



## Landslide and Flash Floods

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### Why in News

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Recently, heavy rains caused **flash floods** and **landslides** in many parts of Himachal Pradesh.

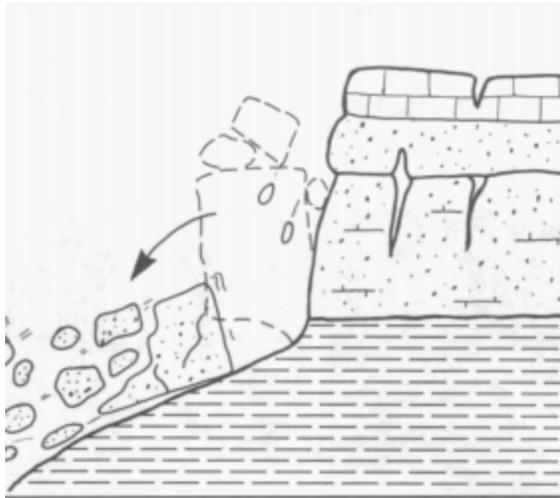
### Key Points

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- **Landslide:**

- **About:**

- A landslide is defined as the **movement of a mass of rock, debris, or earth down a slope.**
    - They are a **type of mass wasting**, which denotes any downward movement of soil and rock under the direct influence of gravity.
    - The term landslide encompasses **five modes of slope movement: falls, topples, slides, spreads, and flows.**



- **Causes:**

- Slope movement occurs **when forces acting downward** (mainly due to gravity) exceed the strength of the earth materials that **compose the slope.**
    - Landslides are caused due to three major factors: **geology, morphology, and human activity.**
      - **Geology** refers to characteristics of the material. The earth or rock might be weak or fractured, or different layers may have **different strengths and stiffness.**
      - **Morphology refers to the structure** of the land. For example, slopes that lose their vegetation to fire or drought are more vulnerable to landslides.

Vegetation holds soil in place, and without the root systems of trees, bushes, and other plants, the land is more likely to slide away.
      - **Human activity** which includes agriculture and construction increases the risk of a landslide.

- **Landslide-Prone Areas:**

The entire Himalayan tract, hills/mountains in sub-Himalayan terrains of North-east India, Western Ghats, the Nilgiris in Tamil Nadu Konkan areas are landslide-prone.

- **Mitigation:**
  - **Restriction on the construction and other developmental activities** such as roads and dams in the areas prone to landslides.
  - **Limiting agriculture to valleys** and areas with moderate slopes.
  - **Control on the development of large settlements** in the high vulnerability zones.
  - **Promoting large-scale afforestation programmes** and construction of bunds to reduce the flow of water.
  - **Terrace farming** should be encouraged in the northeastern hill states where Jhumming (Slash and Burn/Shifting Cultivation) is still prevalent.
- **Step Taken:**

The **Geological Survey of India (GSI)** has done a **national landslide susceptibility mapping** for 85% of the entire 4,20,000 square km landslide-prone area in the country. The **areas have been divided into different zones according to the propensity of the disaster.**

Improvement in early warning systems, monitoring and susceptibility zoning can reduce the damage caused by landslides.

- **Flash Floods:**

- **About:**

- These are **sudden surges in water** levels generally during or following an intense spell of rain.
- These are **highly localised events of short duration** with a very high peak and usually **have less than six hours** between the occurrence of the rainfall and peak flood.
- The **flood situation worsens** in the presence of **choked drainage lines** or encroachments obstructing the natural flow of water.

- **Causes:**

- It may be caused by **heavy rain associated with a severe thunderstorm**, hurricane, tropical storm, or meltwater from ice or snow flowing over ice sheets or snowfields.
- Flash Floods can also occur **due to Dam or Levee Breaks, and/or Mudslides (Debris Flow)**.
- In areas on or near **volcanoes**, flash floods have also occurred after eruptions, when glaciers have been melted by the intense heat.
- The intensity of the rainfall, the location and distribution of the rainfall, the land use and topography, vegetation types and growth/density, soil type, and soil water- content all determine just how quickly the Flash Flooding may occur, and influence where it may occur.

- **Mitigation:**

- Instead of valleys, people should live in areas on slopes with firm ground for safety reasons.
- In areas where ground fissures have developed, appropriate steps should be taken to check the infiltration of rainwater and surface water.
- Banning "indiscriminate" and "unscientific" construction works.

**Source: TH**