

Disasters: Latin America and the Caribbean

In Latin America and the Caribbean, the main natural hazards are droughts, hurricanes, cyclones, tropical storms, floods, tidal waves, avalanches, landslides and mudslides, earthquakes and volcanoes. Mining and oil spill accidents represent the main human-caused disasters in the region.

A total of 65 260 deaths due to natural disasters were reported in the region during the 1990s. The deaths were mainly a result of floods (54 per cent), epidemics (18.4 per cent), storms, cyclones and hurricanes (17.7 per cent), earthquakes (5.2 per cent) and landslides (3.2 per cent) (CRED-OFDA 2002). Considering that floods and landslides are often associated with storms and hurricanes, this means that three-quarters of total human losses due to natural disasters in the region have a hydrometeorological origin.

The number of deaths due to disasters declined markedly between 1972 and 1999, coinciding with the global trend. Total fatalities in the 1990s were less than one-third of those in the 1970s while the number of people injured fell by almost one-half (after rising by nearly 30 per cent in the 1980s) (CEPAL 1999). This trend can be explained by fewer severe earthquakes in densely populated or highly vulnerable areas and by the establishment of early warning systems and disaster-preparedness measures in some countries over the past 30 years (PAHO 1998). Economic losses caused by disasters increased by almost 230 per cent between the 1960s and the 1990s (CEPAL 1999), again reflecting a global trend.

Hydrometeorological events

The best known hydrometeorological event is the El Niño phenomenon, the impacts of which can be severe. For example, after the El Niño of 1983, Peru's GDP fell by 12 per cent, mostly because of a reduction in agricultural output and fishery. The national economy took a decade to recover. Damage in the Andean Community countries (Bolivia, Colombia, Ecuador, Peru and Venezuela) due to the 1997/98 El Niño was estimated at more than US\$7 500 million (CEPAL 1999).

Most countries in Central America and the Caribbean are within the hurricane belt, on both the Atlantic and Pacific coasts. Hurricane Mitch, which

El Niño and epidemic diseases

Cyclical temperature and rainfall variations associated with El Niño are particularly important since they can favour the development and proliferation of vectors of epidemic diseases such as malaria, dengue fever, yellow fever and bubonic plague (WHO 1999). In South America, the most severe outbreaks of malaria generally occur a year after the beginning of an El Niño event, whether associated with an increase in rainfall (as in 1983 in Bolivia, Ecuador and Peru) or with a reduction in rainfall and run-off (as in Colombia and Venezuela).

A similar link has been suggested between the warming of superficial oceanic waters by El Niño, the proliferation of marine algae, and the appearance of cholera in South America in 1992. The impact of extremes in precipitation (both too much and too little) is also important in the transmission of water-borne diseases such as cholera, gastrointestinal infections and various types of diarrhoea. There were outbreaks of cholera in 1997–98 in Honduras, Nicaragua and Peru related to the increase in precipitation, associated with El Niño (WHO 1999, PAHO 1998).

struck the region in 1998, affecting mostly Honduras and Nicaragua, killed more than 17 000 people and left three million homeless with damage estimated at US\$3 000 million. The hurricane also caused fatalities and serious environmental and economic damage in Costa Rica, Dominican Republic, El Salvador and Guatemala (CRED-OFDA 2002).

The 1999 floods on the northern coast of Venezuela also had a strong impact, with damage estimated at more than US\$ 3 200 million or 3.3 per cent of the country's GDP (World Bank 2000). In the state of Vargas, the hardest-hit area, more than 230 000 jobs were lost. The state of Miranda was also badly hit: the El Guapo dam collapsed, causing water shortages and 60 per cent of crops were reported lost (MoPD Venezuela 2000). It is estimated that there were 30 000 deaths, 30 000 families left homeless and more than 81 000 dwellings destroyed (IFRC 2002).

Ecological and social impacts of earthquakes in El Salvador

The series of earthquakes that shook El Salvador in early 2001 began with one of 7.6 on the Richter scale that was initially considered an isolated event. However, it was only part of a series that spanned weeks and demonstrated the complex social and ecological implications of such events. Besides the loss of life and infrastructure during the original series of earthquakes, there has been a long-lasting impact on people and ecosystems. For example, the artisanal fishery lost an essential part of its docking infrastructure as well as service infrastructure for processing fish and transporting it to the market on land. A total of 30 772 farms were damaged and farmers were forced to wait for three months for the rains because they did not have the funds to repair their damaged irrigation systems. The destruction of 20 per cent of the country's coffee processing plants severely affected the jobs and income of thousands of rural families in a country that was also affected by Hurricane Fifi in 1974, civil conflict between 1978 and 1992, the 1986 earthquake and Hurricane Mitch in 1998.

Source: UNICEF 2001

Geological events

Seismic and tectonic activities are particularly intense along the Pacific Ocean coast and in the Caribbean basin due to pressures generated between oceanic and continental plates. Such activity creates a relatively high risk of earthquakes, tsunamis and volcanic eruptions which in some areas add to the already high risk of hurricanes and floods. Between 1972 and 1999, extreme geological events killed 65 503 people and affected 4.4 million others (CRED-OFDA 2002).

Vulnerability to natural hazards of Caribbean countries

	<i>hurricanes</i>	<i>earthquakes</i>	<i>volcanoes</i>	<i>floods</i>	<i>drought</i>
Antigua and Barbuda	●	●	●	●	●
Bahamas	●	●	●	●	●
Barbados	●	●	●	●	●
Belize	●	●	●	●	●
Cuba	●	●	●	●	●
Dominica	●	●	●	●	●
Dominican Republic	●	●	●	●	●
Granada	●	●	●	●	●
Guyana	●	●	●	●	●
Haiti	●	●	●	●	●
Jamaica	●	●	●	●	●
Saint Kitts and Nevis	●	●	●	●	●
St Lucia	●	●	●	●	●
St Vincent and the Grenadines	●	●	●	●	●
Surinam	●	●	●	●	●
Trinidad and Tobago	●	●	●	●	●

● = high vulnerability ● = medium vulnerability ● = low vulnerability

Human-caused disasters

Certain disasters such as spills of hazardous chemicals and oil products have a technological origin. In the Orinoco River delta and neighbouring regions of Venezuela, for example, the use of cyanide and mercury for gold extraction has increased by 500 per cent over the past decade with the growth in the exploitation of the mineral. In the Caroni Basin alone,

3 000 kg of mercury have been dumped and a spill of 1.5 million litres of cyanide-polluted waste has been reported in the Omai and Esequibo rivers in neighbouring Guyana (Filártiga and Agüero Wagner 2001, AMIGRANSA 1997). The largest regional oil spill was an underwater oil blow-out of the Ixtoc well in Campeche Bay in 1979, the second largest in world records at more than 500 000 tonnes (Cutter Information Corp 2000).

Policy responses

Many countries, especially those located on islands, are vulnerable to natural disasters (see table). The major concerns with regard to policy include the following (UNEP 1999):

- deficiencies in disaster prevention, including the lack of zoning of vulnerable areas during the development planning process;
- weak mitigation mechanisms;
- deficiencies and limited use of anti-seismic building measures, as well as inadequate administrative arrangements and human resources for enforcement;
- lack of insurance policies for low-income households; and
- inadequate support systems for affected communities.

Improving management is critical to disaster reduction, especially non-structural mitigation actions using natural mechanisms. For example, wetlands reduce floods, woodlands reduce landslides and mangroves lessen the effect of coastal storms and extreme tides. In general, good land use maintains healthy ecosystems, provides resources and facilitates non-structural mitigation action. This strategy is particularly attractive in countries where risk insurance and structural mitigation come at a high price.

Given the enormous economic, social and environmental burden of disasters, considerable attention has been paid during the past decade to disaster preparedness, assessment and mitigation. Many of the actions took place in the context of the International Decade for Natural Disaster Reduction (IDNDR). At the regional level, its mandate for promoting international cooperation in this field was supported by the Inter-American Conference on Natural Disaster Reduction held in Cartagena, in March 1994.

Vulnerability to natural hazards: a geo-referenced index for Honduras

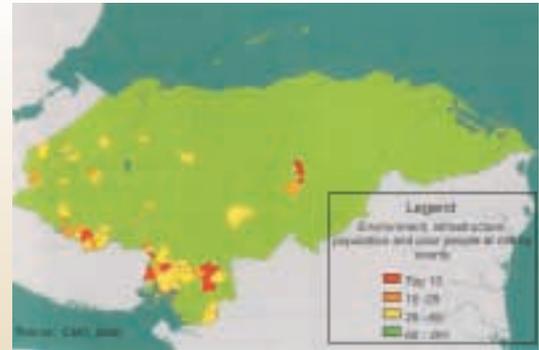
Pre-existing conditions in the environment, demography, social system and infrastructure are among the major factors of vulnerability. The Centro Internacional de Agricultura (CIAT)-UNEP-World Bank rural sustainability indicators have generated a geo-referenced index of vulnerability that combines geographic information from four maps.

The environmental vulnerability map highlights areas at risk from landslides and flooding using data on forests, rivers, topography, slopes, soil permeability and vegetation. The population vulnerability map displays the population density per

county and the social vulnerability map adds data on incomes and poverty. The infrastructure vulnerability map adds data on electricity lines and roads.

These four maps are then combined (see map right) to show the 60 counties of highest priority for disaster prevention and rehabilitation (top 10 in red, next 15 in orange and the other 35 in yellow). The information provided by the maps answers major questions such as why are some counties more vulnerable than others, what can be done about it and where should interventions be focused?

Source: Segnestam, Winograd and Farrow 2000



Several countries in the region — such as Brazil, Costa Rica, Cuba, Chile, Colombia, Guatemala, Nicaragua and Panama — have created and strengthened national institutional frameworks in the area of disaster management. These include the Centre for Coordination of the Prevention of Natural Disasters in Central America, established in 1988, and the Caribbean Disaster Emergency Response Agency, established in 1991. Under the auspices of the Organization of American States, the Inter-American Convention to Facilitate Disaster Assistance was adopted in 1991 and entered into force in 1996 (PAHO 1998).

Experience has shown the positive effects of planning and building institutional capacities. A

fundamental element is to strengthen and standardize data production methods at a regional level, not only to prevent inconsistencies during emergencies but also to assess losses. Also important are efforts to identify the vulnerability of the territories and populations when faced with natural and human-made hazards (see box). The prevailing disaster response is directed towards risk management. It has a growing component of local and community participation, and makes non-centralized use of non-governmental organizations and citizen groups. Within this framework, a new vision is emerging: the development process must reduce risk by lessening populations' and territories' social, economic and environmental vulnerability.

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