Environment & Ecology · GS - III

Mineral resources are fundamental to the country's economy and these are exploited by mining. Why is mining considered an environmental hazard? Explain the remedial measures required to reduce the environmental hazard due to mining.

EXAM YEAR	PAPER	SUBJECT
2025	GS - III	Environment & Ecology

MARKS	WORD LIMIT
15	~250 words

Answer Hint

Mining, deforestation, land degradation, soil erosion, air pollution, water contamination, acid mine drainage, biodiversity loss, displacement, mine closure, reclamation

Model Answer

Introduction

Mining supplies essential minerals for infrastructure, manufacturing and energy security, but extraction can impose significant ecological and social costs when environmental safeguards are inadequate.

1. Environmental hazards

1. Removal of vegetation causes deforestation, habitat fragmentation and biodiversity loss.
2. Overburden and excavation cause land degradation, erosion and landscape alteration.
3. Dust and emissions from blasting, transportation and processing deteriorate air quality.
4. Acid mine drainage and heavy-metal contamination can pollute surface and groundwater.
5. Mining can alter drainage patterns and groundwater regimes.
6. Disposal of tailings and mine waste creates risks of soil and water contamination.

7. Mining-related infrastructure can disturb wildlife corridors and local communities.

2. Remedial measures

A sustainable mining framework should include:

1. Rigorous environmental impact assessment before approval.
2. Scientific mine planning and minimisation of ecological footprint.
3. Progressive mine-site reclamation and afforestation.
4. Treatment and safe disposal of mine water and tailings.
5. Dust suppression and cleaner mining technologies.
6. Restoration of degraded land using native species.
7. Protection of critical habitats and biodiversity corridors.
8. Effective mine-closure plans with financial guarantees.
9. Community participation, rehabilitation and benefit-sharing.
10. Continuous environmental monitoring using GIS, remote sensing and real-time sensors.

Conclusion

The objective should be responsible mineral development rather than extraction at any ecological cost. Strong regulation, technological innovation, ecological restoration and community participation can reconcile mineral security with environmental sustainability.

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