■ INDONESIA
2,080 died in Flores Island struck by earthquake

On 12 December a violent tectonic earthquake (magnitude 7.5 on Richter scale) struck the island of Flores at 13:29 local time, immediately followed by a strong tidal wave which affected the Northern coast of the district of Sikka, East Flores, Ende and Ngada, killing 2,080 persons and injuring 2,103. Damaged houses: 15,223. Damaged hospitals: 11. Damaged schools: 120. Total number of buildings damaged: 305. Total estimation of physical damage/losses: approximately US $100 million. The joint DHA/OFDA mission reported 17,000 families homeless. The islands of Babi and Pomana Besar located in the Flores sea and inhabited by 2,000 people were severely struck by the tidal wave. Flores, with a population of approximately 700,000 persons is located 1,750 km east of the Indonesian capital, Jakarta. 90% of the town of Maumere (approx. 70,000 persons) were destroyed affecting tens of thousands of people obliged to camp in tents for fear of strong aftershocks. Most of the buildings on the island are made of wood and brick. Those made of brick were entirely destroyed or severely damaged. Mudflow occurred in Ndoda on 28 December following severe rainfall over landslide caused by the earthquake. The rainy season which

Earthquakes in a Changing Society

Earthquakes have been a growing threat from the time people began congregating in large communities and building houses out of brittle and heavy materials. One of the first known attempts at forecasting earthquakes was made 1900 years ago, by the Roman historian, Plinius the Elder, who provided an exhaustive list of phenomena which he claimed to occur before large earthquakes. It is quite likely that Plinius drew largely from selected popular knowledge. Most of these phenomena are now intensely studied as promising short-term precursors, and in a few cases have led to successful prediction, for example that of the 1975 Haicheng earthquake in China by which an estimated 100,000 people were saved. However, this earthquake had much stronger precursors then normally occur before major earthquakes, and in this respect was an unusual event.

Why Earthquakes?

The interior of the earth is continuously deforming. In more brittle outer layer (lithosphere) this deformation is partly accompanied by sudden shear movements (ruptures) along fractures (faults). The strain energy released by these ruptures accounts for the earthquakes, the seismic energy that propagates away from the ruptures. The largest of these ruptures can be 1000 km long, as in the 1960 Chile earthquake, or a few meters long as in the smallest earthquakes that can be recorded. The size (magnitude) of the earthquake is closely linked to the length of the rupture.

Source: Excerpts from an article by L. Seeber, UNDRO News.

started in December has but added misery to those living in the open. The rehabilitation/ reconstruction phase officially started in January 1993.

Previous disasters:

Indonesia with its 13,677 mountaneous islands is the greatest archipelago of the earth, and counts more than 100 active volcanoes. Some of them were particularly destructive. In 1883, the Krakatoa, between Java and Sumatra, killed 36,000 people. During the 10 years prior to 1983 there were 31 eruptions. For example, the Galunggung, West of Java. The earthquakes are frequent in the southern islands. In June/July 1976, within a period of 3 weeks, two severe earthquakes occurred in the province of Irian Jaya (420 persons killed) and on the densely populated island of Bali (573 dead, 250,000 homeless). On 19 August 1977 an earthquake followed by tsunamis rocked the Nusa Tengarra Islands of Eastern Indonesia: more than 95 dead and 20,000 homeless. Volcanic eruption : Mt Kelud in East Java erupted on 10 and 12 February 1990 killing 30 persons and 43,000 were evacuated.

■ IRAN
110,000 ha of farmland inundated in the North and North-East

Floods caused by heavy rains around the Gorgan and Atrak rivers in Northern Iran close to the Caspian Sea damaged more than 4,000 housing units and 110,000 ha of farmland. Again on 4 and 5 June torrential rains caused 25 deaths and also heavy material losses in the North East of Iran. Fifty millimeters rain in less than 24 hours resulted in extensive inundations.

Previous disasters:

On 28 July 1981 a major earthquake struck the area east of Kerman, killing 1,200 people. Three years earlier the Tabas earthquake, some 350 km to the north along the same fault zone killed 15,000 people. On 21 June 1990 another quake struck the provinces of Gilan and Zanjan: 40,000 dead, 60,000 injured and 500,000 homeless. In 1962 an earthquake of similar magnitude which occurred in the same area killed 12,000 people.

■ KYRGYZSTAN
Rain, hail and quakes shatter the country

In May, Kyrgyzstan suffered simultaneous blows from torrential rain and hail and an earthquake that measured 7 on the Richter scale. The damage was estimated at some US $31 million. The number of victims reached 20,000.

While still suffering, economically in particular, from these recent disasters, Kyrgyzstan was struck on 19 August by an even stronger earthquake which consequences can be compared to those of the 1988 Armenia earthquake. More than 50 people died in this disaster and the damage exceeded $130 million.

Previous disasters:

Earthquakes in 1977, 1983 and 1985.

Kyrgyzstan, a Muslim Republic with some 4,258,000 inhabitants, covers an area of 199,000 square kilometres. Together with Uzbekistan and Tajikistan, it is one of the Republics with the lowest per capita income. It is a mountainous country, rich in coal and gas deposits. Since 1926 irrigation of the Fergama Valley has enabled the country's agriculture to expand.

Kyrgyzstan declared its independence on 31 August 1991 and became a Member of the United Nations on 2 March 1992. The Government's headquarters are in Bishkek.

River and Coastal Floods

River floods

The basic cause of river flooding is the incidence of heavy rainfall. Not all serious inundation of land or damage from floods, however, is due to this hydrological phenomenon alone. Often other factors operate either to exacerbate an already occurring flood problem or to create a flood problem entirely of their own manufacture. These factors are associated most often with the promotion of hydraulic surcharge in water levels. They include the presence of natural or man-made obstructions in the flood path such as bridge piers, floating debris, weirs, etc. Also included are the generally unforeseen river-surge events caused by sudden dam failure, land slip or mud-flow.

Coastal floods

In many cases, the most devastating flood-producing rainfall event is that associated with the typhoon, hurricane, or other tropical cyclone, the name given to this meteorological phenomenon being dependent on the region in which it occurs. The Indian sub-continent, countries of Asia, the Pacific, Caribbean and Atlantic seaboards of the United States are all regions typically subject to such events. Catastrophic flooding from rainfall is often aggravated by wind-induced surcharge along the coastline. Rainfall intensities are high and the area of the storm is broad based; these two factors together are capable of producing extreme flood discharges in both small and large river basins.

Source: Mitigating Natural Disaster, DHA Publications, March 1991.

■ LEBANON
Snowstorms

In February, snow and rain storms, considered to be the worst in nearly fifty years, left many areas of the country devastated and totally isolated during more than two weeks, particularly in mountainous regions located above 400 meters altitude where the snow accumulated up to 10 meter drifts. The situation culminated on 29 February when very heavy snowfall caused numerous casualties, considerable further disruption of power supply and telecommunications, and destruction of private property (dwellings, agricultural land and forest cover). 25 people were killed, 75 were injured and 3,000 people were made homeless. In early March, the improvement of weather conditions allowed the re-opening of roads and the re-establishement of contact with the isolated population, estimated at 100,000.

■ MONTENEGRO
Overflow of River Tara turns into threat of an ecological disaster

In October, heavy rainfall caused flash-floods in northern Montenegro, one of the Republics of former Yugoslavia. More than 6,000 people lost their homes, roads and bridges were washed away, and large parts of the electrical and communications networks were destroyed. While the first assessment of damages was being made, the threat of an even worse disaster appeared: Northern Montenegro is known for the unique scenery of its high mountains, rivers, canyons, and almost 100,00 hectares of natural parks. The river Tara, listed by the World Biosphere Reservation network of UNESCO as one of the world's cleanest rivers, flows within this parkland. It is right on the banks of this river, in the small town of Mojkovac, that a tailing dam holding back some 3.5 million cubic

Montenegro: A Profile

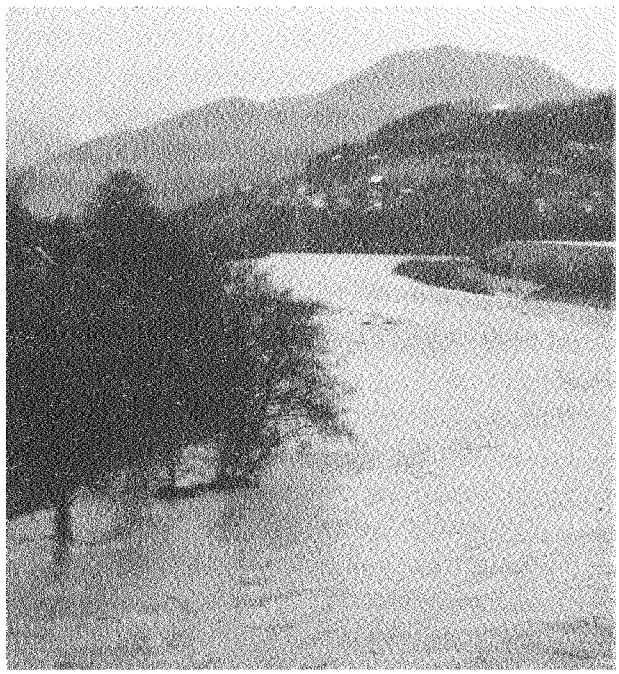
Montenegro, bordering Serbia to the south, is the poorest and least developed of the Republics of the former Yugoslavia. Its weak economic situation has been exacerbated by the process of economic transition, war sanctions and a decline in tourism. Only 134,183 persons are employed, as compared to 189,925 who are either unemployed, retired, or on social security. The 85,000 refugees and displaced persons have added further burden to the country's weak economic situation.

The country at a glance

Montenegro, with an area of 13,812 km^2 and a population of 616,000, is situated in the southwestern part of the Balkan Peninsula, on the southern coast of the Adriatic Sea. Going inland, not far from the coastal strip, mountains peaks close to 2,000 meters high soar towards the sky. The country abounds in lakes. There are over 30 of them. Lake Skadar is the biggest in the Balkans. The territory of present-day Montenegro has been inhabited since prehistoric times. The Slavs settled in this area at the end of the 6th century, penetrating through Roman roads and slowly blending with ancient tribes, thus assimilating various ethnic groups. The first Slav state called Dukjla, was formed there. In the 11th century, the name Zeta appears. By the end of the 12th century, Zeta became part of the Serbian state. By mid-15th century, Turks arrived in Zeta. By the end of the 15th century, the Turks had conquered all the Zeta territories, and this marked the end of the state of Zeta. From the 18th century onward, Montenegro progressively freed itself from the Turkish rule and entered the international scene. Montenegro became a Principality during the reign of Prince Danilo (1815-1860). It acquired independence in 1878, at the Berlin Congress. In 1910, under the rule of Nikola I it became a Kingdom. In 1918, Montenegro became part of Yugoslavia.

As a relatively small Principality and Kingdom, Montenegro made its first steps towards an industrial economy only at the end of the 19th century. The causes for this delay lie in the small population, lack of raw materials, under developed transport, reduced investments, and also in the national effort to ensure independence as well as survival of the state and its history. The first factories were built during the first decade of the 20th century. This brief industrial and economic evolution was interrupted by new wars - the Balkan War (1912-1913), followed by World War I and World War II. Between the two world wars, agriculture remained the main economic source, while industrial plants were limited to wood mills, tobacco factories, breweries and salt-works. The economy made major progress after World War II only. Once more destroyed and plundered, Montenegro made greater strides in its economic policy and development. ■

meters of slimes from lead and zinc mines was severely damaged by the floods If the highly toxic slime leaked into the river, horrendous damage all along its course could not be averted. Zinc is poisonous for all plants, and lead is highly toxic for animal and human life. The area threatened was unpredictable because the Tara is, through the Drina and the Sava rivers, a tributary of one of Europe's greatest river, the Danube.



A Krumdieck Photo

Overflow of River Tara

■ NICARAGUA
Earthquake and tsunami strike the country

On 1 September a powerful earthquake measuring 7.2 on the Richter scale, followed by a tsunami with waves reaching 15 metres high, struck the Pacific coast of Nicaragua, some 120 kilometres south-west of Managua. 116 people were killed, 489 injured and 63 missing. 40,500 persons were directly or indirectly affected. The chain of 40 volcanoes stretching across Nicaragua constitutes a continuing eruptions' threat.

Previous disasters:

The country's history is marked by earthquakes (the quake of 23 December 1972 killed about 10,000 people) and volcanic eruptions. Nicaragua suffered from civil war from 1980 to 1989, and was struck by hurricane "Joan" in October 1988. The country was then struck by a tsunami, with damage estimated at US $25 million. The coastline was devastated, as the winds and more than 100 aftershocks knocked down everything in their path. Most vulnerable of all were the children, many of whom were carried away by the waves. Those who survived suffered from respiratory problems and diarrhoea.

■ PAKISTAN
Destructive monsoon

Since August Pakistan has been the scene of a series of natural disasters: torrential monsoon rains in the province of Sind in the south-east of the country; an earthquake on 28 August 100 km south-west of Quetta and floods in the Azad Kashmir region in the north-west. Most of the territory was affected and 1,500 people died. 6,722,950 people were victims of the floods. 12,048 villages suffered extensive damage. 1,192,000 houses were destroyed or damaged and more than 2,400,000 hectares of land were devastated. The loss in crops and infrastructure was estimated at US $80 million and forests were also damaged.

The unprecedented violence of the monsoon rains (the worst since Pakistan achieved independence in 1947) caused rivers to overflow in the province of Punjab resulting in heavy loss of life and serious economic