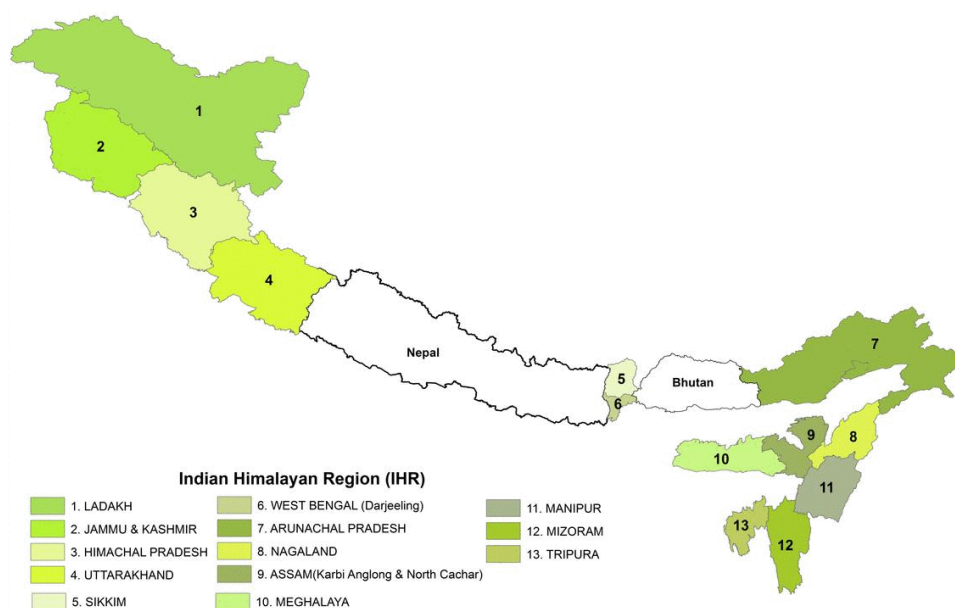




Extreme Weather Events in J&K

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**.



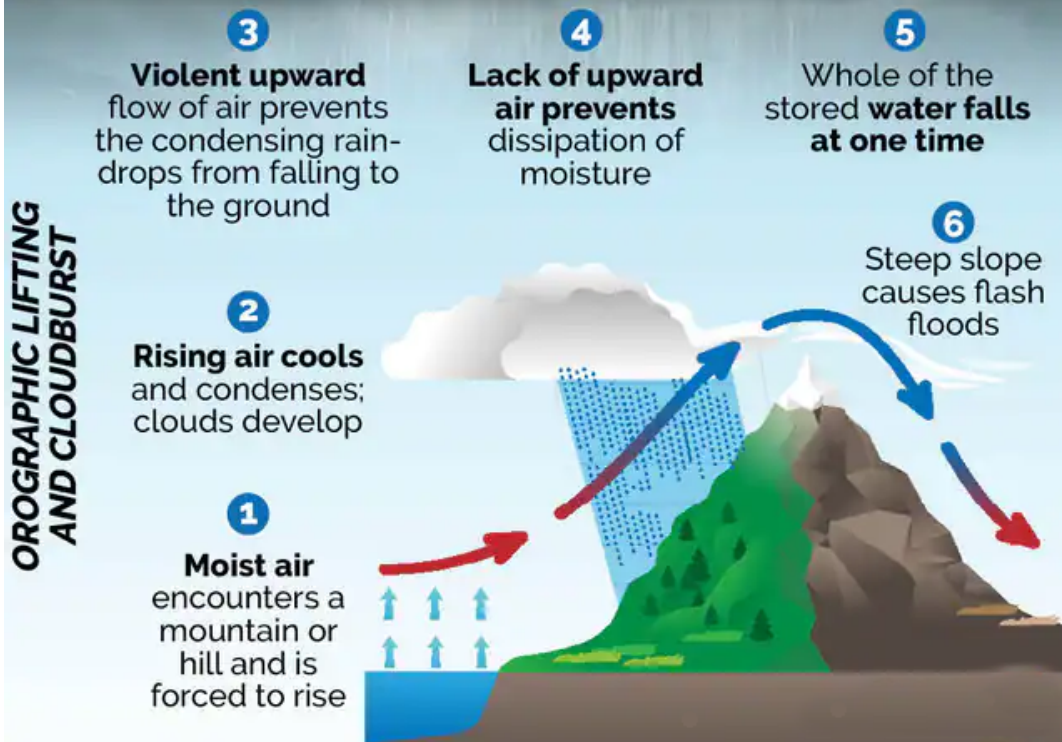
Key Points

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 km².
- 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

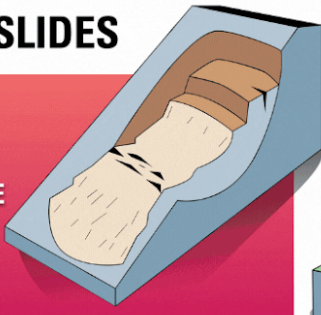
- A landslide is the **downward movement of soil, rocks, and debris** due to **gravity**, often triggered by water infiltration.
 - **Excess rainfall reduces soil strength and friction**, making it easier for slopes to fail.
- Landslides in hilly areas block roads, destroy homes, and even **cause secondary 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

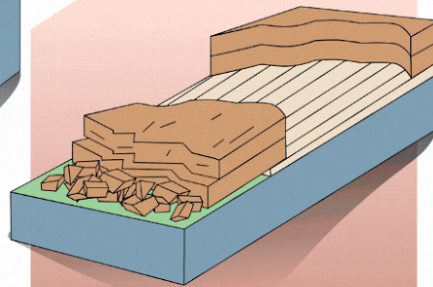
1.

ROTATIONAL LANDSLIDE

Ground rotates and slides along a curved failure plane.



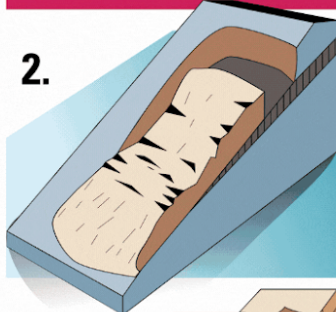
3.



BLOCK SLIDE

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

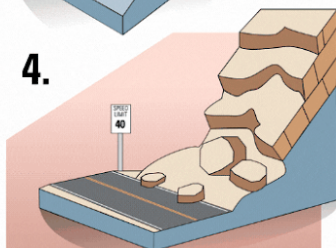
2.



TRANSLATIONAL LANDSLIDE

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

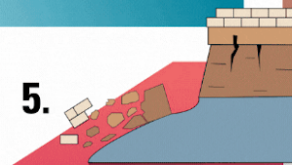
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ROCKFALL

Gravity sends rocks and other materials tumbling downslope.

5.



TOPPLE

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

6.



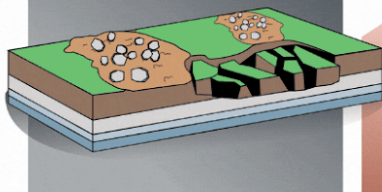
EARTHFLOW

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

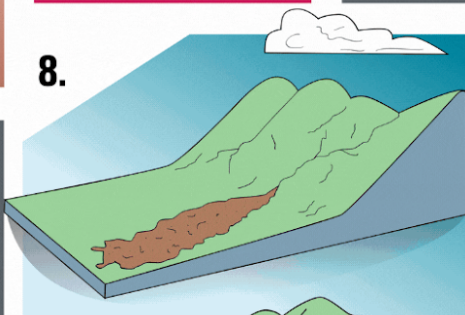
7.

LATERAL SPREAD

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



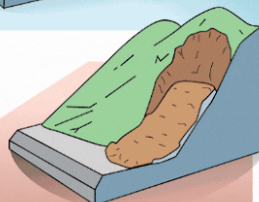
8.



DEBRIS FLOW

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

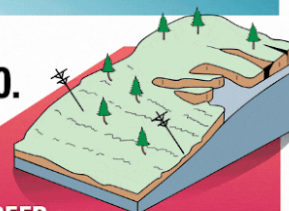
9.



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>

