systems A project is ongoing to rehabilitate and improve service related to meteorology and hydrology in Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama (Proyecto para la Rehabilitación y Mejoramiento de los Servicios Meterológicos e Hidrológicos del Istmo Centroamericano—PRIMSCEN), with the support of Finland, WMO, and the Regional Committee on Water Resouces.

Several projects on flood control have been carried out in Jamaica, including mapping of flood-prone areas, improvement of control practices, and development of a flood forecast and warning system In addition, the Dominican Republic has begun a project on management of reservoirs and flood control in the Yaque del Sur river basin. In Brazil, projects are under way for monitoring the Tocantins River in the Amazon basin, and in the State of Rio de Janeiro a forecasting and warning system is being set up for flood control as part of an integrated system to manage water resources and a program for the recovery of rivers and watersheds (see Box 5 14).

Seismic monitoring networks and systems have been developed at the national and regional levels, mainly in association with universities or vulcanologic and seismologic observatories. At the national level, the Centro Peruano-Japonés de Investigaciones Sísmicas y Mitigación de Desastres (Center for Seimic Research and Disaster Mitigation—CISMID) in Peru and the Centro Nacional de Prevención de Desastres (National Center for Disaster Prevention—CENAPRED) in Mexico have, with the support of Japan, installed seismograph and accelerograph networks. Other regional organizations that have improved monitoring systems are the Centro Regional de Sismología para América del Sur (Regional Center of Seismology for South America—CERESIS), CEPREDENAC, and the Seismic Research Unit (SRU) of the University of the West Indies in Trinidad. The Caribbean Meteorological Organization (CMO) is comprised of 16 English-speaking Caribbean governments and has responsibilities for issuing warnings to members who do not have forecasting capabilities, since it has been agreed that it is not necessary for every Member State to develop such a capability

Water Supply and Sanitation Systems

Although the attention of the public and the mass media is focused almost exclusively on the deaths and injuries caused by natural hazards, these problems are short lived The effects of disasters on the water supply, however, affect more lives and don't disappear in a few days' time. After the 1985 earthquake in Mexico City, some 2 million people, one fifth of the capital's population, did not have access to water. At that time the city had the largest and most complex water system in the world, and normal service was restored to the population only after 40 days of round-the-clock work.

In the mid-1980s, the countries of Latin America and the Caribbean adopted preparedness for the water and sanitation authorities as a priority. People were trained in modern administrative techniques, especially in planning methods and risk management, with the support of the Pan American Center for Sanitary Engineering and Environmental Sciences (CEPIS), based in Peru, and using technical material developed with the assistance of PAHO/WHO.

In Peru, water authorities are experimenting with new methods for imple-

Box 5.13

THE SUCCESS OF EARLY WARNING IN CUBA

The early warning system used in Cuba is an excellent example of employing appropriate technology developed at the community level. Hurricanes and tropical storms that recently affected the island caused severe infrastructure damage and economic loss, but cost surprisingly few lives. An efficient system of monitoring flood levels and forecasting hurricanes, together with a strict policy on timely evacuation from potential risk areas, deserves credit for the few deaths that occurred. However, two unexpected effects ensued from the low number of fatalities: first, there was scant coverage in the mass media about the disaster, and second, little support was offered from donor communities.

Source: PAHO/WHO

Box 5.14

MONITORING FLOOD CONDITIONS IN COSTA RICA

Photo: PAHO/Wash

The watershed along the Atlantic coast of Coast Rica is an area repeatedly affected by major floods. The zone receives an average of 4,000 mm of rainfall annually. The seasonal vulnerability to flooding was exacerbated following the 1991 earthquake of Limón, Costa Rica, when vegetation cover was lost and enormous amounts of sediment accumulated in river basins increasing flood levels. Landslides brought on by the earthquake along the river basins, and standing water in low-lying areas were considered risk factors for serious flood conditions during future rainy seasons.

To address these risks, a plan to monitor hydrometeorological and geological events in the Atlantic region was implemented. Nineteen monitoring posts were located strategically in the river basins and outfitted with communication equipment and gauges to measure rainfall and river level. Indigenous settlements comprise the majority of communities in this area, and the operation and management of the monitoring system is executed principally by community members. This factor helps to ensure that early warnings of serious flood conditions are made known to the local population.

The main objective of this monitoring plan, which is to reduce the risk of death by floods and landslides, has been met. Since its implementation in 1991, flooding in this region has been the most serious experienced in over 70 years. Despite this fact, only three people have died as a result of flooding in this period.

The Plan has received technical and financial support from regional and international organizations such as CEPREDENAC and UNICEF, and is coordinated by the Hydrometeorological Section of the Costa Rican National Emergency Commission.

Source: CNE (Costa Rica)

menting emergency plans. The results obtained by Lima's SEDAPAL company have been disseminated widely in other countries in the Region. Contingency plans and other similar activities have been implemented in Argentina, Chile, and Ecuador. Mexico has placed particular emphasis on this priority, carrying out disaster preparedness activities in the water companies of four large cities: Monterrey, Tijuana, Guadalajara, and Mexico City. This subject area is now included in the curricula of the schools of sanitary, environmental, and civil engineering in universities in Brazil, Colombia, Ecuador, Mexico, Peru, and Venezuela. The subject has become important in regional organizations, such as the Inter-American Association of Sanitary Engineering (AIDIS), which is playing a leading role in training and preparedness in this sector.

Management of Relief Supplies (SUMA)

To put order to chaos, SUMA—the Supply Management Project—was designed by PAHO/WHO with the support of the Government of the Netherlands to assist in solving the vast and complex problem of management of relief supplies. Immediately following a major natural disaster, large donations of pharmaceutical products, medical and relief supplies arrive from other areas of the affected country or from abroad. Most donations have not been requested, and their usefulness, in terms of immediate needs, is questionable. Overwhelming logistics problems may prevent the affected country from sorting through and classifying these items, which quickly fill warehouses. Knowing the exact contents of shipments makes it possible for the country and the international community to better manage post-disaster relief supplies. The principal objectives of SUMA are to develop and maintain a national and regional capacity to manage the donated supplies and equipment; to facilitate the distribution of key supplies, marking them clearly upon their arrival; and to collaborate with neighboring countries to form trained teams to help at disaster sites For this purpose more than 400 people have been trained in Central America, the Andean countries, and the Caribbean

The importance of SUMA does not rest on its high technology (network of portable computers, telecommunications, and other inputs) but rather on its emphasis to develop a national capacity with the support of neighboring countries. This is a critical concept at a time when the international community—in this case the Western countries—has a tendency to export its own experts and technology to solve problems—real or perceived—created by disasters.

Hospital Preparedness

Despite the loss of more than 20,000 beds as a result of disasters in the last 20 years, the use of field hospitals and medical teams from developed countries has never been justified. There are more than 13,000 hospitals in the Region, and in many countries there are sufficient national or local resources to respond to any demand caused by disasters. The key to this self-sufficiency has been the training of hospital personnel. In the 1980s the health sector and PAHO/WHO promoted hospital preparedness for disasters on a large scale. Hospital emergency plans were elaborated and put into practice throughout the Americas, health aspects of disasters became part of the continuing education for health profes-


ARIEL

Photo facing page:

International assistance can be a mixed blessing. The overabundance of donated medical supplies kept Mexican health personnel from attending to other more pressing tasks.

Photo: Vizcarra, PAHO/WHO

sionals, and multisector emergency simulations in hospitals were carried out.

With the initiation of the IDNDR, most hospitals in the largest cities in the Americas have emergency plans for external and internal disasters, organize services in emergency situations, and set up criteria and guidelines for evacuating health facilities. However, health sector workers are also aware of the vulnerability of the old buildings they work in, and how little has been done to reduce this risk.

THE MORAL OF PREPAREDNESS

Maintaining a state of disaster preparedness year after year can be a challenge, especially in countries that experience long periods of relative "calm" between emergencies. The progress made by Latin America and the Caribbean has been spectacular, and achieved in a relatively short period of time. This is due to the government agencies that coordinated and led the work, and the existence of previously prepared, tested, and evaluated plans.

Still, one must not fall into the trap of believing that a country or community is prepared simply because a disaster plan or law exists. In many cases, these plans are simply "paper exercises" that have never been tested or practiced. To make a true contribution to preparedness, these plans must represent a consensus of all the participants involved. Preparedness depends on people and on the institutions they organize.

Although disaster response is more effective when it is local or regional, the most effective preparedness, especially in the Caribbean and in Central America is achieved through collective or intercountry efforts. And the most effective assistance is the support for national preparedness initiatives.

Disaster preparedness alone is not enough to meet the countries' needs and expectations for reducing the effects of disasters. Disaster management, or what has been termed disaster reduction, must become a priority area, and disaster mitigation and prevention are keys to reaching that goal.

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