



Figure 1.2 Some impacts and costs of major world disasters in 1998

The death toll is often greater because the population density may be high, there are less protective structures, inadequate infrastructure and inferior disaster planning and ability to respond quickly to an emergency. Measured in cash terms the economic loss may seem less if the majority of the people depend upon subsistence farming for their living. The loss of their livelihood however may be more disastrous for the region as there may be no cash reserves and access to food is quickly lost. The drought and frosts that destroyed the gardens in the highlands of Papua New Guinea in 1997/98 were an example of this calamitous impact of a hazard.

Most countries are subject to a variety of hazards and disasters. Even one big disaster can have a substantial impact on the economy of a country, especially a poor country, but a series of them can weaken a country's ability to respond to a new disaster. The tsunami in Papua New Guinea, which is discussed chapter 2, came after the string of

calamities, including the volcanic eruptions at Rabaul, East New Britain province in PNG during September 1994 (See front cover).

The *International Decade for Natural Disaster Reduction (IDNDR) 1990-2000* was instituted by the United Nations to help prevent/reduce disasters and to minimize the impacts of those that are unavoidable. The urgent need for such an effort is seen by the disasters listed in Figure 1.2.

Some other disasters around the world in 1998 included: volcanoes, killer bees, and oil spills. Sadly the tally of disasters and their impacts grows each year. As the world's climate appears to change, insurance companies become increasingly concerned about the increased risks from associated things like: increased drought, wind-storms and flooding; sea-level rise; glacier retreat/advance; changing permafrost boundaries; and the ozone hole. Insurance in western style economies is a main way by which the costs of disaster are shared.

As well as the natural hazards one usually considers like earthquakes, landslides and hurricanes one can consider technological and other human caused hazards such as crime and nuclear leaks. This booklet is largely concerned with 'natural' disasters.

The main roles of the IDNDR are to raise awareness of threatening hazards, to improve preparation for possible disasters and to promote better abilities to prevent, respond to and recover from disasters.

The two main themes of the Australian IDNDR program are to:

- reduce the vulnerability of community lifelines, such as water and power supplies, transport routes and communication systems to natural and technological hazards; and
- provide education, especially in schools, on the effects of natural hazards and disaster prevention. This booklet is part of that strategy.

Among its other goals the Australian IDNDR intends to:

- to improve community awareness of risk, prevention, preparedness and response; and
- to develop and implement programs to assist community understanding of vulnerability to hazards.

Source: (EMA hosted Web page) IDNDR Goals of the Decade; <http://www.ema.gov.au/idndr/goals.htm>

This booklet concentrates on a selection of disasters and places. After examining these you should be able to investigate hazards and disasters of many kinds anywhere.

**What is the difference between hazards and disasters?**

A *disaster* is a calamity which happens to people, their buildings, livelihood and belongings and/or the biophysical environment of a place as the result of a hazardous event. A disaster must not be confused with a hazard. Flooding of the Katherine River is a recurring hazard, but the disaster of January 1998 was unprecedented.

**What is a hazard?**

A *hazard* is some event or object that is a potential source of harm to human life, health, income or possessions. Environmental events, such as river flooding and earthquakes, occur naturally and are normally only considered hazardous in relation to the human usage of particular places. A hazard may also threaten people's built structures or aspects of the biophysical environment. It is not

**Activity 1.1**

- a Sort the disasters shown Figure 1.2 into two groups, rich countries and poor countries, and list them under these categories.
- b Which group had the greater casualties? Suggest some reasons for this.
- c Which group had the biggest economic losses? Suggest some reasons for this.
- d Find a report of a recent disaster in a newspaper or from television news. What were the losses in terms of:
  - deaths and injuries.
  - property damage.
  - other economic impacts (e.g. agricultural).
 Suggest reasons for the size of the losses for this disaster.
- e In pairs make a list of different kinds of hazards which caused the disasters in the past few years. Add the location and approximate date for each. Group them as 'natural', 'technological' or other 'human-caused'. You may have to discuss several before deciding their classification.
- f Decide which disaster was the most serious. Discuss the reasons for choosing it. Share your decision and reasons with your whole class. After class discussion list with brief reasons the three disasters you believe were the worst.

only natural phenomena that can prove hazardous to people, but also some human activities can cause disasters. Disasters such as the landslide at Thredbo do not always develop from such hazards. Mass wastage on hillsides often occurs in unpopulated places and the damage to human life and property is small although it can have a major effect on the environment. This booklet helps you to *examine many ways in which disaster can be avoided or reduced* during hazardous events.

**What types of hazards are there?**

It is possible to distinguish between *six broad groupings of hazards*.

- **atmospheric:** e.g. tornadoes, frosts, drought
- **hydrological:** e.g. flooding, coastal wave action, glaciers
- **geological (geomorphic):** e.g. earthquakes, volcanoes
- **biological (ecological):** e.g. epidemics, over grazing, plant invasions, bushfires
- **technological (human induced):** e.g. transportation accidents, hazardous materials, oil spills, explosions, fires.
- **human-caused (other):** e.g. terrorism, mass-killings, political conflicts, crowd-crush incidents.

their quiet neighbourhood cul-de-sac, or the drive way at their home. The main consideration is the difference between the major traffic hazard on the highway and the increasingly lesser dangers of the others. It would obviously be hazardous for children to play on the highway where they would be very vulnerable, but even the limited traffic in the home drive has harmed children at play. The degree of risk relates not only to the intensity of the hazard, but also to the part of the human use system at risk. We rate the risk far greater if it relates to human life or health. Threats by a hazard to property owned by human beings leads to a higher risk rating than threats to other parts of the biophysical environment.

The simple model suggested (See Figure 1.6) categorizes three ways of responding to hazard. Each type of response requires careful study, planning and preparation by individuals and communities if they are to be ready to prevent or cope when a hazard threatens or turns into a disaster. The emphasis of this model is on **being prepared**.

**Enquire, decide, act**

The process of decision-making and subsequent action requires people to gather the information necessary to make good decisions and to act wisely.



**Activity 1.2**

- a With a partner find information about a hazard (probably one that has caused a disaster in the past e.g. the earthquake in Adelaide (1954); Tropical Cyclone Tracey in Darwin (1974)).
- b Use the headings and sub-headings from Figure 1.6 to draw a chart to warn people how they could respond to that hazard now. It should suggest:
  - a suitable response in each category, and
  - reasons why people may (or may not) respond in that way.

Finding out and making decisions are essential before doing anything. In the case of decisions in response to hazards one must understand the nature of an issue. (See Box 1.2)

There may be a tension or conflict between different proposed responses such as permanently evacuating a city destroyed by a volcano (e.g. Rabaul PNG, 1994) as opposed to rebuilding on the same site. This conflict is the basis of all issues and requires us to carefully examine the opinions and motives of every person involved in the issue.

Geographical issues involve competition for a place or region. Such issues may arise naturally such as the conflict between hurricanes (tropical cyclones) and holiday resorts at certain latitudes, but they also usually involve specific groups of people with conflicting opinions special concerns.

Figure 1.6 Responding to hazards

**Responding to hazards**

People are attracted to live or work near hazards for many reasons and given good information about the nature and frequency of the risk are able to make decisions about how they will respond to that risk. The main responses to hazards (See Figure 1.6) are of three main kinds involving change of location or human use, reducing losses by modifying the event or preventing effects, or accepting losses by bearing them or sharing them with others.

It is not easy to find places that are free from all risk, but some places obviously make one more vulnerable than others. (See Figures 1.3 & 1.4)

**Box 1.2 Investigating a hazard**

Before we get involved in any decision-making and action we must investigate all aspects of the issue.

We need to know:

- **where are the hazard and the people/things at risk?**
- **what is the issue(s)?**
- **who is involved?**
- **what is being done about it?**
- **what should be done?**