Landslides in India

Introduction

The recent Wayanad landslide that claimed over 250 lives has once again underlined the growing threat of landslides in India. No longer isolated events, landslides are now frequent, widespread, and increasingly devastating. For aspirants preparing for the Civil Services Exam, understanding the causes, patterns, and implications of this hazard is critical—especially in the context of climate change and disaster management.

Alarming Rise in Landslides in India

Landslides in India are occurring with increasing frequency and intensity. Between 2015 and 2022, India recorded 3,285 major landslides, with Kerala alone witnessing over 2,200 incidents—59% of the national total during that period. The National Institute of Disaster Management (NIDM) reports a 30% increase in landslide incidents in the Himalayas over the past two decades. The India Meteorological Department (IMD) has also recorded a 34% rise in extreme rainfall events since the 1950s, further contributing to landslide risks.

Reasons Behind the Surge in Landslides

The rise in landslides in India is due to a combination of natural factors and human-induced activities -

1. Climate Change and Extreme Rainfall

1. Intense rainfall saturates soil, weakens slopes, and triggers landslips.
2. IMD data shows Kerala and Western Ghats are experiencing heavier and more erratic rainfall due to changing monsoon patterns.

2. Deforestation

1. Removal of forest cover, especially in the Western Ghats and Himalayan regions, weakens natural slope stability.
2. The Forest Survey of India reports a loss of 1,582 sq km of dense forest between 2019 and 2021.

3. Unregulated Urbanization

1. Haphazard construction on fragile slopes (roads, resorts, homes).
2. Lack of slope assessment and building code violations worsen vulnerability.

4. Infrastructure Development

1. Roads, dams, and mining activities disturb the natural terrain, destabilizing slopes.
2. The Char Dham road project and tunneling activities in Joshimath are recent examples.

5. Geological Vulnerability - Steep slopes, fragile rock systems, and seismic activity make areas like the Himalayas and Western Ghats naturally prone to landslides.

Impact of Landslides on India

Landslides are more than just a geological hazard—they have serious social, economic, and environmental consequences -

1. **Human Loss** - Hundreds die annually, as seen in Wayanad (2024), Idukki (2020), and Kottayam (2021).
2. **Displacement** - Thousands are forced to leave their homes and live in relief camps.
3. **Economic Damage** - The World Bank estimates that landslides cause $400 million in losses every year.
4. **Ecological Damage** - Destruction of forests, water sources, and biodiversity hotspots.
5. **Infrastructure Damage** - Roads, bridges, and communication lines are often destroyed, disrupting connectivity.

Areas Most Vulnerable to Landslides

1. Himalayan Region - Includes Himachal Pradesh, Uttarakhand, Jammu & Kashmir, Sikkim, and Arunachal Pradesh. Prone due to steep gradients, tectonic activity, and erratic monsoons.

2. Western Ghats - Kerala, Karnataka, Tamil Nadu, and Maharashtra. Hills with over 20° slope, high rainfall, and dense population increase risk.

3. North-Eastern States - Nagaland, Mizoram, and Manipur face landslides due to deforestation and shifting cultivation.

4. Eastern India - Darjeeling (West Bengal) and parts of Meghalaya are also at high risk.

Current Strategies and Their Shortcomings

India has frameworks in place to manage landslides, but implementation gaps and lack of coordination reduce their effectiveness.

Existing Strategies -

1. Zonation Mapping by the Geological Survey of India (GSI).
2. Early Warning Systems by IMD and ISRO.
3. Disaster Management Plans at central and state levels.
4. National Landslide Risk Management Strategy (2020).

Challenges -

1. Poor enforcement of building codes in hill regions.
2. Lack of data on minor landslides and near-miss events.
3. Fragmented governance between environment, forest, and public works departments. Insufficient funding for early warning systems and slope stabilization.

Government Measures Taken

In response to increasing threats, both central and state governments have introduced several initiatives -

1. Kerala has set up a Landslide Early Warning System in high-risk areas.
2. Indian Navy, Army, and Air Force regularly assist in post-disaster relief efforts.
3. IMD's Climate Report highlights vulnerable zones and climate-induced risks.
4. Geospatial Mapping of over 80,000 landslide-prone areas by GSI is ongoing.
5. The Centre has released compensation for victims, and the State Disaster Response Fund (SDRF) has been expanded.
6. The Ministry of Environment has proposed restrictions on construction in Ecologically Sensitive Zones (ESZs).

Conclusion

The Wayanad disaster is a grim reminder that India's landslide vulnerability is increasing—driven by a dangerous mix of climate change and human negligence. While natural terrain cannot be altered, policy, planning, and preparedness can.

To tackle this challenge, India must -

1. Enforce strict land-use regulations in ecologically fragile zones.
2. Invest in community-based disaster preparedness.
3. Strengthen early warning systems and slope management infrastructure.
4. Integrate climate resilience into all development projects.

As India continues to urbanize and grow, the choice lies between sustainable development or disaster. Civil servants of tomorrow will play a vital role in making that choice wisely.

Mains Practice Question

1. "Landslides in India are no longer isolated geological events but a growing development crisis. Critically analyze the causes, regional vulnerability, and the adequacy of India's current mitigation and response strategies."

Answering Guidelines

1. Introduction (30–40 words) - Define landslides as both natural and human-triggered disasters. Briefly mention their increasing frequency due to climate change and unplanned development.

2. Body -

1. Causes of Rising Landslides (80–100 words) -

1. **Climate-related** - Increased extreme rainfall, monsoon variability.
2. **Human-induced** - Deforestation, unregulated construction, infrastructure in ecologically sensitive zones.
3. **Geological** - Seismic activity, slope instability, poor drainage systems.

2. Areas of High Vulnerability (80–100 words) -

1. Himalayan Region - J&K, Uttarakhand, Himachal Pradesh, Sikkim.
2. Western Ghats - Kerala, Maharashtra, Tamil Nadu, Karnataka.
3. North-East - Mizoram, Nagaland, Manipur.
4. Mention Kerala's disproportionate share of national landslides (over 59%).

3. Impact (60–80 words) -

1. Human fatalities and displacement.
2. Economic loss (over $400 million annually).
3. Environmental damage (loss of forest cover, biodiversity).

4. Government Strategies and Their Limitations (80–100 words) -

1. Landslide Zonation Mapping, Early Warning Systems, National Disaster Management Authority guidelines.
2. Limitations - weak enforcement, poor inter-agency coordination, underfunding, lack of community preparedness.

3. Conclusion (30–40 words) - Emphasize the need for sustainable development practices in fragile ecosystems. Suggest integrated planning, resilient infrastructure, and stronger disaster governance.