Environment & Ecology · GS - III

El Niño-induced drought, land-use change and peatland degradation can transform forest fires into major sources of greenhouse gas emissions. Analyse the ecological and climatic consequences of peatland fires and suggest measures for their sustainable management.

EXAM YEAR	PAPER	SUBJECT
DAILY PRACTICE 20/11/2026	GS - III	Environment & Ecology

MARKS	WORD LIMIT
15	~250 words

Answer Hint

El Niño, peatland drainage, carbon sinks, greenhouse gas emissions, biodiversity loss, transboundary haze, air pollution, hydrological regulation, peatland restoration, fire prevention, ASEAN cooperation.

Model Answer

Introduction

Peatlands are carbon-rich ecosystems formed through the accumulation of partially decomposed organic matter under waterlogged conditions. Their drainage and subsequent burning, particularly during El Niño-related droughts, can release enormous quantities of stored carbon.

Ecological and Climatic Consequences

1. **Carbon emissions:** Peat fires release carbon dioxide and other greenhouse gases, intensifying global warming.
2. **Biodiversity loss:** Fires destroy forest habitats, threaten endemic species and disrupt ecological processes.
3. **Regional air pollution:** Smoke and haze increase particulate matter concentrations, creating respiratory and cardiovascular health risks.

4. **Hydrological disruption:** Peatland degradation reduces water retention and increases vulnerability to drought and flooding.
5. **Long-term ecosystem damage:** Underground peat combustion can persist for extended periods, making restoration difficult.

Measures for Sustainable Management

- **Rewetting degraded peatlands:** Restore natural water levels by blocking drainage canals and maintaining hydrological conditions.
- **Fire prevention:** Establish early-warning systems, community monitoring and restrictions on burning.
- **Sustainable land use:** Promote alternatives to slash-and-burn agriculture and environmentally responsible plantation practices.
- **Ecosystem restoration:** Encourage native vegetation regeneration and protection of biodiversity-rich peat forests.
- **Regional cooperation:** Strengthen ASEAN mechanisms for transboundary haze monitoring and coordinated emergency response.
- **Climate finance:** Mobilise international support for peatland conservation and restoration.

Conclusion

Peatland protection is both a climate mitigation and biodiversity conservation priority. Integrated land management, community participation and regional cooperation are essential to prevent recurring fire disasters and preserve these valuable carbon reservoirs.

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