

## IMPACT OF EXTENDED PRECIPITATION AND UNSCIENTIFIC CONSTRUCTION ON AGRICULTURE IN THE HIMALAYAN REGION

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### ABSTRACT

*Unprecedented 2023 monsoon-induced flash floods and landslides in the Himalayan region caused significant casualties, infrastructure damage, and socio-economic consequences. Hindered drainage systems and unscientific road construction exacerbated flash floods, with 75 casualties in Shimla and 48 in Kullu. Extended rainfall in August, reported by Mr. DC Rana, resulted in 391 casualties and losses of 8,657.8 crores. Over 10,800 homes suffered damage, posing challenges, especially in Mandi district. Variations in precipitation, excessive in Shimla Bilaspur and deficient in Lahaul-Spiti, highlight the impact on approximately 9.4 lakh farmers and emphasize the need for tailored environmental policies.*



### INTRODUCTION

Unpredictable weather events are the events that are unanticipated, uncommon, severe weather as well as weather that falls beyond the historical distribution—the range that has previously been experienced. Extreme weather events can result in landslides, floods, droughts, human fatalities, and financial consequences.

Himachal Pradesh has seen terrible flash floods and landslides due to the monsoon rains in 2023, which have cost unparalleled lives and valuables. There was an abrupt increase in water levels that typically occurred after a heavy rainstorm. The time from the start of the downpour and the peak flood was typically less than six hours for these extremely localized, brief-lived occurrences with a very high peak in the Himalayas. The obstructions prevent the natural flow of water, such as congested drainage systems, and the flood scenario was devastated.

### CASUALTIES AND INFRASTRUCTURE DAMAGE

According to the Disaster Management Authority report (2023), a maximum of 75 casualties were reported between August 13 and August 16 in the Shimla district, 48 in Kullu, 37 in Chamba, 33 in Mandi, 23 in Kangra, 31 in Solan, 21 in Sirmaur, and 17 in Una, as well as 12 in Bilaspur, 15 in Hamirpur, 11 in

Kinnaur, and 4 in Lahaul and Spiti. In addition, more than 5,000 water supply projects have been damaged, and more than 1,000 roads have been closed in the state of Himachal Pradesh.

On 14 August, Monday, more than 20 inhabitants of the Shiv Baori neighbourhood of Himachal Pradesh University, Summer Hill in Shimla were trapped under the rubble during a terrible flash flood that followed a cloud burst, and several homes were also destroyed according to Virender Thakur, a Municipal Councilor for the summer Hill ward, Shimla.



**Landslide in Shiv Baori summer hill, Shimla**

Similar incidences of rockslides were reported in the Balh Valley of Mandi district. The main reason behind these losses is the unscientific road expansion and construction along National Highways. But in Solan City, around 100 houses were damaged due to a huge water flow that was accumulating over a period of time below the earth, or the drainage system was faulty. This incident, which involved several houses subsiding underground, was reported in the village of Bachwai on August 14. It can be visualized that the white building is on the ground level and the slate house has sunk. Researchers observed that houses sink when the water level rises above the surface due to heavy rainfall. There is no expansion of roads near this village still happening.



**Land subsidence case in Bachwai village near Palampur, District Kangra**



**Chakki Bridge and roads in Dharamshala damaged during August 2023**

## IMPACT OF EXTENDED RAINFALL ON SOCIO -AGRICULTURE OF HIMALAYAN REGION

The extended rainfall in the Himalayan region has had a significant impact on agriculture, as reported by Mr. DC Rana, the director of the State Disaster Management Authority. The consequences include 391 casualties, losses totaling 8,657.8 crores, and extensive damage to over 10,800 homes, with 2,500 facing catastrophic destruction. Road closures, particularly 156 roads, including two national highways, have further exacerbated the challenges, with 83 of these closures located in the Mandi district.

Shimla Bilaspur recorded the highest rainfall in August, with an excess of 89%, while Lahaul-Spiti faced a severe deficiency of 96%. Six districts reported insufficient rainfall, and six experienced excess rainfall. By the end of August, the overall excess rainfall for the season was 33%, with Solan receiving 99% more rain than average, Shimla 91%, and Bilaspur 76% since the start of the monsoon. July 2023 ranked as the second wettest on record since 1980.

### Precipitation analysis for August 2023 in Himachal Pradesh

District	Actual (mm)	Normal(mm)	Departure (%)
Bilaspur	597.2	316.8	89
Chamba	177.8	291.7	-39
Hamirpur	646.5	400.6	61
Kangra	720.4	631.5	14
Kinnaur	32.6	77.6	-58
Kullu	122.1	180.2	-32
Lahual & spiti	4.2	117.6	-96
Mandi	681.5	395.3	72
Shimla	253.3	196.4	29
Sirmour	244.6	402.1	-39
Solan	466.1	287.9	62
Una	355.6	372.2	-4
Overall	247.6	256.8	-4

Source: IMD, Shimla

Government estimates indicate that around 9.4 lakh farmers in the state have been adversely affected. The buildup of debris in fields after river inundation poses a threat to soil fertility and nutrient quality, affecting crop cultivation costs for the next cycle. Agricultural expert Shri Nek Ram Sharma from Mandi emphasizes the urgency of clearing debris. Rabi and vegetable crops on 4,01,843 hectares, including the main rabi crop wheat on 3,29,084 hectares, suffered destruction, resulting in a crop loss of Rs. 20 crores due to hailstorms and floods. Approximately 10% of Himachal's apple orchards have been washed away, representing a significant loss with a recovery period of around 15 years.

The economic impact extends to the state's output, expected to drop by 40% from 640,000 metric tons last year, particularly affecting the lucrative tomato commerce valued at close to 600 crores annually. The continuous above-normal rainfall from March to May, leading to soil moisture retention and subsequent landslides, further contributed to damages.

The Environment Policy Guidelines (EPG) highlight the inadequacy of central policies for mountain areas, emphasizing the need for methods compatible with the unique characteristics of mountain ecosystems, including fragility, difficulty of access, marginality, diversity, and climatic quirks. The current situation underscores the importance of tailored environmental policies for sustainable development in the state.

## CONCLUSION

The Himalayan region grapples with the devastating aftermath of unforeseen weather events, particularly the flash floods and landslides in 2023, demanding immediate attention to casualties, infrastructure damage, and the socioeconomic landscape. The vulnerabilities are exacerbated by unscientific road construction and inadequate drainage systems, evident in the casualties reported by the Disaster Management Authority. Extended rainfall has adversely affected agriculture, impacting farmers, soil fertility, and nutrient quality, resulting in substantial economic losses, including a 40% drop in the state's output and significant damage to the lucrative tomato commerce. The urgency for prompt debris clearance in fields, coupled with measures to mitigate future environmental risks, underscores the imperative for tailored policies outlined by the Environment Policy Guidelines (EPG). The current scenario emphasizes the importance of adaptive infrastructure planning and environmental policies for sustainable development in the Himalayan state.

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