



## Topic: Disaster and disaster management.

### Landslides in India

#### Introduction

- A **landslide** is defined as the movement of a mass of rock, debris, or earth down a slope, under the direct influence of gravity.
- The important causes of Landslides are slow weathering of rocks as well as soil erosion, earthquakes and volcanic activity.

#### Land-use change

- Historically, most of the settlements were **concentrated in the coastal plain**, the adjoining lowlands and parts of the midlands.
- However, this scenario has **altered now**, with **significant land-use change** across topographic boundaries.
- Population growth, agricultural expansion, economic growth, infrastructure development, have all led to **settlement of the highlands**.
- The demand for construction materials, with the attendant quarrying and excavations, is altering the landscape.
- Road construction in hilly areas, even when cutting across the toe of the slope, is destabilising and creates conditions conducive to landslides.
- This has resulted in gross disturbance of the character of the terrain.
- Consequently, the **water-absorbing capacity** of the river catchment is lost, contributing to increasing surface run-off and reduction in ground water recharge.

#### Measures undertaken to control landslides

- **National Landslide Risk Management Strategy** in India which addresses all the components of landslide disaster risk reduction and management.

- The **Geological Survey of India (GSI)** has done a **national landslide susceptibility mapping** for 85% of the entire landslide-prone area in the country.
- Improvement in early warning systems, monitoring and susceptibility zoning.
- **National Disaster Management Authority (NDMA) Guidelines on Landslide Hazard Management.**
  - Delineating areas susceptible to landslide hazards
  - Encouraging implementation of successful landslide remediation and mitigation technologies.
  - Developing institutional capacity and training for geoscientists, engineers, and planners for the effective management of the landslide hazard.
- **National Institute of Disaster Management (NIDM)** provides Capacity Building support to various National and State level agencies in the field of Disaster Management.

### Reasons why impact of landslides are still high

- Lack of correct data and poor data collection strategies.
- The CAG reported the lack of communication systems which aggravated the problems. Example during the Uttarakhand landslides.
- The issue of coordination and administration at different levels is still lingering.
- **Poor predictability:** The appropriate interpretation of the meteorological forecast is still lacking.
- Lack of awareness among the people.
- The inappropriate hill area development like unscientific construction of roads, tunnels, hydroelectric projects cause damage to the natural balance of the structures.
- Illegal encroachment of the rivers is still not contained through appropriate actions.
- Weak environmental impact assessment regime.
- Lack of scientific analysis of landslide events and inventory of data analysis makes mistakes recurring.

### Way forward

- **Structural measures**
  - **Plantation in barren areas**, especially on slopes, with grass cover is an important component of integrated watershed management programme.
  - Stopping Jhum cultivation.
  - Grazing should be restricted.
  - Construction of engineering structures like **buttress beams, retaining walls, anchors** to stabilise the slopes.
  - Use the **surface vegetative cover** to bind the soil particles and decrease the velocity of flowing water.
- **Non-structural measures**
  - **Mandatory Environmental Impact Assessment of the infrastructure projects** before commencing the work.
  - Declaration of **eco-sensitive zones** where mining and other industrial activities are banned.
  - **Hazard mapping** of the region to identify the most vulnerable zones and take measures to safeguard it.
  - **Local Disaster Management** force for quick relief and safety of the people affected by landslides.
  - Teaching people about landslides & ways to mitigate.
  - Constructing a **permanent assessment team comprising scientists & geologists** for better mitigation and adaptation techniques.
  - **Involving the local people** for sustainable development of Himalayas.