

Article

Extreme Weather Events and Out-Migration in the Indian Himalayan Region: Evidence from the 2025 Monsoon

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Introduction

The Himalaya, often referred to as the “Third Pole and water tower of Asia,” is among the most ecologically fragile and disaster-prone mountain systems in the world. Recently, the region is witnessing a marked rise in extreme weather events such as cloudbursts, debris flows, flash floods, landslides and GLOFs (Kumar et al., 2023; Vargas-Burgos et al., 2025). These disasters not only cause the loss of lives but also destroy critical infrastructure, farmlands, orchards, livestock, and livelihoods, thereby disrupting the socio-economic stability of mountain communities (Gautam & Andersen, 2016). The impacts extend beyond immediate physical damage, as recurrent exposure creates cumulative risks that affect the long-term sustainability of settlement patterns and human habitation (Banerjee, 2017).

In the Indian Himalayan Region (IHR), the states of Jammu & Kashmir (UT), Himachal Pradesh, Uttarakhand, and Sikkim have emerged as hotspots. The steep topography, fragile geology, and intense monsoon rainfall make them highly vulnerable to water-related disasters during the monsoon (Sati & Kumar, 2022). Over the past decade, as climate change intensifies, the frequency and intensity of these disasters have increased, raising concerns about climate variability and anthropogenic pressures (Kumar et al., 2023). While direct impacts are reported in terms of death tolls and economic losses, their indirect role in influencing migration and depopulation of mountain villages has received less attention (Gioli et al., 2014).

Therefore, this paper examines the nexus between extreme weather events and out-migration in the Himalayan context, using the 2025 monsoon season (June–August) as a case study. It specifically focuses on deaths, injuries, missing persons, destruction of livelihoods, economic losses, and psychosocial impacts. By situating these findings within the broader climate change and migration discourse, the study seeks to contribute to a better understanding of how climate-induced disasters are reshaping migration and mobility in the Himalayan region (Vargas-Burgos et al., 2025).

Study Area

The study focuses on the states of Jammu & Kashmir (UT), Himachal Pradesh, Uttarakhand, and Sikkim, located in the Indian Himalayan Region (IHR). This region is a hotspot for disasters, characterized by steep topography, fragile geology, and high seismicity, making it extremely vulnerable to water-related hazards during the monsoon. Intense rainfall, cloudbursts, flash floods, landslides, and GLOFs frequently occur, disrupting both ecosystems and human settlements. The dependence of local communities on climate-sensitive sectors such as agriculture, horticulture, livestock, forests, and tourism further heightens their vulnerability. These combined vulnerabilities make the selected Himalayan states critical sites to examine the nexus between extreme weather events, livelihood disruption, and out-migration.

Methodology

This study relies on secondary data collected from State Disaster Management Authority (SDMA) reports of the Himalayan States, government press releases, and verified

media reports covering the 2025 monsoon season from June to August. Information on deaths, injuries, missing persons, and other losses was compiled and cross-checked to ensure the accuracy. The additional details on environmental damages, livelihood disruptions, and psychosocial impacts were drawn from institutional updates and news reports. The data were organized into three thematic categories—destruction of lives and livelihoods, environmental and economic impacts, and psychological and social impacts—to analyze how extreme weather events contribute to out-migration in the Indian Himalayan region.

Results

Destruction of Lives and Livelihoods

The 2025 monsoon season (June–August) caused widespread devastation across the Himalayan states. Till August, Himachal Pradesh witnessed the highest toll with 312 deaths, 199 injuries, and 37 missing (Table 1). Uttarakhand reported 70 deaths, 94 injuries, and over 100 missing due to cloudbursts and flash floods. In the Jammu region, 78 deaths, 400 injuries, and 200 missing were reported, while Sikkim recorded 3 deaths, 4 injuries, and 3 missing. These figures reflect not only immediate human loss but also severe damage to livelihoods. Thousands of acres of farmland, orchards, and livestock were destroyed, disrupting agriculture, horticulture, and tourism. For many, sudden disasters and the collapse of livelihoods leave migration as the only survival option when settlements become uninhabitable.

Table 1: Destruction of lives and livelihoods

State/Region	Deaths	Injured	Missing
Uttarakhand	70	94	100+
Himachal Pradesh	312	369	38
Jammu & Kashmir	78	400	200+
Sikkim	3	4	3

Source: SDMA and Media Reports (June-August, 2025)

Environmental and Economic Impacts

Each monsoon underscores the environmental fragility and economic vulnerability of the Himalayan region. Flash floods and cloudbursts destabilize mountain slopes, triggering landslides, soil erosion, and riverbank collapse, damaging farmlands, forests, and water resources (Fig. 1). These events also lead to the land degradation that reduces productivity and hampers recovery. Economically, households face repeated rebuilding of homes and restoration of fields. Tourism, a major income source, also suffers as damaged infrastructure and perceptions of risk deter visitors. These combined shocks and limited livelihood alternatives push communities toward out-migration.

Psychological and Social Impacts

These disasters leave lasting psychological and social impacts. Families exposed to repeated disasters live under constant fear, insecurity, and trauma, especially those who lose families and relatives. Younger generations increasingly view migration as the pathway to safety and stability. Social dynamics reinforce this: once some households migrate, others follow, creating chain migration. This process weakens community cohesion and accelerates depopulation of mountain villages.

Discussion and Conclusions

Our findings highlight how extreme weather events in the Himalayas are emerging as a significant driver of human migration in the region. The reported destructions of lives and livelihood demonstrate not only the immediate loss but also the structural vulnerability and fragility of the mountains and the local communities (Vargas-Burgos et al., 2025). The results clearly show that Himachal Pradesh has borne the highest human toll, while Jammu region has reported the largest number of missing persons. Such regional variation indicates that exposure, preparedness, and coping capacity differs significantly across the region (Kumar et al., 2023). The destruction of critical infrastructure, farmland, orchards, livestock, forests and water resources demonstrates that extreme weather events in the Himalaya are not isolated disasters but a recurring phenomenon with long-term implications for environmental sustainability, economic resilience, and human habitation (Banerjee, 2017).



Fig.1. Large scale destruction due to disasters

The study reveals that these events not only have physical impacts such as loss of lives and livelihood, environmental and economic damages, but also profoundly affect the social and psychological wellbeing of the people. Post-disaster trauma and social disruption play a decisive role in shaping migration decisions (Gioli et al., 2014). The fear of recurrence, compounded by lack of alternative livelihoods, drives households to view migration as a survival strategy (Gautam & Andersen, 2016). Such chain migration can weaken community cohesion, reinforcing the cycle of out-migration and depopulation of villages (Banerjee, 2017). Addressing these problems requires immediate policy measures. Strengthening disaster preparedness, resilient infrastructure, and sustainable livelihoods are important to reduce the impact of these disasters on forced out-migration. Unless integrated environmental and social protection measures are adopted, the combined pressure of fragility, economic loss, and social distress is likely to accelerate the pace of out-migration from these ecologically sensitive regions (Vargas-Burgos et al., 2025).

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