Chapter 13
The 2013 North Indian Floods: A Case Study

Zahid Nabi
https://orcid.org/0000-0001-6724-6345
Central University of Jammu, India

Shivali Kundan
Central University of Jammu, India

Neha Verma
Central University of Jammu, India

Dinesh Kumar
Central University of Jammu, India

ABSTRACT

The 2013 North Indian floods were a devastating hydrometeorological event that affected several states in northern India, primarily Uttarakhand and Himachal Pradesh. The floods were triggered by heavy rainfall combined with cloud bursts, cloudburst-induced landslides, and the melting of glaciers in the region. The event resulted in extensive flooding, landslides, and loss of life and infrastructure. This book chapter aims to explore the causes, impacts, and aftermath of the 2013 North Indian floods, highlighting both the devastation brought upon by the disaster and the remarkable resilience displayed by the affected communities. It emphasizes the need for improved disaster management strategies, sustainable development practices, and community resilience to minimize the impact of future floods and protect vulnerable regions.

INTRODUCTION

Flood hazard is a serious threat to at least 20 million people worldwide, which claims around 20,000 lives every year (Kellens et al., 2013; Yin and Li, 2001). Flash floods stand apart from many other forms of flooding due to their swift onset, transpiring within a timeframe of 2 to 6 hours following intense

DOI: 10.4018/978-1-6684-8771-6.ch013

rainfall, the breach of a dam, failure of a levee, rapid snowmelt, or ice-related events. Flash floods are one of the most destructive types of natural hazards. The main threat arises from the speed with which they develop and the depth and power of the resulting flows (Bandyopadhyay and Gyawali, 1994; Sene and Sene, 2016). The year 2013 marked a tragic chapter in the history of North India as the region was ravaged by one of the deadliest floods it had ever witnessed. Starting in June 2013, heavy monsoon rains caused widespread flooding and landslides in various states, including Uttarakhand, Himachal Pradesh, and parts of Uttar Pradesh, Rajasthan, and Haryana (Joseph et al., 2015; Sati and Gahalaut, 2013). The floods in the parts of the north-west Himalayan region caused severe damage in the Uttarakhand state of India and some parts of western Nepal (Sati and Gahalaut, 2013).

Between the 13th and 17th of June 2013, a series of torrential downpours wreaked havoc on several states in northern India, causing catastrophic flooding in Uttarakhand as shown in Figures 1.1 and 1.2, and giving rise to one of the most devastating floods in recorded history (Dobhal et al. 2013). The deluge triggered massive landslides, resulting in an alarming death toll exceeding 5,000 lives lost and inflicting significant damage to properties. Apart from the severe impact on Uttarakhand, this calamitous event also reverberated across other regions of India, including Himachal Pradesh, Haryana, Delhi, and Uttar Pradesh, as well as affecting western Nepal and parts of Tibet (Cho et al., 2016; Dubey et al., 2014). Heavy rainfall in the early summer monsoon causes rapid snow melting, sediment transport, and debris flow, thus impacting soil profile (Rasouli et al, 2023) and water quality (Vaseashta et al, 2021). This process triggers lake outbursts, landslides, and river erosion in downstream areas. The sudden discharge of water quickly spreads over the river valleys and surrounding regions, therefore causing devastating floods (Al Fatah,2019)

Figure 1. Before and after flood picture of Kedernath Uttrakhand
(Numerical identifiers delineate distinct regions in the following manner: "1" marks the presence of a solitary watercourse originating from a glacier, "2" indicates a noticeable accumulation of debris obstructing the water body's path, "3" represents the bifurcation of water into two separate streams, and "4" illustrates the water's exclusive progression through narrow channels.) (**Source**: *http://www.downtoearth.org.in/news/floods-in-uttarakhand-explained-41451)*