



SOCIAL AND HEALTH EFFECTS OF FLASH FLOOD IN HIMACHAL PRADESH

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ABSTRACT Flash flood is a torrent flooding of water in low lying areas. It may be caused by heavy rain associated with severe thunderstorm, by melting water from ice or snow flowing over ice sheets or snow fields, collapse of natural ice, debris dam, man made dams. In hilly state of Himachal Pradesh, flash flood is common during monsoon. One of the recent floods were in 2023, when major land slides, cloud bursts and wide spread flooding incidents happened. Portions of Himachal Pradesh received up to 16.54 inches (420 mm) in 24 hours. The intensity and duration of rain fall, steepness of watershed and stream gradients are the important factors in flash flooding. The floods led to closure of schools, disruption of flights and train operations in various parts of North India. Flash flood causes more damage as compared to ordinary floods. Co-ordination among different departments and stakeholders in the state and conducting post disaster needs assessment is very important for effective disaster response.

KEYWORDS : Flash flood, Effect, Impact, Overview**INTRODUCTION:**

A flash flood is a rapid flooding of low lying areas such as washes, rivers, dry lakes and depressions. It may be caused by heavy rain associated with a severe thunderstorm, hurricane, tropical storm or by melt water from ice or snow. Flash floods may also occur after the collapse of a natural ice or debris dam or a human structure such as a man made dam. Flash floods are distinguished from regular floods by having a timescale of fewer than six hours between rainfall and time of onset of flooding.¹ The floods led to the closure of schools, disruption of flights and train operations in various parts of North India.^{2,3,4} Portions of Himachal Pradesh received up to 16.54 inches (420 mm) in 24 hours.⁵

Causes of Flash flood in Himachal:**1. Major Landslides:**

As per Government report, a large number of landslides were recorded because of cloudburst, flash floods and heavy rainfall during this season. In addition to the data below, a large number of small and medium landslides also took place in various parts of the state resulting in loss of public and private properties.⁶

Table-1: District Wise Major Landslides Data

S. No.	Name of the District	Total
1	Bilaspur	3
2	Chamba	241
3	Hamirpur	0
4	Kangra	2
5	Kinnaur	257
6	Kullu	2600
7	Lahul & Spiti	13
8	Mandi	203
9	Sirmaur	17
10	Solan	184
11	Una	0
12	Shimla	1960
	Total	5480

2. Cloud burst Recorded: A total of 14 cloud bursts in three districts were recorded.⁶

Table-2: District Wise Cloud Burst Data

S. No.	Name of the District	Total
1	Kullu	12
2	Solan	1
3	Shimla	1
	Total	14

Table-3: District Wise Wide Spread Flood Incident Data

S. No.	Name of the District	Total
1	Bilaspur	1
2	Chamba	4
3	Hamirpur	1

4	Kangra	25
5	Kinnaur	1
6	Kullu	20
7	Lahul & Spiti	12
8	Mandi	10
9	Sirmaur	3
10	Solan	0
11	Una	1
12	Shimla	5
	Total	83

3. Wide spread flooding: A total of 83 wide spread flood incidents were recorded.

Impact of Flash flood:

This natural calamity hit the state of Himachal Pradesh badly, with at least 330 dead, 38 missing and more than 100 injured during flooding since 1 April 2023.^{7,8} More than 1,000 roads were blocked in the state as a result of downed power lines and other damaged infrastructure.^{9,10} Approximately 70,000 tourists were evacuated from the state, as per report.¹¹ Rescue operations were led by National Disaster Response Force and teams from the Indian army. Maximum districts had an entire month's worth of rainfall within a single day. In Manali, roads were wiped out by the heavy floods, thereby resulting in both tourists and their vehicles stranded.¹²

Towards the end of second week of August, additional heavy rains hit Shimla, resulting in landslides and destroying several buildings, homes and a temple (Figure-1) and killing approximately 57 people. The intensity of the rains was attributed to climate change.¹³ The landslides washed out several roads, including the Himalayan Expressway,¹⁴ and sections of the Kalka-Shimla Railway.¹⁵ The additional floods and landslides killed a total of 71 people.⁸ A massive landslide destroyed roads and buildings in the city of Shimla.¹⁶ Cumulatively, since the monsoon hit on 24 June 2023, 170 incidents of cloudburst or land sliding were reported and 9,600 houses were damaged in Himachal Pradesh.⁸ Chief minister stated that the losses from the combined floods of 2023 were about 10,000 crore rupees, and the damaged configuration would take a year to repair.^{17,18}

Overview Of Flash Flood

Torrential rainfall in the region led to depredation, thus activating landslides, resulting in road blockages, damage to bridges and power failures. Since the monsoon's onset on 24th June 2023 until 30th July 2023, the state reported 34 people missing, 215 injured and 187 fatalities, as mentioned by Himachal Pradesh State Disaster Management Authority. The districts of Shimla, Solan, Sirmour, Kinnaur, Kullu, Kangra, Mandi and Chamba were severely affected by heavy and ceaseless constant rains, leading to extensive damage to roads, bridges, and culverts. The unfavorable weather conditions also led to large scale damage to properties, with 845 houses fullyFigure-1: Rescue personnel searches for victims after a temple collapsed in Shimla on Aug 14, 2023 damaged and 7,161 houses partially

damaged. Beside this, 241 shops and 2,218 cow houses were also affected by the rain and floods. The economic toll of the ongoing disasters was estimated at 5,620.22 crore rupees, reflecting the widespread devastation in the state. A total of 5480 landslides and 83 flash floods were recorded, leading to the closure of more than 650 roads, including three national highways. The National Highway from Dharamshala to Mcleodganj was severely damaged in multiple locations, as reported by news agency ANI.



There was a significant impact of this season on tourism sector. Hotel occupancy rates dropped down, leading to private hotels offering substantial discounts to attract guests. The Himachal Pradesh Tourism Development Corporation announced a 50% discount on room rents until September 15th 2023 to support the struggling industry. Apart from the human casualties and infrastructure damage, the natural disasters also impacted the livestock in the region. Nearly 400 sheep were reported dead due to extreme cold in the high- altitude Pin Valley, while 1,200 sheep were successfully rescued in Lahaul and Spiti districts, which experienced heavy snowfall.

Authorities along with the humanitarian actors and the community were working earnestly to address the situation, provided aid to those affected, and restored essential infrastructure. However, the extent of the damage underscores the urgency of relief efforts to support the affected communities and restore normalcy in the region.⁶

Health Effects Of Flash Floods And Rainy Season:

Health officials raised the concerns about Snake bites along with health issues arising out of fever, diarrhoea.¹⁹ Conducted awareness about health, hygiene and preventive measures against vector borne diseases and water borne diseases. Special attention was given to the patients with chronic conditions, especially non communicable diseases and providing health education to better manage their health conditions.²⁰

In summary, In Himalayan region, cause of flash floods, land slides and cloud bursts are the steep slopes and global warming along with increased susceptibility for heavy rain fall in that region resulting in loss of life and property.

CONCLUSION:

Main causes of flash floods in Himachal Pradesh were land slides, wide spread flooding incidents and cloud bursts with significant risk to human life, environment and infrastructure. Overflowing of the rivers in hilly areas results in flash floods. Co-ordination among different departments and stakeholders in the state and conducting post disaster needs assessment is very important for effective disaster response.

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