

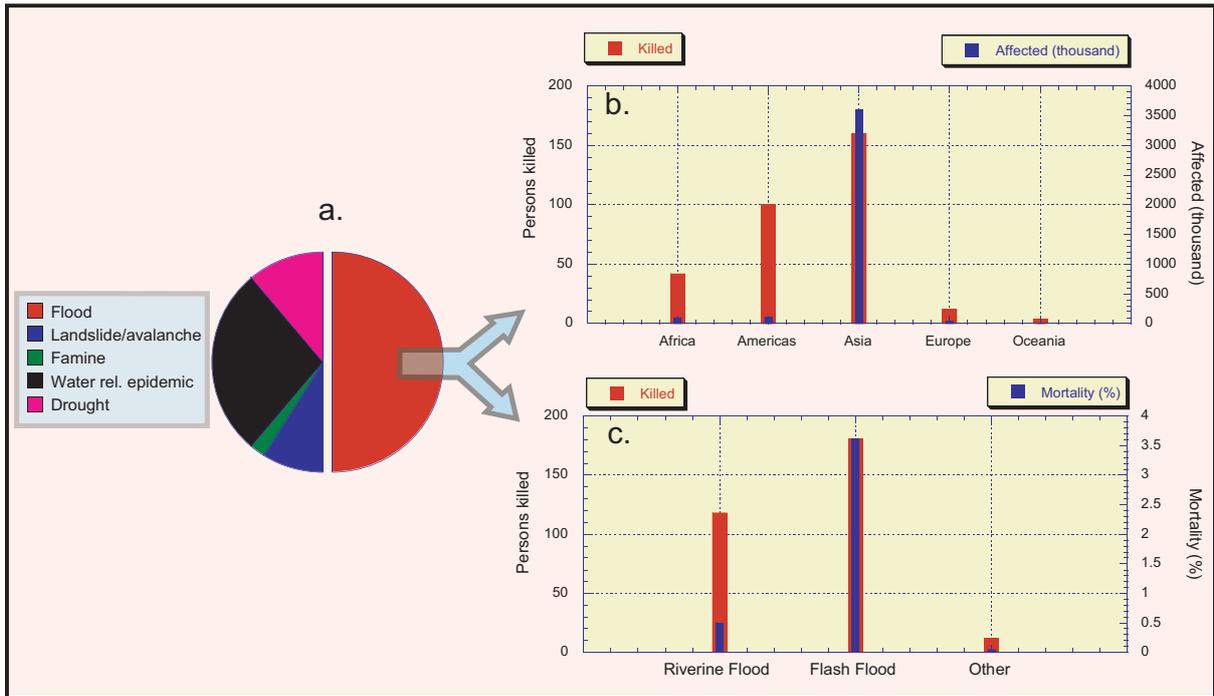
# Chapter 1

## Introduction

The Hindu Kush-Himalayas (HKH) are the youngest mountains on earth and are still tectonically active. They are undergoing uplift and, therefore, the region is characterised by steep slopes and a high rate of surface erosion. In addition to the geological conditions, intense seasonal precipitation in the central and eastern Himalayas, particularly during the summer monsoon, and in the western Himalayas and the Hindu Kush during winter, triggers various types of natural hazards. Floods are one of the most common forms of natural disaster in this region. Intense monsoon rainfall or cloudbursts can cause devastating flash floods in the middle mountains (500–3500 masl). Rapid melting of snow accumulated during winter is the main cause of flash floods in the Hindu Kush and western Himalayas. Furthermore, the region is experiencing widespread deglaciation, most probably as a result of global climate change (WWF 2005; Mool et al., 2001; Xu et al. 2007). Deglaciation has caused the birth and rapid growth of many glacial lakes in the region. These lakes are retained by unstable natural moraine dams that tend to break due to internal instabilities or external triggers leading to a glacial lake outburst flood (GLOF) that can cause immense flooding downstream. Landslides due to intense rainfall in combination with geological instabilities can cause ephemeral damming of rivers. Another type of flash flood common in the region results from the outbreak of dammed lakes. These dammed lakes can break resulting in flash flood.

Hundreds of lives and billions of dollars worth of property and investment in high-cost infrastructure are lost in the region every year due to landslides, debris flows, and floods, along with the destruction of scarce agricultural lands. In the last decade of the 20<sup>th</sup> Century, floods killed about 100,000 persons and affected about 1.4 billion people worldwide. And the number of events as well as deaths are increasing (Figure 1 and Jonkman 2005). Statistics show that the number of people killed per event on average is significantly higher in Asia than elsewhere, and among all water-induced disasters this number is much higher for flash floods (Jonkman 2005). In Nepal, landslides, floods, and avalanches destroy important infrastructure worth US \$9 million and cause about 300 deaths annually (DWIDP 2005). In Afghanistan, 362 people were killed or reported missing and 192 people were injured as a direct consequence of flash floods in 2005 (Azizi and Naimi 2005, cited in Xu et al. 2006). In total, about 100,000 people were displaced by these events. Exceptional events can exceed these numbers by many times — in 1998 the Yangtze flood in China caused an estimated US \$31 billion of damage (Kron 2005).

Despite the destructive nature and immense impact they have on the socioeconomy of the region, flash floods have not received adequate attention. This is mainly because of poor understanding of the processes of flash floods and lack of knowledge of measures to manage the problem in the HKH region.



Sources: Based on data drawn from Jonkman 2005; CIMOD 2007