

In Tamil Nadu, the level of preparedness is raised by using mass media to increase public awareness of measures to prevent or mitigate disasters. Warnings of emergencies are communicated through the police network, by megaphone, and drum. Asked about rehabilitation in Tamil Nadu, Mr. Rajagopal indicated that some persons receive assistance to rebuild their huts, whereas others are resettled in less vulnerable locations. In either case, however, the construction or reconstruction of homes following a disaster is viewed as an opportunity to introduce new building techniques and materials that are more disaster resistant. Although several delegates expressed concern about the increased potential for abuse when cash (rather than commodities) is provided to compensate for losses, Mr. Rajagopal suggested that low interest business loans be considered as one way of providing relief to cottage industries and farmers who experience great losses.

## Shelter

Mr. Ludovic Van Essche

The factors that determine the need for emergency shelter following a disaster are closely related to the country's need for housing in general: land use practices, climate, threat and vulnerability, population densities, migratory patterns, social, political and economic conditions. Consideration of the need for emergency shelter should, therefore, be based on input from land use managers, engineers, social and economic planners, community members and disaster relief experts.

A major problem with emergency housing is that donated supplies often arrive too late to be useful. Mr. Van Essche, Chief of the Africa, Europe and Middle East Section of UNDRO, cited the Managua earthquake of 1972 as an example of such a situation. By the time the imported, pre-fabricated housing arrived, most of the survivors of the earthquake were in tents or improvised shelters--and the rate of occupancy of the imported houses was never more than 60 percent, due to late arrival.

Another problem is that temporary housing often becomes permanent housing. People's expectations are raised but later dashed if they are left too long in temporary housing. Mr. Van Essche advocated consideration of permanent, self-help housing projects whenever possible.

Efforts to evacuate people from their homes should always be undertaken with an awareness of cultural traditions. To increase the likelihood that people will heed warnings and leave their homes when necessary, evacuation centers should be close to their homes -- within sight, if possible -- and protection of the contents of their homes should be assured. Community centers and schools can be designed and built to serve as evacuation centers, thereby reducing the necessity for displaced persons to be moved great distances from their homes.

International Assistance -- The Role of the League  
of Red Cross Societies

Mr. Alfred Schmid and Mr. Hiroshi Higashiura

In both its national and international capacity, the League of Red Cross Societies (LRCS) endeavors to prevent and alleviate human suffering, to protect life and health, and to ensure respect for the human being. The League is the federation of the 125 national Red Cross and Red Crescent societies. Each national Red Cross society is an independent organization, sanctioned by the government in which it functions, often used as an auxiliary of government. The national societies keep LRCS informed of every large-scale disaster occurring within their countries, the extent of the damages, and the measures taken by the societies to provide relief.

The role of the Red Cross/Red Crescent varies from country to country. Usually, in countries with a national plan, the Red Cross' tasks are identified before emergencies arise; in countries where there is no disaster preparedness plan, the Red Cross assists countries to develop and implement plans. In general, the Red Cross does very little long-term rehabilitative work. Rather, it conducts surveys and assessments; implements community preparedness programs; engages in warning activities; performs evacuation and rescue work; stockpiles essential materials; and provides food, clothing, shelter, and social welfare services. In 1976, the Red Cross published and distributed the Disaster Relief Handbook which lists the emergency supplies and equipment to be on hand in the event of a disaster. LRCS also publishes Country Fact Sheets containing data on demography, topography, cultural factors, major crops, governmental systems and agencies involved in disaster preparedness. LRCS has four permanent, regional warehouses in which relief supplies are stockpiled.

Among its disaster preparedness projects in South Asia, the Red Cross has helped introduce mobile disaster units and stockpile supplies in Afghanistan, develop a cyclone disaster warning system in Bangladesh, and conduct training programs in remote areas of Burma.

International Assistance -- The Role of UNDR0

Mr. Robin Morison

The goal of the Office of the United Nations Disaster Relief Coordinator (UNDR0), as described by Mr. Morison, is to facilitate the process of coordination among donors and recipients for disaster relief by:

- fostering a common strategy and common goal at the national and regional levels;
- acting as a clearinghouse for information on disaster preparedness;
- coordinating requests for disaster assistance;
- providing a focal point for the receipt and distribution of contributions;
- assisting countries in obtaining appropriate assistance;
- providing assistance in damage assessment; and
- acting as liaison with LORCS and UN agencies.

Support for UNDR0 stems from the recognition that coordination increases the possibility of recipient countries receiving what they need at the appropriate time; it reduces waste and graft, and helps prevent logistics bottlenecks. Since resources are limited, donors emphasize the need to pool those resources and minimize duplication of effort. To increase the effectiveness of the international relief effort, UNDR0 tries to assess exactly what is needed, in what quantities, when and where. Occasionally, however, UNDR0's role is constrained by factors such as a donor government's desire to provide only bilateral assistance, or by a recipient government's refusal to declare a disaster or otherwise prevent the UNDR0 staff from assessing needs or serving as a clearinghouse.

Mr. Morison recommended that each country create a disaster group representing government agencies and other private and public, domestic and international organizations capable of providing disaster assistance. The purpose of the group would be to assist with preparedness planning, help draft appropriate legislation and to disseminate information about the line of authority and procedures for response in time of disaster.

Mr. Morison also recommended that the governments of South Asia provide authoritative information to UNDRO through their UNDP Resident Representative, request UNDRO's assistance in assessing damage and determine as precisely as possible the assistance required before making a public appeal.

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International Assistance -- The Role of OFDA

Senator Anne Martindell

Senator Anne Martindell, Director of the Office of U.S. Foreign Disaster Assistance (OFDA), explained the role of the United States in disaster assistance. The first U.S. assistance offered to another country during a disaster was in 1812, following a severe earthquake in Venezuela. Between 1964 and 1978, OFDA provided relief in nearly 600 disasters in over 100 countries.

OFDA receives requests for disaster assistance through the U.S. ambassador in the country affected. Once a disaster declaration is made, an assessment team from OFDA is offered if necessary. Frequently, the U.S. channels disaster assistance through U.S. voluntary agencies within the stricken country since they are both familiar with the procedures of the U.S. and the recipient country and have distribution systems in operation.

Mrs. Martindell stressed the importance of disaster preparedness and early warning. She emphasized the need to bring the proper decision makers and technical experts together for preparedness planning. In addition, Mrs. Martindell stated that the U.S. is willing to share information, experiences and technological expertise to assist with the disaster preparedness activities of the countries of South Asia.

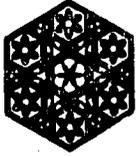
### International Assistance -- Problems and Constraints

Mr. T. A. Gunasekara (Sri Lanka) (Moderator), Mr. S. P. Mukherji (India),  
Mr. Hayatullah (Afghanistan), Brig. Sher Ali Baz (Pakistan),  
Mr. U Ohn Myint (Burma)

When a disaster threatens to deplete a country's own stockpile of supplies or technical capabilities, assistance may be needed from elsewhere. Whether the additional assistance is purchased or donated, the problem is to assure that the assistance is appropriate and timely. Cultural characteristics may pose constraints, as may climate, geography and religion. Medicines should conform to the nature of the medical emergency, should remain potent at least six months, and should be clearly labeled as to content and expiration date. Instructions on the bottles should be in the language of the recipient.

To assure that international disaster assistance is appropriate to the needs of a country stricken by disaster, India recommended that each country make a list of supplies that are useful. Bangladesh expressed the need to open channels of communications with donors, and to monitor and coordinate their donations. Sri Lanka suggested that countries work more closely with UNDRO which is prepared to coordinate the solicitation of supplies. Both Pakistan and Nepal discussed the need for UNDRO to play a more active role in disaster assistance.

All of the delegations at some point during the Seminar made recommendations in support of regional cooperation. Afghanistan recommended that emphasis be placed on cooperative measures to prevent disasters, and the Nepalese delegation advocated regional cooperation among Pakistan, India, Bangladesh, Burma, and Nepal on water resources. Bangladesh recommended that the countries of South Asia create a regional stockpile of supplies, and that UNDRO coordinate activities among national research and development centers. Burma suggested that an office be established to facilitate disaster preparedness efforts throughout the region; and India suggested that cooperative efforts be undertaken to transfer information and technology to improve disaster prediction and warning systems.



# South Asia Disaster Preparedness Seminar

## IV. RECOMMENDATIONS OF THE SOUTH ASIA DISASTER PREPAREDNESS SEMINAR

### NATIONAL

#### 1. Organization of Disaster Management

Countries should establish an office for disaster preparedness effective at all levels.

#### 2. Disaster Legislation

Disaster legislation should be simple and beneficial. There is need for both disaster legislation and a code definition of what it covers.

#### 3. Community Participation

Involvement of volunteers from within the community for counter-disaster activities should be encouraged to stimulate participation of village people who take interest in protecting their own welfare and working towards their own development.

### REGIONAL

#### 4. Regional and Bilateral Cooperation

- a. Cooperation in planning and designing of disaster plans should be increased.
- b. There should be more cooperation on afforestation, flood and cyclone warning, communication, flood control, etc.
- c. Cooperation in terms of shelters, huts, outboard motor boats, medicaments, vaccination, rescue operation, etc. is encouraged.



# South Asia Disaster Preparedness Seminar

- d. Stockpiling of relief goods should be to regional advantage.
- e. Technical cooperation in scientific fields should be carried out.
- f. Regional studies and seminars should be more frequent. A regional seminar should be held once every two years.
- g. Designs and plans of prototype equipment and stores should be made and shared for mutual advantage.

## 5. Mutual Visits

There should be mutual visits to each others' institutions and installations.

## 6. Case Study

A case study should be assigned to a study group which should be formed by each country to prepare a presentation on those disasters suffered by respective countries. These reports can be distributed at the next seminar.

## 7. Mutual Assistance Agreements

Discussion should be held on mutual assistance programs in general to study the possibilities for establishing mutual assistance agreements and working arrangements.

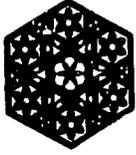
## 8. Regional Coordination Cell

It is desirable to establish a regional coordination cell, perhaps in Sri Lanka.

## INTERNATIONAL

## 9. Financial and Technical Assistance

The United Nations, including its specialized agencies, the League of Red Cross Societies, other voluntary agencies and USAID should render more financial and technical assistance to the region.



# South Asia Disaster Preparedness Seminar

USAID and the UN should organize training courses and studies for the region.

## 10. Satellite Operation

Appropriate international organizations should widen the operation of Landsat and meteorological satellites and extend their coverage of the entire area. Satellite receiving stations should be added where necessary.

## 11. Radar Coverage

Areas still not covered by weather radar should be assisted by appropriate international organizations and the necessary coverage provided.

## 12. Seismic Stations

More seismological stations should be established to assist in earthquake prediction research in the region. Assistance in determining appropriate locations is required.

## 13. Dissemination of Materials

USAID and UNDRO are requested to disseminate more technical materials and papers to all countries of the region.

## 14. Periodic Visits

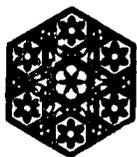
Officials of USAID and UNDRO are requested to make periodic visits to the region to exchange ideas on disaster preparedness problems.

## 15. Role of UNDRO

UNDRO is requested to play a more positive role and to coordinate all disaster activities in this region. UNDRO should continue studies on all aspects of disaster and emphasize disaster management education by holding more seminars, conferences, etc.

## 16. Disaster Assistance by Donor Countries

Donor country disaster assistance should be entirely on a humanitarian basis and for no other reasons.



# South Asia Disaster Preparedness Seminar

## 17. Stockpiles

Appropriate international organizations should place regional stockpiles of relief goods in areas that would maximize quick relief response.

## 18. Disaster Prevention Versus Relief

Disaster prevention and preparedness should be emphasized more than relief and funding of prevention programs should be carried out by the UNDP, USAID and the World Bank.

## 19. Agricultural Contingency Plans

Contingency plans should be prepared in flood prone areas for evacuation of the population in case of disastrous breaching of embankments, etc., including legislation for land use zoning so as to minimize loss of life and reduce damage to the agricultural economy. This may also include improved methods of preserving seeds and grains against storms and floods and protecting farm animals and equipment loss.

Recommendations Offered and Coordinated by: Brig. Sher Ali Baz  
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