



Mains Practice Question

Q. "India's wetlands continue to degrade despite being under legal protection. Examine the implementation challenges of wetland conservation in India and suggest innovative approaches for their protection. **(250 words)**

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Approach

- Introduce the answer by briefing the significance of wetland
- Give Implementation Challenges in Wetland Conservation
- Highlight Innovative Approaches for Wetland Conservation
- Conclude suitably.

Introduction

Wetlands, critical ecosystems for biodiversity, water security, and climate regulation, cover approximately **4.86% of India's total land area**.

- Despite legal protection under the **Wetlands (Conservation and Management) Rules, 2017**, they continue to face degradation due to encroachment, pollution, and unsustainable development.

Body

Implementation Challenges in Wetland Conservation:

- **Lack of Comprehensive Identification and Mapping**
 - Many wetlands remain **unmapped or unrecorded**, especially smaller wetlands (<2.25 hectares) not covered under the **Wetlands Rules, 2017**.
 - Absence of accurate and updated **geo-spatial data** hampers effective monitoring.
- **Encroachment and Urbanization**
 - Rapid urbanization leads to encroachment for **infrastructure, agriculture, and real estate development**.
 - For instance, **East Kolkata Wetlands**, vital for wastewater treatment, are under pressure from **urban sprawl**.
- **Pollution and Eutrophication**
 - Discharge of untreated sewage, industrial effluents, and agricultural runoff leads to **chemical pollution** and **eutrophication**.
 - For example, **Loktak Lake in Manipur** suffers from siltation and pesticide runoff.
- **Weak Enforcement of Wetland Rules**
 - Wetlands Rules, 2017, focus primarily on **notification and regulation** but lack clear guidelines on restoration and community participation.
 - There is **limited monitoring and accountability** for polluters and encroachers.
- **Lack of Public Awareness**
 - Wetlands are often **undervalued by local communities**, perceived only as wastelands

rather than vital ecosystems.

- The cultural and ecological significance of wetlands like **Chilika Lake (Odisha)** and **Vembanad Lake (Kerala)** remains poorly understood.

- **Climate Change Impacts**

- Rising temperatures and erratic rainfall patterns exacerbate **wetland drying**, affecting biodiversity and hydrological cycles.

Innovative Approaches for Wetland Conservation:

- **Technology-Driven Solutions**

- **Satellite Mapping and GIS:** Use satellite technology for real-time monitoring of wetland health, encroachments, and pollution.
 - The **National Wetland Inventory and Assessment (NWIA)** can be expanded,
- **AI and IoT Sensors:** Deploy IoT sensors to monitor water quality parameters like **pH, oxygen levels, and pollutant concentration** in real-time.

- **Community-Based Wetland Management**

- **Participatory Approaches:** Engage local communities, particularly those dependent on wetlands for livelihoods, in conservation efforts through **eco-tourism** and sustainable fishing.

- **Payment for Ecosystem Services (PES)**

- Introduce **PES models where industries or urban local bodies** financially compensate local communities for maintaining wetlands.
 - Farmers around wetlands could be incentivized to adopt **organic farming to reduce pesticide runoff.**

- **Strengthening Legal and Institutional Framework**

- **Expand Wetland Rules** to include **smaller and seasonal wetlands**, which are critical for groundwater recharge and biodiversity.

- **Ecological Restoration Initiatives**

- Adopt **natural engineering techniques** like planting native vegetation, de-silting, and creating buffer zones to restore degraded wetlands.
 - For instance, The **Loktak Development Authority (LDA)** has taken concerted efforts in improving the Lake drainage by **undertaking desiltation.**

- **Public Awareness Campaigns**

- Launch **nationwide awareness drives** on the importance of wetlands in flood control, water filtration, and biodiversity conservation.
- Integrate wetlands education into school curricula and use **social media campaigns** for wider outreach.

- **Private Sector Participation**

- Encourage **Corporate Social Responsibility (CSR)** investments in **wetland conservation**, such as sponsoring cleanup drives and building treatment plants.
- Collaborate with industries to develop **green infrastructure** that minimizes wetland damage.

Conclusion

India's wetlands play a vital role in maintaining **ecological balance, biodiversity, and water security**. However, their degradation due to urbanization, pollution, and governance challenges demands immediate attention. By incorporating technological innovation, participatory governance, and robust legal frameworks, **India can build upon the purpose of Ramsar Convention** and ensure the long-term protection of these essential ecosystems for sustainable development.