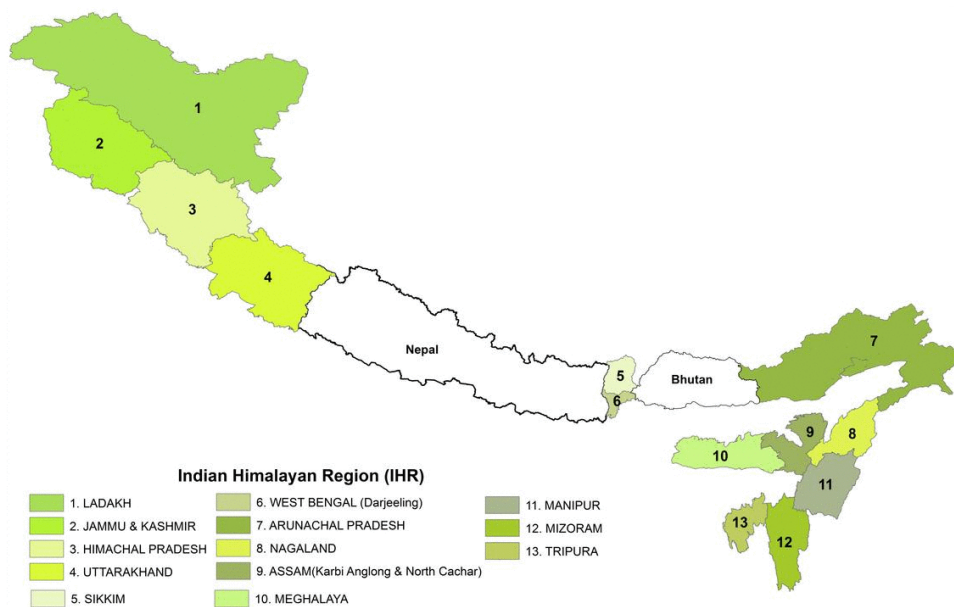




# Extreme Weather Events in J&K

## Why in News?

The **occurrence of cloudburst, flash flood, and landslide**, in Ramban, Jammu & Kashmir caused deaths, damaged buildings, disrupted transport, and displaced many. This highlights the issue of increasing frequency of extreme weather events in the **ecologically sensitive Himalayan region**.



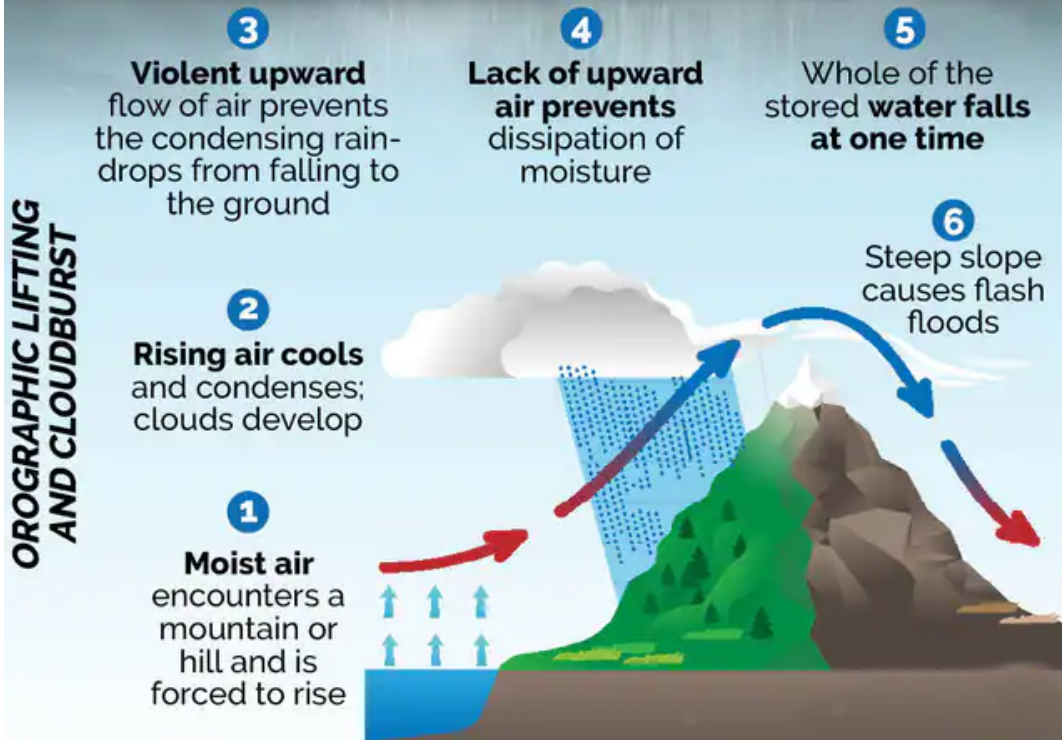
## Key Points

### Cloudburst

- A cloudburst is a **localised extreme rainfall event, defined as 10 cm or more rainfall** within an hour over an area of approximately 10 km<sup>2</sup>.
- The phenomenon is common in hilly regions due to **orographic lift**—where warm air rises along mountain slopes, cools rapidly at higher altitudes, and releases accumulated moisture as sudden, intense rainfall.
  - **Cloudbursts are difficult to predict or monitor** due to their localized and short-lived nature.
- It can **trigger flash floods and landslides** by overwhelming natural and artificial drainage.
- **Cloudbursts in Himachal Pradesh (2024) and Uttarakhand (2021)** caused fatal floods, landslides, and extensive damage to infrastructure.

# WHAT CAUSES CLOUDBURSTS?

Cloudbursts occur only via orographic lift i.e. a situation when a warm air parcel mixes with cooler air, resulting in sudden condensation.



## Flash Floods

- A flash flood **occurs when sudden, intense rainfall leads to rapid runoff into rivers, streams, and drainage systems, especially in rocky terrains that have low water absorption capacity.**
- These **floods are short-lived but violent**, and can result in serious loss of life, unlike **riverine floods that are slower but more damaging to property.**

## Landslide

- A landslide is the **downward movement of soil, rocks, and debris** due to **gravity**, often triggered by water infiltration.
  - **Excess rainfall reduces soil strength and friction**, making it easier for slopes to fail.
- Landslides in hilly areas block roads, destroy homes, and even **cause secondary flooding by displacing water bodies.**
  - The **2021 Chamoli landslide**, triggered by heavy rain and a glacier burst, led to widespread flooding and fatalities.

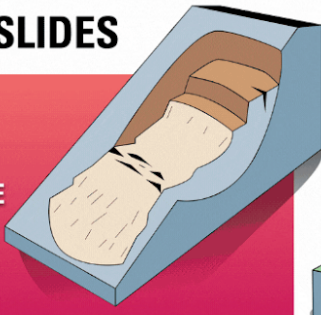


## TYPES OF LANDSLIDES

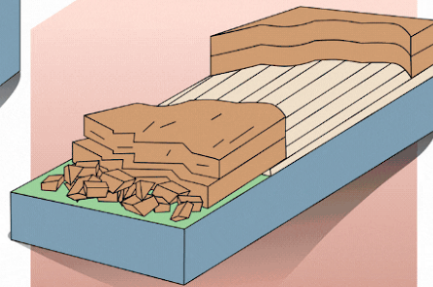
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### ROTATIONAL LANDSLIDE

Ground rotates and slides along a curved failure plane.



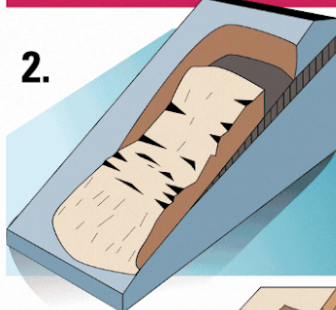
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### BLOCK SLIDE

A type of translational landslide made of mostly one block of surface material that moves downslope.

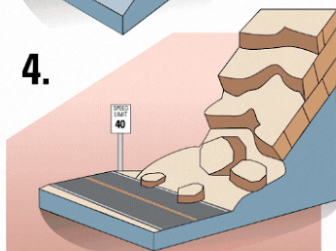
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### TRANSLATIONAL LANDSLIDE

Ground slides with little rotation along a flat plane parallel to the surface.

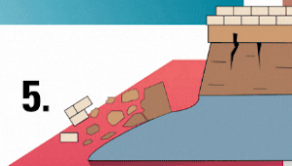
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### ROCKFALL

Gravity sends rocks and other materials tumbling downslope.

5.



### TOPPLE

Pieces of a cliff or rock face fall forward as large blocks.

6.



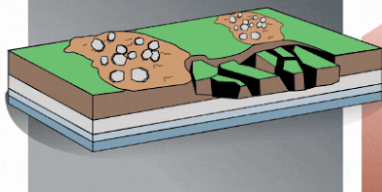
### EARTHFLOW

Form on moderate slopes when fine-grained material liquefies and runs out in hourglass shape.

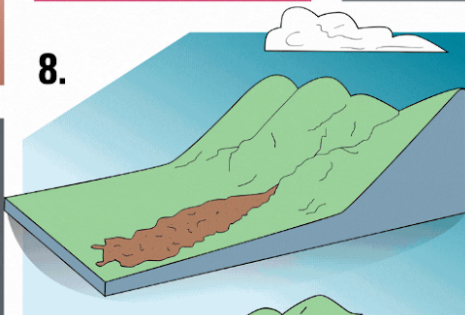
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### LATERAL SPREAD

When surface material extends or spreads on gentle slopes. This type of ground deformation is often associated with earthquake shaking.



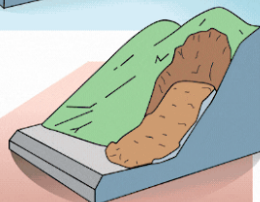
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### DEBRIS FLOW

Rapidly moving mix of water, mud, trees, and other materials that flows downvalley and can travel great distances.

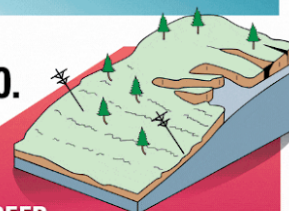
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### DEBRIS AVALANCHE

An extremely large and fast moving debris flow.

10.



### CREEP

Soil and surface material that slowly moves down a slope.

## Why Himalayan Regions Like Ramban Are Vulnerable?

- The Himalayas are **young fold mountains**, tectonically active and prone to erosion, making the region naturally unstable.
  - Roads, buildings, and dams are **often built without adequate slope stabilization** or environmental assessments, **increasing the risk of disaster**.
- **Loss of vegetation reduces soil cohesion**, which increases the chances of landslides and slope failure.
- The **frequency of extreme weather events** such as cloudbursts is rising due to **changing climate patterns**, leading to intense and erratic rainfall.

- Local populations often lack the training and resources to respond quickly and effectively during such disasters.

## Mitigation Measures

- Enhance **satellite-based monitoring and real-time forecasting tools** to track localised extreme weather events.
- Enforce **eco-sensitive construction norms**, especially in hilly and ecologically fragile districts like Ramban.
- **Integrate climate vulnerability assessments** into district-level disaster management plans and planning processes.
- **Train local communities in evacuation protocols** and first-response mechanisms to minimise casualties during extreme weather events.

PDF Reference URL: <https://www.drishtiias.com/printpdf/extreme-weather-events-in-jk>

