Natural Disasters

"Natural disasters are part of the environment in which we live. We cannot eliminate them, but if we work together, both locally and internationally, we'll be able to limit the loss of life and the destruction they cause."

Jan Eliasson
Under-Secretary-General for Humanitarian Affairs

Pompeii and Herculaneum were once beautiful cities in Italy just off the coast of the Bay of Naples. In 79 A.D., a colossal volcanic eruption of Mount Vesuvius destroyed them completely, killing hundreds of people. For over 1,600 years, these cities lay buried under cement-like volcanic matter. Then, in 1709, a well-digger accidentally broke his spade in what used to be a theatre in Herculaneum, and the world rediscovered the long-lost cities.

Volcanic eruption is just one of the many kinds of natural disasters that hit the world from time to time. Cyclones, earthquakes, floods, forest fires and other natural disasters claim hundreds of thousands of lives each year and damage property worth billions of dollars. In 1931, more than 3.7 million people lost their lives due to floods of the Hwang-ho River China. In 1989, more than 60,000 people became homeless when a hurricane lashed across the Caribbean Sea. And in March 1992, more than 36,000 buildings were destroyed after an earthquake struck Turkey.

In the past, many people believed natural disasters were sent by gods to punish them for their sins and there was very little they could do about such disasters. Now we do have enough experience and ability to reduce the impact of natural disasters by taking early precautions. We know years in advance which regions are likely to be hit by natural hazards. Satellites, for example, can forecast the approaches of floods and cyclones; seismographs can record the force and direction of an earthquake. As you will see from this leaflet, countries which take precautions in time are able to reduce greatly their loss and suffering from such disasters.

Through the United Nations, the countries of the world are working together to minimize the harm caused by natural disasters. With this end in mind, they have declared the 1990s the International Decade for Natural Disaster Reduction (IDNDR). During this Decade, a concerted effort is being made to reduce the loss of life and destruction caused throughout the world by the violent forces of nature.

Estimates of the major disasters which occurred worldwide (excluding the United States) from 1900 up to 1988, indicate that, in these 9 decades, about 339 million people have been affected by floods, with a total of 36 million rendered homeless; 26 million have been affected by earthquakes, with similar numbers affected by typhoons and cyclones, creating another almost 10 million homeless people; finally, 3.5 million have been affected by hurricanes, resulting in 1.2 million people without homes. From 1970 to 1981, floods were the most frequent disaster, comprising more than one-third of all disasters occurring in that decade. Windstorms were the next most frequent disaster (one fourth of the total number), while earthquakes caused the greatest number of deaths and monetary loss.

The actual numbers killed in disasters is estimated to be some 3 or 4 times higher in developing countries than in the developed. The striking difference however is in the number of survivors who are affected, which is estimated to be some 40 times higher in the developing countries. One must presume that this indicates a massive psychosocial as well as physical need for the latter group.

The geographical distribution of disasters between developed and developing countries deserves attention, as there seems to be a relationship between the location of a disaster on the one hand, and the severity of its consequences on the other. Out of the 109 worst natural disasters which occurred between 1960 and 1987, as selected and studied by Berz (1989), 41 occurred in developing countries; however, the number of deaths caused among the affected populations was far greater in the developing countries (758,850 deaths in developing countries as compared to only 11,441 in developed countries).

A list of disasters for the period 1960-81 resulting in the greatest numbers of people killed indicates that all occurred in countries characterized by a low-income economy: Bangladesh 633,000 deaths, China 247,000 deaths, Nicaragua 106,000 deaths, Ethiopia 103,000 deaths.

The extent of risk among many populations, especially in developing countries, has increased over the last few decades due to increasing population size, greater population density in vulnerable areas and the strong tendency of large populations towards urbanization. There has also been a concurrent increase in the magnitude of certain types of man-made disaster. Very little however is known about the stress-related disorders caused by such events, which represent an important area in need of investigation.

In disaster situations certain vulnerable groups tend to exist. High mortality may be seen among elderly people and young children. Children up to 2 years old may show lower mortality than their elder brothers or sisters, perhaps because parents protect their youngest children but cannot afford to help older ones. Pregnant or lactating women and persons already suffering from existing disease are also more vulnerable, as are the poor or certain minority groups who might for instance, have no choice but to live in flood-prone areas.

Source: WHO - Psychosocial Consequences of Disasters, 1992.

"No part of the world is completely free of the risk of natural disasters, but there are certain zones where, and for some disasters, certain times of the year when catastrophes are much more likely to happen. It is also the poorer segments of society that are generally the most vulnerable."

■ AFGHANISTAN
River Floods

The country is surrounded by high mountains and the culminant peaks of the Hindu Kush, the so called "Sky's theater" reach 7,690 m. The geographical and climatic conditions often render relief efforts very difficult.

On 3 September cloudbursts struck the mountainous Hindu Kush region creating mud flows that caused the overflowing of three rivers, devastated the Salang, Ghorband and Shutul valleys and severely affected the town of Gulbahar 70 km north of Kabul. Four hundred and fifty people died and more than 500 were missing as a result of this disaster, which mainly affected refugees who had returned from Pakistan after 14 years of civil war.

UNOCA/A. Donini Photo

Transport was one of the major problems facing the relief effort, with large parts of the countryside under water.

Previous disasters:

On 1st February 1991 an earthquake struck Northern Afghanistan. More than hundred people died and some 2,000 families were made homeless. The following days severe floods were reported in the Southwest of the country. 415 people were killed and 27,000 families affected.

■ ALBANIA
7,000 families and 17,000 ha of land severely affected by floods

Albania, one of Europe's poorest countries, could well have done without the floods which affected the northern parts of the country, a particularly deprived area where living conditions are already very harsh and where most basic commodities, such as food, clothing and fuel are in short supply. In mid-November, three days of exceptionally heavy rains caused the Mat and Drin rivers to overflow and break their embankments, creating flash-floods in the river valleys and low-lying agricultural areas down-stream, where these rivers join the Adriatic sea. Six districts were affected by the floods: Kruja, Lac, Lezha, Shkodra, Tropoja and Mirdita. The water washed away the belongings of many families, and destroyed food stored for the coming winter. Although only 11

people died in the floods, 7,000 families were affected. Over 450 houses were damaged or destroyed. Damage to infrastructure and institutions included schools, health posts, bridges, irrigation canals and electric supply lines. In the low fertile area along the Adriatic coast, 17,000 hectares of agricultural land were inundated and it is feared that next spring's harvest will have been compromised in a country which needs every grain it can produce. The value of the direct damage caused by the floods was estimated at approximately US $7 million.

Previous disasters:

In 1991, 3.2 million Albanians were severely affected, following a 3-year drought and the disruption of medical services.

Albania: A Profile

Albania is bounded by the former Yougoslavia to the north and east, by Greece to the south and by the Adriatic Sea to the west. The population of the country which has an area of 28,748 sq. km is composed of 3.18 million people, including a minority of Greeks (approx. 59,000) and Macedonians (approx. 4,700). The capital is Tirana. Albania gained independence in 1912 after 450 years of Turkish rule. It was occupied by Germany and Italy during World War Two but liberated by Albanian partisans in 1944. During almost fourty years of stalinist rule under the leadership of Enver Hoxha, Albania sided with the former Soviet Union (relations broke down in 1961) and then with China (relations broke down in 1977/78). Proclaimed by Enver Hoxha as the "only true communist country", Albania lived in total isolation from the rest of the world for many years. In April 1985, following Hoxha's death, Ramiz Alia, President of the Presidium of the National Assembly, pledged to follow the same path as his predecessor, although the country showed signs of breaking its almost total isolation. Two extra border crossings to Greece opened in 1985 and freight transport to Italy was expanded. The popular revolutions that spread through East and Central Europe in 1989 appeared to have passed Albania by, but in July 1990, following the Government's decision to boost the role of the market in setting wages and prices, thousands of Albanians seeking to leave the country stormed embassies, and were permitted to leave for West Germany, Italy and elsewhere (the right for Albanian citizens to apply for a passport was announced in May 1990).

The country's economy, one of Europe's poorest, relies on the processing of agricultural raw materials, textiles and oil products, and exports of ore, ferro-chrome, copper wire, tobacco and cigarettes, timber, textiles and foodstuffs. Industry was completely nationalized under the Communist regime, but since July 1990, individuals have been permitted to own craft business. The former Yugoslavia used to be Albania's main trading partner.

Source: Reuter; The Statesman's Year-Book 1992-93.

■ ALGERIA faces heavy rains and earthquake

After a long and disturbing period of drought, central and western Algeria, in particular the departments of Alger, Ain-Defla, Blida, and Tipaza, were affected by torrential rains between 21-29 January. Roads and at least 50,000 ha of land were extensively flooded and several houses destroyed. 18 people were reported dead and three missing. In addition, a medium-size earthquake occurred in Ain-Defla, affecting more than 450 families.

Previous disasters:

In 1989, a strong earthquake measuring 6.0 on the Richter scale, rocked northern Algeria, killing 22 people and injuring 184. The quake was caused by a release of energy following a shippage at the boundary between the African and the Euro-Asian continental plates. Algeria's most destructive earthquake occurred on 10 October 1980, when two major tremors (7.3 and 6.4 on the Richter scale) completely destroyed more than half of the city of El-Asnam, in the central-northern part of the country, killing or injuring close to 11,000 people, and rendering 300,000 people homeless.

Earthquakes

Magnitude and Intensity

The severity of an earthquake can be expressed in several ways: the magnitude of an earthquake, as defined by the Richter magnitude scale, is a measure of the energy released at the point of origin, and is a fixed value for each earthquake.

The intensity, on the other hand, describes the damage done at any point of interest, and will obviously decrease to progressively lower values with increasing distance from the origin of the earthquake.

Economic Losses Inflicted by Major Recent earthquakes*

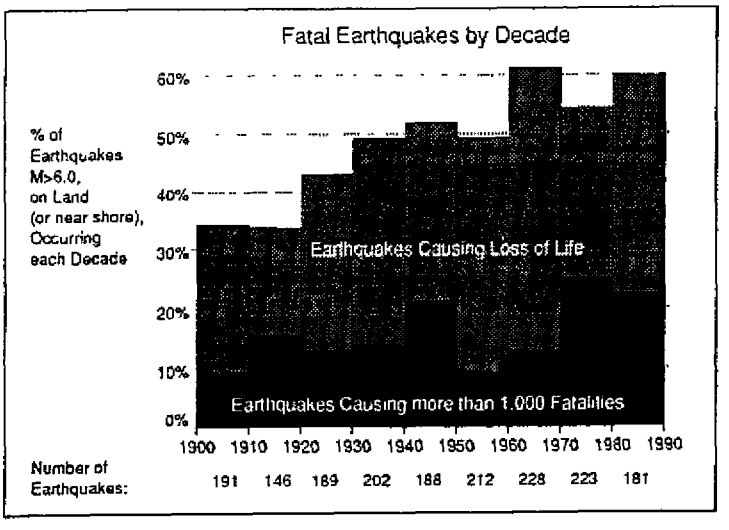
Country	*Earthquake*	*Year*	*Loss ($bn)*	*GNP that year ($bn)*	*Loss (%GNP)*
Nicaragua	Managua	1972	2.0	5.0	40.0
Guatemala	Guatemala City	1976	1.1	6.1	18.0
China	Tangshang	1976	6.0	400.0	1.5
Romania	Bucharest	1977	0.8	26.7	3.0
Yugoslavia	Montenegro	1979	2.2	22.0	10.0
Italy	Campania	1980	45.0	661.8	6.8
Mexico	Mexico City	1985	5.0	166.7	3.0
Greece	Kalamata	1986	0.8	40.0	2.0
El Salvador	San Salvador	1986	1.5	4.8	31.0
USSR	Armenia	1988	17.0	566.7	3.0
USA	Loma Prieta	1989	8.0	4,705.8	0.2
Iran	Manjil	1990	7.2	100.0	7.2
Philippines	Luzon	1990	1.5	55.1	2.7

**Source: Martin Centre Earthquake Database - in Coburn and Spence; Earthquake Protection, 1992.*

A quake of magnitude 2 on the Richter scale is the smallest quake normally felt by humans. Earthquakes with a Richter magnitude of 7 or more are commonly considered to be major. Richter magnitudes are not used to estimate damage.

An earthquake in a densely populated area, which results in many deaths and considerable damage, may have the same magnitude as an earthquake that occurs in a barren, remote area, that may do nothing more than frighten the wildlife.

The World's Earthquake Problem is Increasing*



On average, about 200 large magnitude earthquakes occur in a decade - about 20 each year. As the world's population increases and areas previously almost uninhabited become increasingly settled, the propensity for earthquakes to cause damage increases. At the start of the century, less than one in three large earthquakes on land killed someone. The number has gradually increased throughout the century, roughly in line with the world's population, until in the 1990s, two earthquakes in every three now kill someone, as shown in this table. ■

**Source: Coburn and Spence:* Earthquake Protection, 1992.

Dr. Charles Richter, the seismologist who set up the scale now generally used to measure the force of earthquakes, died in Pasadena, California, on September 30, 1985, at the age of 85. Richter had a great influence on the development of instruments of measurement and the engineering measures needed to withstand earthquakes.

The scale was first set up in 1932 in order to distinguish between large and small earthquakes in California, an area particularly prone to them. It was then extended to catalogue and classify earthquakes all over the world.

When Richter began his work, there were difficulties in measuring the force of the 300 or so earthquakes detected in Southern California each year, because a large earthquake some distance away from the seismometer could appear to be of the same strength as a smaller, nearer one. Richter solved this by devising a method of measuring an earthquake at three or more points, so that the point of origin could be established. By comparing the distance with the recorded strength, it was then possible, by means of a law which he devised on the attenuation of energy, to work out the strength of the tremor at the epicentre.

On the Richter scale, each whole number represents an amplitude of ground movement 10 times greater than the one below it. He himself insisted that there was no upper limit, though in practice there has not been a reading above nine.

■ ARGENTINA state of emergency in three provinces following floods

Heavy and continuous rainfall since April caused a substantial rise in the Parana and Paraguay rivers and their tributaries. This lead to extensive floods, not only in Paraguay and Brazil, but also in northern Argentina where the level of waters reached historical records. A state of emergency was declared in the provinces of Formosa, Chaco and Corrientes. As of 25 June, over 100,000 people had been evacuated from the provinces of Formosa, Corrientes, Misiones, Chaco, Santa Fe, Entre Rios and Buenos Aires. The majority of the affected population came from the poorest strata of society, including people who already suffered from unsatisfied basic needs as well as poor sanitary and health conditions. In early July, the overall situation was gradually improving in many parts of the stricken areas, allowing part of the evacuated population to return home.

On 6 January, an avalanche of mud, rocks and trees, caused by flash floods and the collapsing of a dam, swept through the town of San Carlos Minas and its 2,000 inhabitants, in Cordoba Province, 960 km Northwest of Buenos Aires. 200 houses were destroyed and 30 people died.

Previous disasters:

In 1985, heavy rains which started in October and continued to pour down throughout November, caused extensive flooding in Buenos Aires province, affecting an area of 6,400,000 ha, and rendering 50,000 people homeless. While the number of dead and injured was minimal, the overall damage inflicted to agriculture, livestock and infrastructure (roads, bridges) was estimated at more than US $1 billion.

■ BAHAMAS AND THE UNITED STATES swept by Hurricane "Andrew"

On 23 August, despite warnings issued in the Bahamas, Cuba and south-eastern Florida, "Andrew", the most violent hurricane of the last 50 years, with winds of up to 240 km per hour, struck the Bahamas, causing 4 deaths, making 1,700 people homeless, destroying 800 houses and causing serious damage to infrastructure.

On 24 August this tropical cyclone struck the south-eastern coast of Florida south of Miami and, although losing speed, pursued its deadly course over Louisiana on 26 August, after having spared New Orleans. The hurricane then became a no less destructive tropical storm, with torrential rain which caused serious damage to coastal towns. The cost was heavy: 35 dead, many people missing and material damage estimated at US $15 to 20 billion, with 63,000 houses destroyed in Florida and $400 million to $2 billion worth of damage and 8,000 houses destroyed in Louisiana. One hundred and eighty thousand people were left homeless. Florida had not previously experienced a natural disaster of this magnitude. Many shelters organized before the arrival of hurricane "Andrew" were kept open for those seeking refuge. Three million people were deprived of electric power for several days and schools had to close.

In 1988 hurricane "Gilbert" devastated Jamaica and in September 1989 hurricane "Hugo" struck the South of Carolina and the Caribbean. These violents hurricanes could be the results of global warming. "Andrew" could be compared to "Hugo" and to the storm that struck Miami in September 1926.

Century of Deadly Storms

Following is a list of the worst Atlantic hurricanes of the 20th century. Hurricanes were given names in 1954.

Sept. 8, 1900 - Galveston Tex., 6,000 dead.
Sept. 16-22, 1926 - Florida and Alabama, 372 dead.
Oct. 20, 1926 - Cuba, 600 dead.
Sept. 12-17, 1928 - West Indies and Florida, 6,000 dead.
Sept. 3, 1930 - Dominican Republic, 2,000 dead.
Sept. 21, 1938 - Long Island and New England, 600 dead.
Sept. 12-16, 1944 - North Carolina to New England, 389 dead.
Aug. 30, 1954 - **Hurricane Carol**, north-eastern United States, 68 dead.
Oct. 12-13, 1954 - **Hurricane Hazel**, Haiti and eastern United States, 347 dead.
Aug. 18-19, 1955 - **Hurricane Diane**, eastern United States, 400 dead.
Sept. 19, 1955 - **Hurricane Hilda**, Mexico, 200 dead.
Sept. 22-28, 1955 - **Hurricane Janet**, Caribbean, 500 dead.
June 27-30, 1957 - **Hurricane Audrey**, Louisiana and Texas, 526 dead.
Sept. 4-12, 1960 - **Hurricane Donna**, Caribbean, eastern United States, 148 dead.
Oct. 31, 1961 - **Hurricane Hattie**, British Honduras, 400 dead.
Oct. 4-8, 1963 - **Hurricane Flora**, Cuba and Haiti, 6,000 dead.
Oct. 4-7, 1964 - **Hurricane Hilda**, Louisiana, Mississippi and Georgia, 38 dead.
Sept. 24-30, 1966 - **Hurricane Inez**, Caribbean, Florida and Mexico, 293 dead.
Aug. 17-18, 1969 - **Hurricane Camille**, Mississippi and Louisiana, 256 dead, US $3.8 billion in damage.
July 30 - Aug. 5, 1970 - **Hurricane Celia**, Cuba, Florida and Texas, 31 dead.
June 19-29, 1972 - **Hurricane Agnes**, Florida to New York, 118 dead, $4.7 billion damage.
Sept. 19-20, 1974 - **Hurricane Fifi**, Honduras, 2,000 dead.
Aug. 20 to Sept. 13, 1979 - **Hurricane David**, Dominican Republic, Dominica and Florida, 1,200 dead. **Hurricane Frederic**, the Bahamas, Alabama and Mississippi, 7 dead, $2.5 billion damage.
Aug. 4-11, 1980 - **Hurricane Allen**, Caribbean and Texas, 272 dead.
Sept. 1988 - **Hurricane Gilbert**, Caribbean and Mexico, 400 dead.
Sept. 1989 - **Hurricane Hugo**, Caribbean and
Aug. 1992 - **Hurricane Andrew**, (most destructive) Bahamas, USA.

The Associated Press

■ BOLIVIA
5,000 people rendered homeless by floods

In mid-March a state of emergency was declared in the northeastern department of Beni, where approximately 100,000 square kilometres of pasture were flooded following the overflow of rivers in the region. Heavy losses were inflicted to cattle (92,000) and crop (80%) in the disaster stricken area where 8,700 families are living. More than 1,000 houses were damaged and 5,000 people made homeless.

A mudslide, caused by torrential rains buried the gold mining camp of Llipi on 8 December, in Larecaja Province, 285 km north of La Paz. 49 people died.

Previous disasters:

In January 1986, during the rainy season, a state of emergency was declared in five Bolivian provinces, including Cochabamba and La Paz. As the rains continued to pour down, the level of Lake Titicaca had risen considerably by the end of February and the lakeshore provinces were extensively flooded. On 3 April, the level of the lake was rising by 2 cm per day and the shoreline had expanded by 400 meters horizontally. 50,000 families lost their homes and/or their fields during these floods, considered to be the worst in Bolivia this century.

■ BRAZIL
also affected by overflow of Paraguay and Parana rivers

The Southern States of Santa Catarina, Parana and Rio Grande were also affected, at the end of May, by the overflow of the Paraguay and Parana rivers which caused extensive flooding in Argentina and Paraguay this year. About 4,000 people were made homeless and 41 people were killed.