Disaster Management · GS - III

Disaster preparedness is the first step in any disaster management process. Explain how hazard zonation mapping will help disaster mitigation in the case of landslides.

EXAM YEAR	PAPER	SUBJECT
2019	GS - III	Disaster Management

MARKS	WORD LIMIT
15	~250 words

Answer Hint

Landslide susceptibility; hazard zonation; geological factors; slope stability; GIS and remote sensing; land-use regulation; early warning; resilient infrastructure; community preparedness

Model Answer

Introduction

Landslide hazard zonation mapping identifies areas with different levels of landslide susceptibility or hazard. It supports preparedness by helping authorities and communities understand where landslides are more likely and where consequences may be severe.

Role in Landslide Mitigation

1. Identification of High-Risk Areas

Maps combine information on slope, geology, soil, rainfall, drainage, vegetation, seismicity and past landslides to identify vulnerable locations.

2. Land-Use Regulation

Authorities can restrict unsafe construction, road cutting, quarrying and settlement expansion in highly susceptible areas.

3. Infrastructure Planning

Roads, railways, dams and buildings can be aligned or designed to avoid unstable slopes. Engineering interventions can be prioritised according to mapped risk.

4. Early-Warning Systems

When combined with rainfall thresholds, ground sensors and real-time monitoring, zonation maps help identify locations requiring alerts, evacuation or closer surveillance.

5. Preparedness and Evacuation

Maps guide evacuation routes, shelters, emergency access and public-awareness programmes in vulnerable settlements.

6. Resource Allocation

They help governments prioritise slope stabilisation, drainage improvement, retaining structures, afforestation and monitoring in high-risk areas.

7. Environmental Management

Zonation can inform watershed protection and discourage land-use practices that destabilise slopes.

Technology and Implementation

Geographic information systems, remote sensing, digital elevation models, geological surveys and field validation improve mapping accuracy. Maps must be updated as rainfall patterns, land use and infrastructure change.

Limitations

Small-scale maps may miss local hazards, while uncertain data and weak enforcement can reduce effectiveness. Zonation should therefore be integrated with detailed site investigations and community knowledge.

Conclusion

Hazard zonation mapping converts scientific understanding into preventive action. Combined with early warning, safe land-use planning and public preparedness, it can significantly reduce landslide losses.

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