



Reimagining Plastic Waste Management in India

This editorial is based on “[A cut in time: On the plastic pollution problem](#)” which was published in The Hindu on 05/11/2024. The article brings into picture the deadlock in the UN's Global Plastics Treaty, highlighting the divide between developed nations advocating production cuts and developing countries, like India, opposing them over economic concerns. It underscores India's recycling gap, managing only a third of its annual plastic waste, emphasizing the need for improved waste management.

For Prelims: [Plastic pollution](#), [UN Environment Programme's Global Plastics Treaty](#), [Electric vehicles](#), [Pradhan Mantri Krishi Sinchayee Yojana](#), [Dioxins and furans](#), [Microplastics](#), [Paris Agreement](#), [Plastic Waste Management Rules, 2016](#), [Urban local bodies](#), [Environmental Compensation](#), Hyderabad's Jawahar Nagar WTE plant.

For Mains: Major Sectors in India that are Relying Heavily on Plastic, Challenges Emerging from the Mismanagement of Plastic Waste in India

The global endeavor to address [plastic pollution](#) through the [UN Environment Programme's Global Plastics Treaty](#) has reached an impasse, revealing deep divisions between nations on how to tackle this environmental menace. While developed countries and island nations advocate for **stringent production cuts** to combat the pervasive environmental and health risks of plastic, **many developing countries, including India, resist such measures, viewing them as economic threats**. India's current plastic recycling capacity stands at **merely one-third of its annual plastic introduction**, underscoring the critical need for a comprehensive and proactive approach to plastic waste management.

What are the Major Domains in India Relying Heavily on Plastic?

- **Packaging Industry:** Accounting for approximately **59% of India's plastic consumption**, the packaging sector relies heavily on both rigid and flexible plastics for their durability and cost-effectiveness.
 - The surge in [e-commerce](#) and retail has amplified the demand for plastic packaging solutions.
 - For instance, the widespread use of plastic packaging during the Covid-19 pandemic facilitated the safe distribution of essential goods.
- **Building and Construction:** This **sector utilizes plastics in pipes, insulation, and fittings** due to their corrosion resistance and longevity.
 - The government's "**Housing for All**" initiative has further propelled the use of plastic materials in affordable housing projects, enhancing construction efficiency and reducing costs.
- **Automotive Industry:** Plastics are **integral in manufacturing automotive components** like dashboards, bumpers, and fuel tanks, aiding in weight reduction and fuel efficiency.

- The push towards [electric vehicles \(EVs\)](#) has intensified the adoption of lightweight plastic materials to extend battery life and performance.
- Companies like Tata Motors have incorporated advanced plastic composites in their EV models to achieve these goals.
- **Agriculture:** The agricultural sector employs plastics in applications such as **drip irrigation systems, greenhouse films, and mulching**, which enhance water conservation and crop yields.
 - The [Pradhan Mantri Krishi Sinchayee Yojana](#) promotes micro-irrigation techniques, increasing the demand for plastic-based solutions to improve agricultural productivity.
- **Healthcare:** Plastics are vital in producing **medical devices, disposables, and packaging, ensuring hygiene and patient safety.**
 - The **Covid-19 pandemic** underscored the importance of plastic in manufacturing **personal protective equipment (PPE) kits, syringes, and vaccine vials**, facilitating mass immunization efforts across the country.

What Challenges Are Emerging from the Mismanagement of Plastic Waste in India?

- **Environmental Degradation:** Plastic waste in India amounts to nearly **9.3 million tonnes** annually, with **40% of it remaining uncollected**, severely impacting rivers, soil, and marine ecosystems.
 - Rivers like the [Ganga](#) significantly contribute to a major chunk of global riverine **plastic pollution**, disrupting aquatic biodiversity and food chains.
 - Plastics take up to **500-1000 years to degrade**, resulting in microplastic contamination in drinking water sources, posing a grave threat to ecosystems.
- **Public Health Crisis:** Plastic pollution significantly contributes to **respiratory diseases due to open burning**, releasing harmful carcinogenic chemicals like [dioxins and furans](#).
 - Additionally, microplastics have infiltrated the human food chain through **water, seafood, and salt**, raising serious concerns about long-term health risks such as **endocrine disruption and infertility**.
 - In 2024, India to be among **top 4 contributors of microplastics** released into water bodies
- **Economic Burden:** India recycles **60% of its plastic waste—much higher than the global average of 9%.**
 - However, this is primarily driven by the **informal sector**, which employs **1.5 million waste pickers** working in hazardous conditions, with little access to healthcare, insurance, or fair wages.
 - This perpetuates **socio-economic marginalization**. Moreover, **plastic pollution incurs heavy costs for India's economy** in the form of lost fisheries, tourism revenue, and damage to urban infrastructure.
- **Regulatory Gaps:** Despite the ban on certain **single-use plastics introduced in July 2022** and the **establishment of [Extended Producer Responsibility \(EPR\)](#) regulations**, compliance remains weak due to limited monitoring and enforcement.
 - Small-scale manufacturers, who make up 90% of the plastics industry, face high compliance costs, **leading to resistance and ineffective transition to eco-friendly alternatives.**
 - A new [Centre for Science and Environment](#) report uncovers **70,000 fake certificates and low registration of major polluters**, and banned items like plastic cutlery continue to be produced.
- **Climate Change Nexus:** Plastics are **petroleum-based and their production and incineration** contribute significantly to greenhouse gas emissions. India's increasing reliance on plastics in sectors such as **packaging, agriculture (e.g., mulch films), and e-commerce exacerbates** the nation's carbon footprint.
 - Additionally, **energy-intensive recycling processes undermine India's climate goals under the [Paris Agreement](#).**
- **Socio-Cultural Barriers:** India faces significant **behavioral challenges in reducing plastic usage**, as single-use plastics are deeply embedded in everyday consumption patterns.
 - Public awareness about alternatives and proper waste segregation remains insufficient, limiting the success of government initiatives.

- Cultural practices, such as **mass consumption during festivals**, lead to **seasonal spikes in plastic waste**, overwhelming municipal systems.
- Brihanmumbai Municipal Corporation (BMC) recovered **363 metric tonnes (MT) of solid waste** from seven beaches in Mumbai after Ganesh Chaturthi in 2024.
- **Lack of Circular Economy Solutions:** India's waste management infrastructure remains inadequate for **handling the growing plastic burden**.
 - Only **12-15% of plastic waste is scientifically processed**, while the rest is dumped in landfills or waterways.
 - Innovative technologies such as **pyrolysis and bioplastics**, which could improve plastic waste management, are **underutilized due to high costs and insufficient public-private partnerships**.

What is the Current Plastic Waste Management Framework in India?

- **Plastic Waste Management Rules, 2016:** Focus on minimizing waste generation, preventing littering, and ensuring segregation and proper disposal. It introduces Extended Producer Responsibility (EPR) for producers, importers, and brand owners. The minimum thickness of plastic carry bags is raised to 50 microns, with rural areas also included for implementation.
- **Plastic Waste Management (Amendment) Rules, 2018:** Phases out non-recyclable, non-energy recoverable, or non-reusable multi-layered plastic (MLP). Introduces a registration system for producers under the Central Pollution Control Board (CPCB).
- **Plastic Waste Management Amendment Rules, 2021:** Bans specific single-use plastics by 2022 and mandates EPR for packaging waste. Increases carry bag thickness to 120 microns by December 2022.
- **Plastic Waste Management (Amendment) Rules, 2022:** Sets mandatory recycling and reuse targets, imposes environmental compensation for non-compliance, and promotes a circular economy.
- **Plastic Waste Management (Amendment) Rules, 2024:** Specifies registration, reporting, and certification requirements for manufacturers and importers. Expands definitions of "importer" and "producer," mandates certification for biodegradable and compostable plastics, and requires reporting of pre-consumer plastic waste.

What Measures can India Adopt to Effectively Manage Plastic Waste?

- **Strengthen Waste Segregation at Source:** Segregating plastic waste at the household and institutional levels is essential for **effective recycling and disposal**.
 - Implementing community-based models with robust incentives and penalties can ensure greater compliance.
 - **Urban local bodies (ULBs) should be equipped and funded to invest in digital monitoring tools** to track waste segregation and processing.
 - For instance, cities like **Indore**, through extensive awareness and monitoring, achieved **100% source segregation**, becoming a model for urban waste management in India.
- **Enhance Recycling Infrastructure and Circular Economy:** Expanding **mechanized recycling units and adopting advanced technologies** like pyrolysis and chemical recycling can improve plastic waste processing rates.
 - Partnerships with **startups and the informal sector can drive innovation in recycling**.
 - Reliance becomes the **first in India to chemically recycle plastic waste-based pyrolysis oil into International Sustainability and Carbon Certification (ISCC)-Plus certified circular polymers**, can serve as a role model.
- **Promote Biodegradable and Alternative Materials:** Investing in research and development (R&D) for biodegradable plastics and alternatives such as **jute, hemp, and bamboo-based packaging** can reduce dependence on conventional plastics.
 - Government subsidies and tax benefits for eco-friendly startups can encourage industry adoption.

- Consumer and business education about these alternatives is also crucial.
- **Strengthen Extended Producer Responsibility (EPR) Framework:** Mandating stringent EPR compliance ensures producers, importers, and brand owners finance the collection and recycling of plastic waste they generate.
 - **Regular audits and digital tracking tools** can ensure accountability. Financial penalties for non-compliance and incentives for exceeding targets should be introduced.
 - The Ministry of Environment, Forest, and Climate Change (MoEFCC) has approved new [Environmental Compensation \(EC\) guidelines](#) to enhance waste tyre management.
 - Manufacturers failing to meet their Extended Producer Responsibility (EPR) targets will face penalties of up to **Rs 8.40 per kg of waste tyres**, which can serve as a model for other sectors.
- **Integrate the Informal Sector into Formal Waste Management:** India's informal sector recycles major of its plastic waste, but workers often lack safety equipment, fair wages, or financial stability.
 - Formalizing this sector by **providing training, safety gear, and integrating them into ULB contracts** can improve efficiency while ensuring social equity.
 - Waste cooperatives and microfinancing options can empower these workers.
 - **Pune-based SWaCH**, for instance, **employs over 3,000 waste pickers**, processing 50,000 tonnes of waste annually while providing dignified livelihoods.
- **Leverage Technology and Data Analytics:** Deploying AI-driven sorting machines, GPS-enabled waste collection systems, and blockchain for tracking EPR compliance can streamline plastic waste management.
 - Real-time data on **collection, processing, and leakage into ecosystems** can improve decision-making and resource allocation.
 - Mobile apps for citizen engagement can enhance transparency.
- **Develop Waste-to-Energy Plants:** Establishing **waste-to-energy (WTE) plants** can convert non-recyclable plastic waste into energy, reducing landfill pressure and contributing to renewable energy targets.
 - Stringent environmental controls are necessary to prevent toxic emissions during combustion.
 - Public-private partnerships can effectively finance and operate these plants.
 - **Hyderabad's Jawahar Nagar WTE plant**, can serve as a model.
- **Educate and Mobilize Communities:** Community-led waste management models foster a culture of responsibility and action at the grassroots level.
 - **School programs, awareness campaigns, and incentivized initiatives** can motivate citizens to adopt sustainable waste practices.
 - Local self-help groups can play a crucial role in spreading awareness and organizing waste collection drives.
 - **Alappuzha's "Clean City" initiative**, which engaged residents in decentralized waste management, earned the **UN's recognition**.
- **Legislate and Monitor Plastic Use in Industry:** Industries like **agriculture (mulch films)** and logistics depend on plastics, requiring sector-specific regulations to optimize use while minimizing leakage.
 - Encouraging industries to adopt **lightweight, reusable, or degradable packaging** options through tax incentives and mandatory recycling quotas can help mitigate plastic waste.
- **Foster International Collaboration and Financing:** Collaborating with global organizations for **knowledge-sharing and accessing international green funds** can support innovation and infrastructure in waste management.
 - Participating in global initiatives like the **Global Plastic Action Partnership** provides technical and financial assistance.
 - India's active participation in the **Intergovernmental Negotiating Committee for Plastics Treaty** is a step forward in addressing global plastic pollution.

Conclusion:

India stands at a critical juncture in addressing its plastic waste challenge, requiring a **holistic approach that balances economic imperatives with environmental sustainability**. The path forward

demands collaborative efforts across government, industry, and civil society, with a focus on **developing circular economy solutions and promoting sustainable alternatives**. Ultimately, India's success in managing plastic waste will not only mitigate environmental risks but also **position the nation as a global leader in sustainable development**.

Drishti Mains Question:

Despite several regulatory measures, plastic waste management continues to face significant challenges in India. Identify and discuss the key issues in the implementation of the Plastic Waste Management Rules

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q.1 In India, 'extend producer responsibility' was introduced as an important feature in which of the following? (2019)

- (a) The Bio-medical Waste (Management and Handling) Rules, 1998
- (b) The Recycled Plastic (Manufacturing and Usage) Rules, 1999
- (c) The e-Waste (Management and Handling) Rules, 2011
- (d) The Food Safety and Standard Regulations, 2011

Ans: (c)

Q2. How is the National Green Tribunal (NGT) different from the Central Pollution Control Board (CPCB)? (2018)

1. The NGT has been established by an Act whereas the CPCB has been created by an executive order of the Government.
2. The NGT provides environmental justice and helps reduce the burden of litigation in the higher courts whereas the CPCB promotes cleanliness of streams and wells, and aims to improve the quality of air in the country.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Ans: (b)

Q3. Why is there a great concern about the 'microbeads' that are released into environment? (2019)

- (a) They are considered harmful to marine ecosystems.
- (b) They are considered to cause skin cancer in children.
- (c) They are small enough to be absorbed by crop plants in irrigated fields.

(d) They are often found to be used as food adulterants.

Ans: (a)

Mains

Q: What are the impediments in disposing the huge quantities of discarded solid waste which are continuously being generated? How do we remove safely the toxic wastes that have been accumulating in our a habitable environment? **(2018)**

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