



## Strengthening India's Environmental Governance

*This editorial is based on “ [Burrow tragedy: On the coal mining tragedy in Assam's Dima Hasao](#)” which was published in *The Hindu* on 16/01/2025. The article brings into focus the persistent issue of illegal coal mining in Assam, exemplified by the recent Dima Hasao tragedy, which highlights the gap between environmental regulations and their enforcement in India.*

**For Prelims:** [National Green Tribunal](#), [Environmental regulations](#), [Water \(Prevention and Control of Pollution\) Act, 1974](#), [Environment \(Protection\) Act, 1986](#), [E-Waste \(Management\) Rules, 2016](#), [Forest \(Conservation\) Act, 1980](#), [Supreme Court's Godavarman Judgement](#), [Pollution Control Boards](#), [Environment Impact Assessment](#), [Biological Diversity Act, 2002](#), [Forest \(Conservation\) Amendment Act, 2023](#), [2023 floods in Himachal Pradesh](#), [Carbon credit trading market](#)

**For Mains:** Key Environmental Regulations Currently in Place in India, India's Environmental Regulations not Translating into Effective Action.

The recent **Dima Hasao coal mining tragedy in Assam** starkly illustrates India's persistent **challenge with illegal and hazardous rat-hole mining** despite its ban by the [National Green Tribunal in 2014](#). The ongoing exploitation, driven by industrial demands for coal in cement manufacturing and thermal power plants, reflects the **gap between environmental regulations and their enforcement**. This constant struggle between development and environmental protection demands immediate attention, particularly as **India aims to achieve its ambitious climate goals while sustaining economic growth**.

### What are the Key Environmental Regulations Currently in Place in India?

- **Constitutional Provisions:** The Indian Constitution provides the foundation for environmental protection.
  - **Article 48A:** Directs the State to protect and improve the environment and safeguard forests and wildlife.
  - **Article 51A(g):** Imposes a fundamental duty on citizens to protect the environment and have compassion for living creatures.
  - **Article 21:** Right to **life includes the right to a clean and healthy environment (interpreted by the Supreme Court in MC Mehta Case)**.
- **Pollution Control Laws:**
  - [Water \(Prevention and Control of Pollution\) Act, 1974:](#) Aims to prevent and control water pollution by regulating effluent discharge into water bodies.
    - Establishes Central and State Pollution Control Boards (CPCB and SPCBs) to monitor and enforce compliance.
  - **Air (Prevention and Control of Pollution) Act, 1981:** Seeks to curb air pollution by

regulating emissions from industries and vehicles.

- **Environment (Protection) Act, 1986**: An umbrella act empowering the central government to take measures for environmental protection.
- **E-Waste (Management) Rules, 2016**: Regulates the management and disposal of electronic waste through **Extended Producer Responsibility (EPR)**.
- **Plastic Waste Management Rules, 2016**: Bans single-use plastics and mandates the recycling and proper disposal of plastic waste.
- **Forest and Wildlife Protection**
  - **Indian Forest Act, 1927**: Regulates the conservation and sustainable use of forest resources.
    - Provides for the classification of forests into reserved, protected, and village forests (complemented by **Supreme Court's Godavarman Judgement**)
  - **Forest (Conservation) Act, 1980**: Restricts the diversion of forest land for non-forest purposes without central government approval.
  - **Wildlife (Protection) Act, 1972**: Focuses on the conservation of wildlife and biodiversity.
    - Establishes protected areas like National Parks, Wildlife Sanctuaries, and Biosphere Reserves.
  - **Compensatory Afforestation Fund Act, 2016**: Mandates developers to pay for compensatory afforestation if they divert forest land for non-forest use.
  - **Biological Diversity Act, 2002**: Protects India's biological diversity and regulates access to genetic resources and their sustainable use.
- **Environmental Impact Assessment (EIA) Notifications**: Requires prior environmental clearance for projects with significant environmental impacts.
  - Mandates public consultations and environmental management plans before granting approvals.
- **National Green Tribunal (NGT) Act, 2010**: Establishes the NGT as a specialized judicial body to handle environmental disputes.
  - Provides speedy resolution of cases and strict penalties for environmental violations.

## Why are the Key Issues Associated with India's Environmental Regulations?

- **Weak Enforcement Mechanisms**: India's environmental laws are stringent on paper, but enforcement is marred by weak institutional capacity, corruption, and bureaucratic inefficiency.
  - **Over 6% of India's 4,40,989 operational industries** fail to meet environmental standards, posing risks to air, water, and soil through pollutant emissions and effluent discharge.
  - Regulatory bodies like the **Pollution Control Boards (PCBs)** are **underfunded and understaffed**, leading to inadequate monitoring and lack of accountability for violators.
    - A recent report stated that most Indo-Gangetic state pollution boards are **understaffed and under-equipped**, despite generating surplus funds annually.
- **Conflicts Between Development and Conservation**: The prioritization of economic growth often leads to **dilutions in environmental regulations**, undermining their effectiveness.
  - Policies such as **relaxing the Environment Impact Assessment (EIA)** norms for certain industries reflect this trend.
  - For example, the diversion of forest land under the **Forest (Conservation) Amendment Act, 2023**, prioritizes development while compromising ecological preservation.
  - India has been placed at the bottom on a list of 180 countries judged for their environmental performances by US-based institutions. **(though the Indian government has not acknowledged the report)**
- **Inadequate Public Participation**: Environmental governance in India often overlooks the role of local communities in decision-making.
  - Public consultations under laws like the **EIA** are **either superficial or bypassed entirely**.
  - Marginalized communities, **especially tribal populations**, face displacement and loss of livelihood without adequate compensation or rehabilitation.
    - For instance, the **Hasdeo Arand coal mining project in Chhattisgarh** faced resistance from tribal communities, but mining continued despite environmental

and social concerns.

- Over the past 5 years, the MoEFCC has made **110 changes to the 2006 EIA notification via office memorandums**, bypassing public consultation as they are **not considered legal amendments**.
- **Underutilization of Technology in Regulation:** The adoption of advanced monitoring technologies like **IoT-based sensors, remote sensing, and AI remains limited**, leading to delayed detection of environmental violations.
  - Reliance on manual inspections further reduces the effectiveness of enforcement agencies.
  - For instance, out of 4,041 cities and towns, **only 476 have air quality monitoring stations (either manual or real-time)**, with the majority-267 cities relying on manual stations.
  - **India's average AQI in 2023 exceeded WHO limits by over 10 times**, yet regulatory response remained reactive.
- **Judicial Overreach and Delayed Litigation:** While India's judiciary has played a **proactive role in environmental protection**, excessive reliance on courts leads to delays in action.
  - Judicial intervention often creates **uncertainty in project execution**, and the **absence of timely judgments stalls both environmental conservation and development goals**.
  - The **ongoing litigation on sand mining bans in Tamil Nadu** has led to unchecked illegal mining in the absence of clear policy enforcement.
  - In 2022, over **88,400 environment-related cases** were pending trial in India, some pending for over a decade..
- **Lack of Adequate Focus on Climate Adaptation:** India's environmental policies heavily emphasize mitigation (e.g., **renewable energy, emissions reduction**) but often **neglect adaptation measures like ecosystem restoration, community resilience, and disaster preparedness**.
  - This imbalance worsens the impact of climate-related disasters.
  - The **2023 floods in Himachal Pradesh** highlighted the absence of climate-resilient infrastructure.
  - The **Economic Survey 2023-24** reveals that India's climate adaptation expenditure was **5.6% of GDP in 2021-2022**, emphasizing the need for increased adaptation finance to support sustainable development and economic growth.
- **Rise of Unsustainable Urbanization:** Rapid urbanization has overwhelmed urban planning frameworks, leading to environmental degradation in cities.
  - **Unregulated construction, poor waste management, and insufficient green cover** have exacerbated issues like air and water pollution.
  - For instance, a 2019 MoEFCC's report stated a **47% reduction in Haryana's Natural Conservation Zones (NCZs)**, including significant exclusions in Gurugram and Faridabad, despite concerns from environmentalists that this will **expose the Aravallis to real estate development**, negatively impacting air quality and groundwater recharge.
  - India's e-waste has surged by **73% over the last five years, yet the country lacks effective management and recycling policies** for electronic waste. The E-Waste Management Rules, 2016, remain under implementation.
- **Lack of Strict Actions Against Illegal Mining:** Illegal mining continues to be a **major challenge, undermining and bypassing environmental regulations** and causing severe ecological degradation.
  - This unregulated activity leads to deforestation, loss of biodiversity, soil erosion, and groundwater depletion, while also threatening the livelihoods of local communities.
  - For instance, **illegal sand mining in rivers like Yamuna and Ganga** has caused extensive damage to riverbeds and aquatic ecosystems, **leading to disrupted water flow and loss of habitats**.
  - In 2022, **just 6% of illegal mining cases led to the filing of FIRs**. This highlights the limited legal action against such activities.

## What Measures can India take to Strengthen Environmental Regulations while Balancing Economic Growth?

- **Strengthening Enforcement Mechanisms:** India needs to empower regulatory bodies like

the **Central and State Pollution Control Boards with adequate funding, skilled manpower**, and advanced technology for real-time monitoring.

- The introduction of **AI-based sensors for pollution tracking, drone surveillance for forest encroachment**, and **GIS mapping for industrial zones** can improve compliance.
- Accountability mechanisms such as **independent audits and periodic performance reviews** of regulatory bodies are essential.
- **Popularisation of Carbon Credit Markets:** India can develop a robust **domestic [carbon credit trading market](#)** that incentivizes industries to adopt low-carbon technologies.
  - By making **carbon offsets mandatory for high-polluting sectors** like steel, cement, and thermal power, emissions can be reduced without stifling industrial growth.
  - Revenue generated from these credits can be **channeled into renewable energy projects and community-led afforestation programs**.
  - Strengthen the **[Perform, Achieve, Trade \(PAT\) scheme](#)** under the **National Mission for Enhanced Energy Efficiency** and align it with the **Green Credit Programme introduced in the 2023-24 budget** for greater impact.
- **Promoting Climate-Resilient Infrastructure:** To balance development with environmental sustainability, India must enforce **stringent environmental audits for infrastructure projects** and invest in eco-friendly alternatives.
  - Using **permeable pavements, green roofing, and energy-efficient building designs** can minimize ecological damage.
  - Projects should prioritize disaster-resilient infrastructure in vulnerable regions, especially in the Himalayan and coastal areas.
- **Revamping the Environmental Impact Assessment (EIA) Process:** The EIA framework must be made **more transparent, participatory, and evidence-based**.
  - **Public consultations should be conducted rigorously at every stage**, with provisions to include marginalized communities.
  - Instead of diluting the norms, **India should implement cumulative impact assessments** to account for multiple projects in ecologically sensitive zones.
  - Link **EIA reforms with digital platforms like [PARIVESH \(Pro-Active Responsive facilitation by ICT\)](#)** for faster but thorough clearance processes.
- **Incentivizing Clean Energy Transitions:** To balance economic growth and environmental goals, India should **expand subsidies for renewable energy adoption in industries and households**.
  - Decentralized renewable energy solutions like **solar rooftops, biomass-based power, and mini-grids** can reduce reliance on fossil fuels, especially in rural and semi-urban areas.
  - A phased reduction in fossil fuel subsidies and incentives for electric mobility can accelerate the transition.
  - Strengthen synergy between the **[Green Hydrogen Mission](#) and the [Faster Adoption and Manufacturing of Hybrid and Electric Vehicles \(FAME\) scheme](#)** to decarbonize key sectors like transport and energy.
- **Integrating Circular Economy Principles:** Adopting circular economy principles can reduce waste generation and resource extraction while **creating economic opportunities**.
  - India should incentivize industries to adopt **resource-efficient practices such as recycling, reusing, and upcycling**.
  - Initiatives like **[extended producer responsibility \(EPR\)](#) for e-waste, plastics, and packaging materials** should be strictly enforced.
- **Expanding Urban Green Spaces:** Promoting urban forestry and creating dedicated **green zones in cities** can mitigate the urban heat island effect, improve air quality, and enhance community well-being.
  - Cities should be **mandated to maintain a fixed percentage of their area as green cover under municipal regulations**. Such spaces can also serve as carbon sinks in densely populated urban areas.
  - Integrate **[AMRUT 2.0 \(Atal Mission for Rejuvenation and Urban Transformation\)](#)** with the **[National Afforestation Programme](#)** for enhanced urban ecological restoration.
- **Mainstreaming Public-Private Partnerships in Conservation:** India should promote public-private partnerships for environmental protection projects like **afforestation, waste management, and clean energy initiatives**.



- This can ensure resource mobilization, efficient project execution, and technology transfer from private players. PPP models can also play a key role in **rejuvenating rivers, cleaning water bodies, and conserving wetlands.**
- **Fostering Community-Led Conservation:** Local communities should be empowered to participate in environmental governance by **decentralizing decision-making under the Forest Rights Act (2006).**
  - Community-led afforestation programs, watershed management, and conservation projects can ensure **inclusive development.**
  - Tribal and marginalized groups must be compensated fairly for conserving biodiversity hotspots.
  - Integrate **Van Dhan Vikas Kendras** under the TRIFED initiative with the **National Afforestation Programme** to support both conservation and tribal livelihoods.
- **Restoring Degraded Ecosystems:** India must prioritize the restoration of degraded forests, rivers, wetlands, and grasslands by adopting a **watershed approach.**
  - Large-scale reforestation with indigenous species, removal of invasive species, and wetland restoration projects can improve biodiversity and ecosystem services.
  - These efforts can also help meet **India's Nationally Determined Contributions (NDCs) under the Paris Agreement.**
- **Strengthening Judicial and Dispute Resolution Mechanisms:** India must expand the jurisdiction and capacity of the National Green Tribunal (NGT) to **ensure quicker resolution of environmental disputes.**
  - Specialized benches for climate change, biodiversity, and pollution can address complex cases more effectively.
  - **Alternative dispute resolution mechanisms like mediation and arbitration** should be introduced for industrial conflicts over environmental violations.
  - **The NGT's proactive role in air pollution cases in Delhi-NCR** could be replicated for water pollution and forest diversion disputes.
- **Strengthening Monitoring Mechanisms in Mining:** Deploy advanced technologies such as **satellite imagery, drones, and GPS-based tracking systems** to monitor mining activities in real-time.
  - Integrating digital tools with centralized data systems can help authorities detect and prevent illegal mining operations.
  - **States like Maharashtra have implemented drone-based monitoring for sand mining,** and can be replicated in other states as well.

## Conclusion:

India faces significant challenges in enforcing its robust environmental regulations due to **weak institutional capacity, conflicts between development and conservation, and insufficient public participation.** Strengthening regulatory frameworks through technology adoption, transparent EIAs, and empowering local communities is critical. A balanced approach that **integrates sustainable development, climate adaptation, and ecosystem restoration** is essential to align economic growth with environmental protection.

### **Drishti Mains Question:**

Analyze the challenges in enforcing environmental regulations in India and suggest measures to balance economic growth with environmental sustainability.

## UPSC Civil Services Examination, Previous Year Questions (PYQs)

### **Prelims**

**Q1. Which of the following can be threats to the biodiversity of a geographical area? (2012)**

1. Global warming
2. Fragmentation of habitat

3. Invasion of alien species
4. Promotion of vegetarianism

**Select the correct answer using the codes given below:**

- (a) 1, 2 and 3 only
- (b) 2 and 3 only
- (c) 1 and 4 only
- (d) 1, 2, 3 and 4

**Ans: (a)**

**Q2. Biodiversity forms the basis for human existence in the following ways: (2011)**

1. Soil formation
2. Prevention of soil erosion
3. Recycling of waste
4. Pollination of crops

**Select the correct answer using the codes given below:**

- (a) 1, 2 and 3 only
- (b) 2, 3 and 4 only
- (c) 1 and 4 only
- (d) 1, 2, 3 and 4

**Ans: (d)**

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### **Mains**

**Q.** How does biodiversity vary in India? How is the Biological Diversity Act, 2002 helpful in the conservation of flora and fauna? (2018)