Chapter 1
Introduction

In recent years, despite the age we live in being one of technological innovation, the increased frequency, intensity, magnitude, and impact of natural disasters have claimed thousands of lives and caused immense material losses throughout the world. In recent decades this has been attributed to an increase in population worldwide and subsequent developments like urbanisation, use of vulnerable regions or degraded land, and alterations in the environment. In the second half of the twentieth century about 250 'great natural catastrophes' claimed the lives of about 1.4 million people, most of whom succumbed to windstorms or floods. The 1990s alone had four times more disasters than in the 1950s and a 15-fold increase in economic losses during the same period (Munich Re Group 2000).

Most of the world's worst disasters occur between the Tropics of Cancer and Capricorn, Asia being the most affected continent with 39% of the total disasters reported from 1992-2001, accounting for 74.5% of the total casualties (IFRC 2002).

Whereas hazard events cannot be prevented from occurring, devastation and loss can be prevented to a great extent. Impacts of natural disasters can be reduced through pre-disaster activities for mitigating risks; and such activities are among the most crucial aspects of disaster risk reduction to consider in forming a coordinated strategy or plan. Natural hazard mitigation is an important policy issue because 'monetary losses from natural disasters are reaching catastrophic proportions' and are expected to increase. Mitigation is arguably the most critical activity of the four phases of disaster management: mitigation, preparedness, response, and recovery (Godschalk et al. 1999). This is particularly relevant in the case of recurrent natural hazards, such as cyclones and floods, in vulnerable locations where action to reduce damage can be more effective than relief and recovery.

The terrain

The state of India covers an area of 3.3 million sq. km., extending from the Himalayas in the north to the tropical rain forests in the south. It lies entirely in the northern hemisphere, the mainland extending between latitudes 8°4' and 37°6' north and longitudes 68°7' and 97°25' east. Surrounded by the Bay of Bengal in the east, Arabian Sea to the west, and the Indian Ocean to the south, the total length of the

coastline of the mainland, Lakshadweep Islands, and the Andaman and Nicobar Islands is 7,516.6 km. The Himalayas form a natural barrier for the peninsula from mainland Asia. Extending 2,500 km over northern India, the three parallel ranges, the Himadri, Himachal, and Shivaliks, have deep canyons gorged by rivers flowing into the Gangetic Plain. The topography varies from high mountains in the north, to flat rolling plains and the Deccan Plateau in the south.

The climate varies from tropical monsoon in the south to temperate in the north. The climate is broadly classified as tropical monsoon and the monsoons have two seasonal wind directions - the northeast monsoon and the southwest monsoon. The northeast monsoon, commonly known as winter monsoon, blows from Central Asia to the Indian Ocean, whereas the southwest monsoon blows from the Indian Ocean, the Arabian Sea, and the Bay of Bengal. The southwest monsoon brings most of the rainfall.

There are four groups of rivers; namely, Himalayan, Deccan, coastal rivers, and rivers of the inland drainage basin. The Himalayan rivers are fed by melting snow and glaciers and flow throughout the year. During the monsoon months, the Himalayas receive very heavy rainfall and rivers swell, causing frequent floods. The Deccan rivers are rainfed and fluctuate much in discharge. The coastal streams, especially on the west coast, are short in length and have limited catchments. The streams of the inland drainage basin of western Rajasthan are few.

Demography

The population of India was more than 1,027 million according to the 2001 population census; hence India's population rose by 21.34 % from 1991 to 2001. The sex ratio (i.e., number of females per thousand males) was 933, rising from 927 in 1991. The total literacy rate is 65.38%. Although India covers only 2.4% of the world's land area, it supports over 15% of the global population, exceeded only by China. Two-thirds of the population work in agriculture and related sectors, accounting for around 22% of its gross domestic product (GDP).

For administrative purposes, India is divided into 29 states and six union territories (UT). States are administered by elected state governments whereas union territories are administered by the President through an appointed administrator. Each state is divided into districts, sub-divisions or tehsils and blocks, and gram panchayats (village administration). There are 604 districts in India administered by state and/or UT governments.

Past perspectives on disasters

Indian history cites many instances of coping with natural and human-made disasters, from invasions and wars to droughts, floods, famines, earthquakes, and cyclones. The location of the sub-continent with its unique geoclimatic features, together with a dense population, makes for an interesting mix of vulnerability and resilience. Through the centuries, people have had to cope with frequent hazards through distinctive settlement patterns, livelihood preferences, sociocultural practices, and traditions.

In addition to religious literature promoting the need for harmony between humans and their environment, scholastic and scientific literature in ancient India dealt with aspects of disaster preparedness and mitigation. One example is the philosopher-astronomer-mathematician Varahamihira (505-587 AD) who wrote about earthquakes, their causes, and predictability in the Brihad Samhita. In it he discusses signs of earthquakes and correlates them with cosmic and planetary influences, underground water and undersea activities, unusual cloud formations, and abnormal behaviour of animals. These became part of folklore and form the basis of coping mechanisms extant at community level today. The Atharva Veda discusses drought mitigation strategies (Biswas 2000) and the Arthashastra, a treatise on public administration by Chanakya (4th century BC), has a section on famine relief and mitigation measures.