

Landslides

Mains: GS III – Disaster management

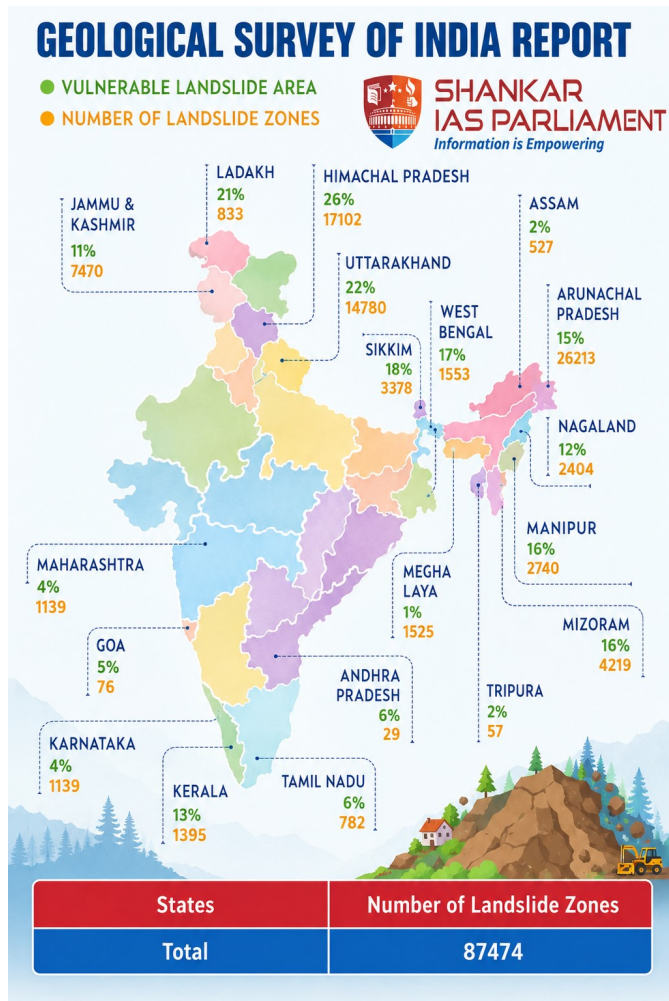
Why in News?

Recently there has been a heavy landslide affecting significant parts of Keralam.

What is a Landslide?

- **Definition** – The **National Disaster Management Authority (NDMA)** defines a landslide as a wide variety of processes resulting in the downward and outward movement of slope-forming materials—including **natural rock, soils, artificial fills**, or combinations of these—under the direct influence of gravity.
- **Main Types**
 - **Falls** – Rocks and debris break off a steep cliff or slope and drop straight down, bouncing or rolling as they hit the ground.
 - **Topples** – Large blocks of rock or soil tilt forward over a pivot point near the bottom and fall away from the slope.
 - **Slides** – A coherent mass of material moves down a slope along a clear breaking or slip surface.
 - This includes rotational slides (moving along a curved surface) and translational slides (moving along a flat plane).
 - **Spreads** – Fractured parts of a hard top layer stretch or move apart horizontally, usually because a weak layer underneath gives way.
 - **Flows** – Mixed soil, rock, air, and water rush down like a liquid or thick fluid, often called mudflows or debris flows.
- **Landslides Zones of India** – India currently has **87,474 active landslide zones**, spread across 179 districts in 19 states and union territories, a recent report released by the Geological Survey of India (GSI) has revealed.
- These danger-prone zones collectively cover about 4.2 lakh square kilometres, underscoring the scale of the challenge.
- Arunachal Pradesh ranks first with 26,213 landslide zones, followed by Himachal Pradesh with 17,102 zones across the nation.
- Uttarakhand stands third with 14,780 zones.
- **Major Recent Landslides in India**
 - 2026(pathanamthitta, kerala)
 - 2024 (Wayanad, Kerala)
 - 2023 (Irshalwadi, Maharashtra)
 - 2023 (Himachal Pradesh)
 - 2022 (Noney, Manipur)

- 2021 (Kinnaur, Himachal Pradesh)



What are the causes of Landslides?

- **Heavy Rain** - Water makes soil heavy and slippery, which lowers the friction holding the dirt on the slope.
- **Earthquakes** - Shaking from the earth breaks rocks and shifts loose dirt on mountains.
- **Volcanoes** - Hot ash, melting snow, and lava flows from eruptions can start fast mudslides.
- **Erosion** - Rivers or ocean waves wash away the bottom part of a hill, leaving the top unsupported.
- **Cutting Trees (Deforestation)** - Tree roots hold the soil tightly together, removing trees makes the slope weak.
- **Building and Mining** - Digging into the sides of hills or using loud blasts shakes and weakens the ground structure

What are the impacts of Landslides?

- **Human and Social Impacts**
 - Loss of life and injuries from falling rocks and moving mud.
 - Displacement of local communities and families.
 - Psychological trauma and stress for survivors.

- Disrupted access to schools, hospitals, and emergency services.
- **Economic and Infrastructure Damage**
 - Blocked roads and railways that halt trade and travel.
 - Destroyed utilities including power, gas, and water lines.
 - Costly repairs for damaged buildings and public works.
 - Loss of agricultural land and livestock for local farmers.
- **Environmental Effects**
 - Soil erosion and permanent land degradation.
 - Pollution of nearby streams and water bodies from heavy debris.
 - Destruction of vegetation and local wildlife habitats

What could be done to reduce the impacts of Landslides?

- **Land Use and Planning** - Avoid constructing homes near steep hillsides, mountain ridges, or natural drainage channels.
- Review historical hazard information and local guidelines before purchasing land or starting new developments.
- Limit residential and commercial construction in areas identified as highly susceptible to landslides.
- **Drainage and Water Management** - Install effective surface and underground drainage systems, such as channels, pipes, and French drains, to reduce water accumulation in the soil.
- Ensure that roof gutters and runoff are directed away from unstable slopes.
- Regularly inspect and clear storm drains and weep holes to prevent water blockages.
- **Vegetation and Bioengineering** - Restore vegetation on bare or damaged slopes by planting native trees, shrubs, and deep-rooted grasses.
- Preserve existing tree roots, stumps, and ground cover, as they help stabilize the soil naturally.
- Use bioengineering methods, such as live crib walls and brush layering, to combine vegetation with structural support.
- **Engineering and Structural Measures** - Construct retaining or deflection walls to stabilize unstable slopes and prevent soil movement.
- Reshape steep slopes into stepped terraces to reduce their incline and improve stability.
- Strengthen loose soil and rock using geotechnical reinforcement techniques, including soil nails, rock bolts, geogrids, or grouting.

Reference

[The Hindu| Landslides in Kerala](#)