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Q4

Differentiate the causes of landslides in the Himalayan region and Western Ghats.

UPSC Civil Services Mains 2021 · GS I · 10 marks · Geophysical Phenomena

Important Geophysical phenomena such as earthquakes, tsunami, volcanic activity, cyclone etc., geographical features and their location-changes in critical geographical features (including water-bodies and ice-caps) and in flora and fauna and the effects of such changes.

Core demand of the question

- Differentiate the causes of landslides in the Himalayan region and Western Ghats
- Keep the differentiation within a 10-mark length

Revision summary

Himalayan landslides are driven by tectonics, shattered rock, glaciers, and cloudbursts.

Kedarnath 2013 and Chamoli show rain plus mountain structure.

Western Ghat slides are monsoon, laterite, and slope cutting, as at Malin and in Kerala.

Seismicity is primary in the Himalaya and secondary in the Ghats.

NDMA maps must use different triggers for the two belts.

Introduction

Both belts slide, but they are not the same machine. The Himalaya is a young thrust mountain with earthquakes and deep rain on debris. The Western Ghats are an older scarp with laterite, monsoon cloudbursts, and hill-cutting for roads and estates.

Body

Himalayan causes

- **Tectonics:** the Main Central Thrust and frequent earthquakes, as in **Chamoli, Sikkim 2011**, and **Nepal 2015**, shatter slopes before rain even falls.
- **Lithology:** fractured schist, shale, and glacial till; river undercutting in gorges of the Alaknanda and Teesta.
- **Climate:** intense monsoon and cloudbursts, plus freeze-thaw at height; 2013 **Kedarnath** combined rain, moraine, and a lake outburst.
- **Human load:** hydropower cuts, Char Dham road widening, and unplanned hotels on colluvium.

Western Ghat causes

- Steep west-facing scarp and thick laterite or saprolite that loses strength when saturated, as in **Malin 2014** (Pune district) and **Kerala 2018-19**.
- Extreme monsoon orographic rain, not Himalayan seismicity as the first cause.

- **Land use:** tea and plantation benches, quarry benches, and ghat-road hairpins that remove toe support.
- Coastal and midland laterite cliffs fail as debris flows more than as huge rock avalanches of the High Himalaya.

Contrast

- **Himalaya:** earthquake plus glacier plus thrust plus rain. Ghats: rain plus laterite plus slope cutting, with far weaker seismic trigger.
- **NDMA landslide guidelines therefore need different maps:** seismic-landslide for the north; rainfall-threshold and laterite for the west.

Flow diagram

Himalaya -> Earthquakes thrusts
Himalaya -> Glacial debris rain
Western Ghats -> Laterite saturation
Western Ghats -> Road plantation cuts
Earthquakes thrusts -> Landslide
Laterite saturation -> Landslide

Conclusion

Himalayan slides start in a live collision belt. Western Ghat slides start in a monsoon-soaked scarp of weak weathered rock. Treat them as two hazard families, not one hill problem.

Facts & figures

Kedarnath 2013

Uttarakhand disaster where extreme rain, moraine, and a lake outburst destroyed a pilgrim town.

Malin 2014

Maharashtra village buried after heavy rain on a cut laterite slope.

Kerala 2018

Monsoon floods with widespread Ghat landslides on plantation and road cuts.

NDMA guidelines

National landslide risk guidelines that ask for region-specific hazard zonation.

MCT

Main Central Thrust, a Himalayan structure that concentrates slope failure.