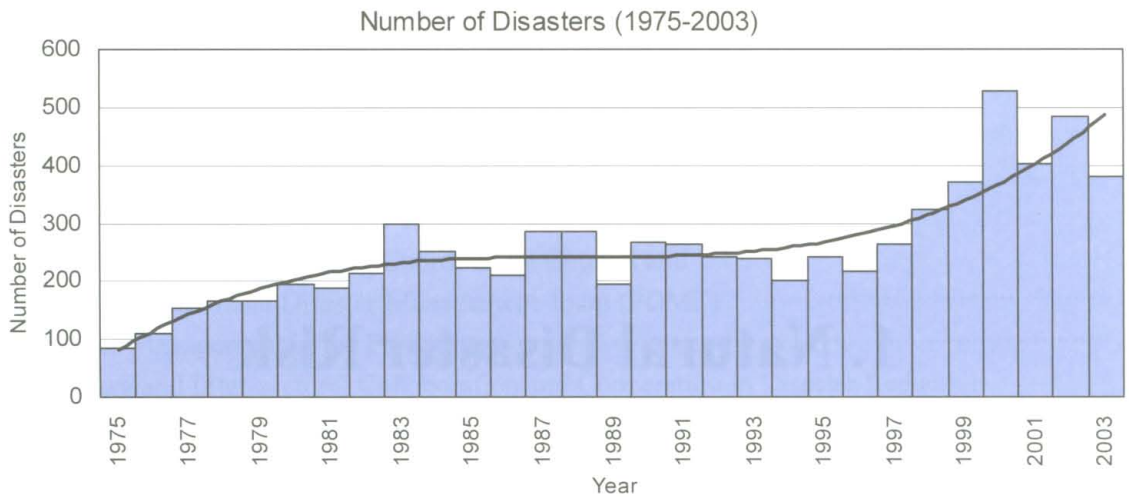
1. Natural Disaster Risk

1.1 Impact of Natural Disasters

Natural disasters have posed great threats to people and their livelihoods all over the world, and the number of disasters and people affected by them are increasing worldwide (Figure 1.1). As shown in Figure 1.2, Asia is especially prone to various types of natural disasters due to its geographical and meteorological conditions. The region accounted for 89% of the world's affected population and almost 50% of all the economic damage reported in the world during the period 1975 - 2003 (Table 1.1).



Source: Compiled by the Asian Disaster Reduction Center based on information from the Center for Research on the Epidemiology of Disasters (CRED), Universite Catholique de Louvain, Belgium.

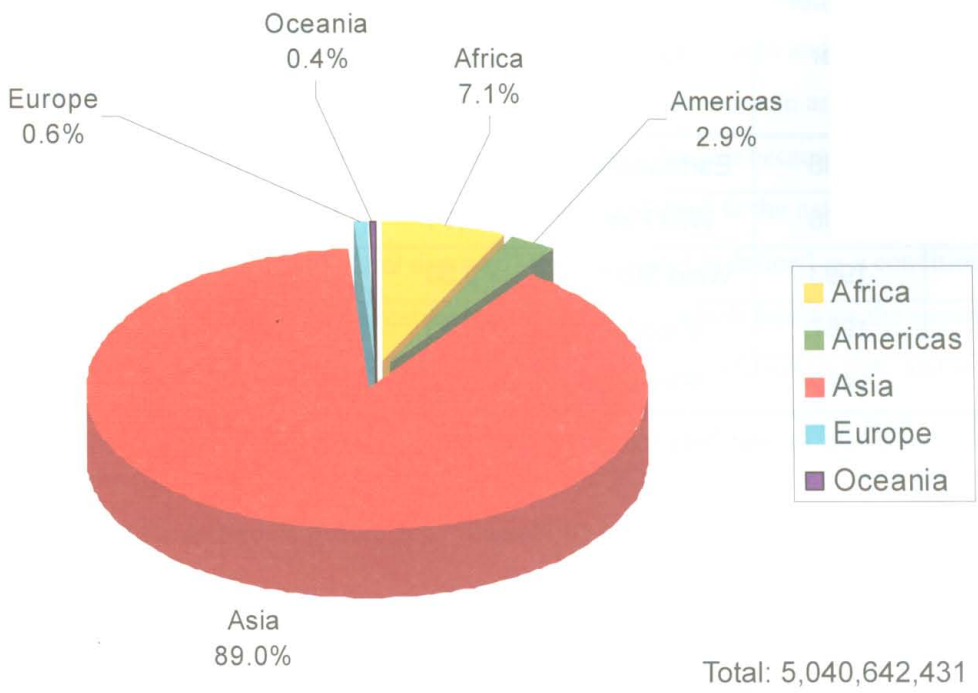
Figure 1.1 Worldwide Disaster Trends (1975 - 2003)

Table 1.1 Summary of Natural Disasters (1975 - 2003)

	Number of Disasters	Death Toll	Number of People Affected[1]	Value of Economic Damage (US$ mln)
Asia	2,783	934,108	4,485,901,493	464,828
(share)	(37%)	(49%)	(89%)	(47%)
World	7,456	1,914,687	5,040,642,431	993,693

Source: Compiled by the Asian Disaster Reduction Center based on information from CRED.

[1] "Affected people" are people who are influenced by disasters in some way, including fatalities, injuries and displaced persons.



Source: Compiled by the Asian Disaster Reduction Center based on information from CRED.

Figure 1.2 Number of People Affected Worldwide (1975 - 2003)

Many countries have been stripped of a considerable proportion of their gross domestic product (GDP) by a single disastrous event. For example, the 1988 Spitak Earthquake in Armenia devastated that country's economy, producing damage valued at nine times its annual GDP. Table 1.2 shows examples of countries whose economies have been significantly impacted by natural disasters. Natural disasters can also become a major obstacle to the social security of the population in the countries where they strike.

Table 1.2 Ratio of Economic Damage to GDP

Country	Disaster Year	Disaster Type	Value of Economic Damage (US$ billion)	GDP in the Year before Disaster Year (US$ billion)	Economic Damage/GDP
Armenia	1988	Earthquake	20 50	2.26 *	908%
Mongolia	1996	Wild Fire	1 71	0.89	192%
Lao, PDR	1993	Wind Storm	0 30	1 13	27%
Nepal	1987	Flood	0.73	2 85	26%
Yemen	1982	Flood	0.98	4 83 *	20%

Source: Compiled by the Asian Disaster Reduction Center based on information from CRED and the World Bank (2004).

Note * GDP in 1990

1.2 Definition of Disaster Risk

As mentioned in the previous section, the number of natural disasters has been increasing, as has their impact due to such external changes as the concentration of populations and property in hazardous areas, and rapid urbanization. Figure 1.3 shows how natural disasters develop. Earthquakes, storms and torrential rains, are natural phenomena we refer to as "hazards" and are not considered to be disasters in and of themselves. For instance, an earthquake that occurs on a desert island does not trigger a disaster because there is no existing population or property affected. In addition to a hazard, some "vulnerability" to the natural phenomenon must be present for an event to constitute a natural disaster. "Vulnerability" is defined as a condition resulting from physical, social, economic, and environmental factors or processes, which increases the susceptibility of a community to the impact of a hazard. "Exposure" is another component of disaster risk, and refers to that which is affected by natural disasters, such as people and property. In general, "risk" is defined as the expectation value of losses (deaths, injuries, property, etc.) that would be caused by a hazard. Disaster risk can be seen as a function of the hazard, exposure and vulnerability as follows;

Disaster Risk = function (Hazard, Exposure, Vulnerability)

Growing exposure and delays in reducing vulnerabilities result in an increased number of natural disasters and greater levels of loss.

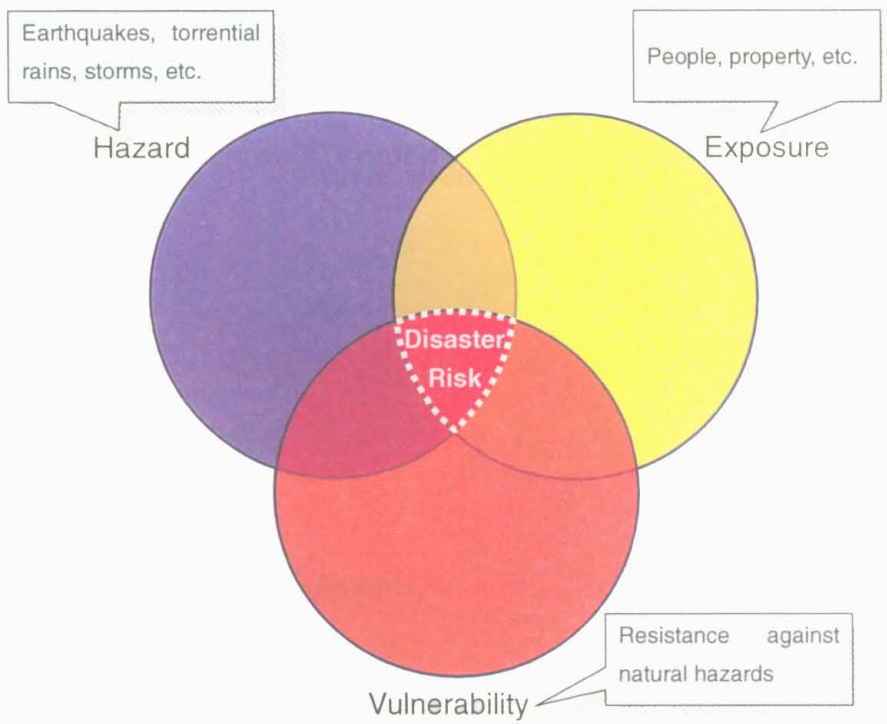


Figure 1.3 Mechanism Behind the Emergence of Natural Disasters