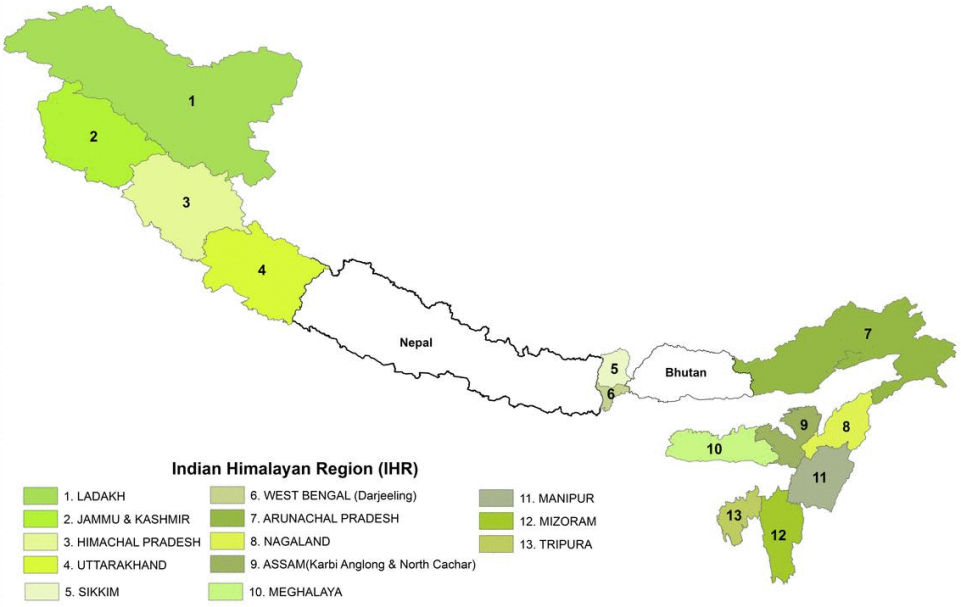
Extreme Weather Events in J&K

Why in News?

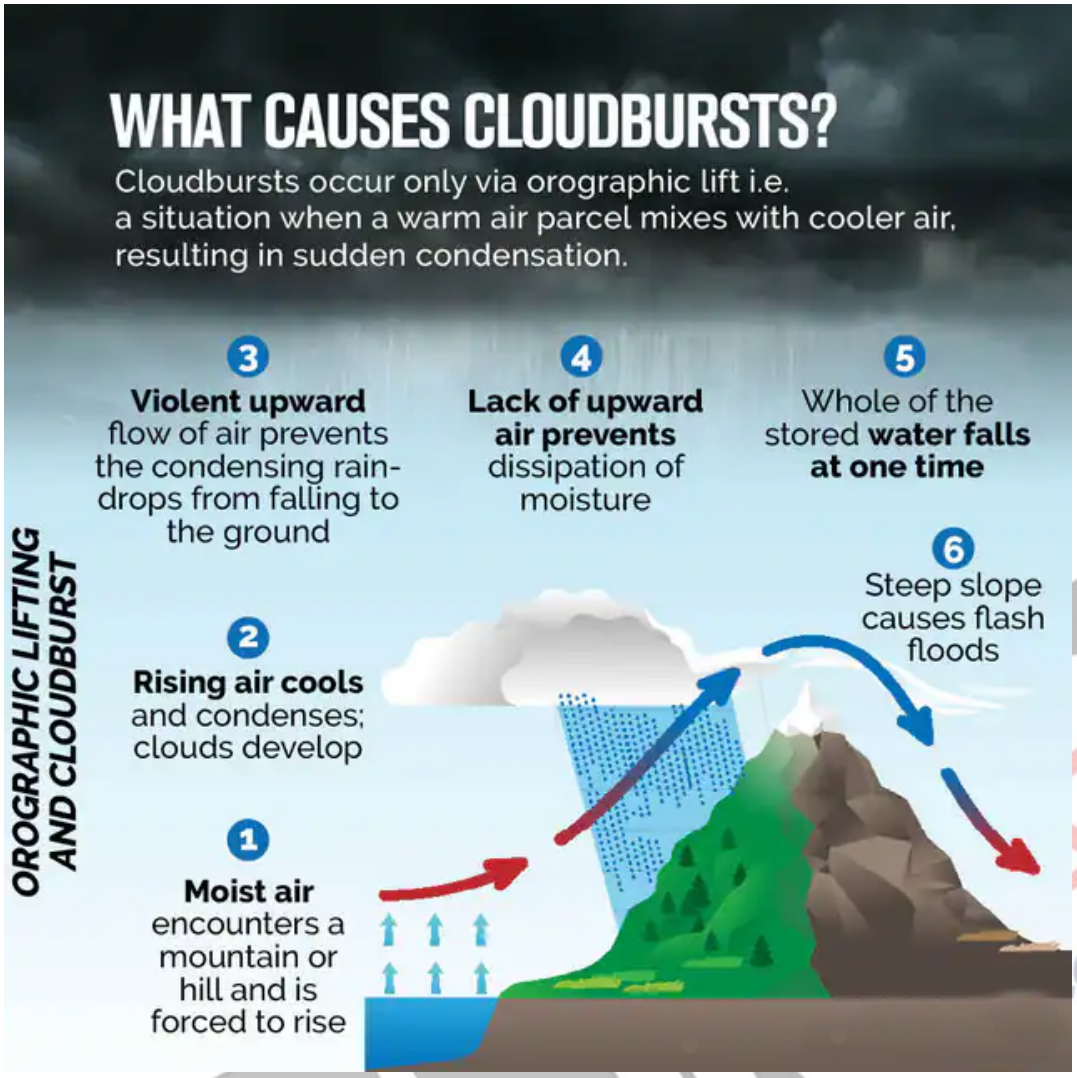
The **occurrence of cloudburst**, **flash flood**, and **landslide**, in Ramban, Jammu & Kashmir caused deaths, damaged buildings, disrupted transport, and displaced many. This highlights the issue of increasing frequency of extreme weather events in the **ecologically sensitive Himalayan region**.



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.

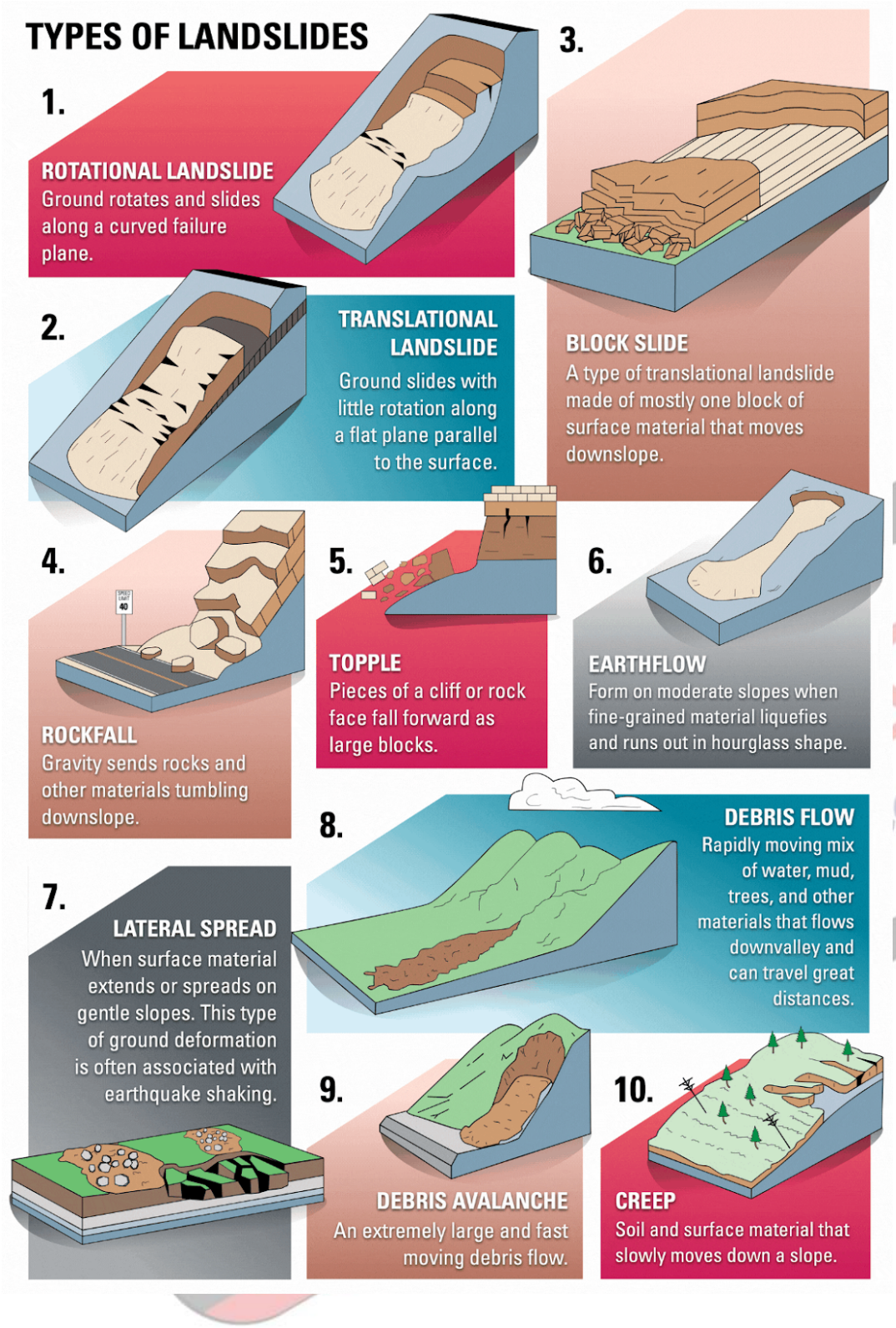


Flash Floods

- 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.



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.