



India's Battle Against Plastic Waste

*This editorial is based on “[Plastic mess: On India’s waste problem](#)” which was published in *The Hindu* on 29/07/2024. The article highlights India's significant plastic waste problem, where only a quarter of the annual four million tonnes of plastic waste is recycled, and discusses the challenges and necessary improvements in the Extended Producer Responsibility system to ensure effective recycling and reduce plastic production.*

For Prelims: [Plastic Waste Management Rules, 2016](#), [Extended Producer Responsibility, Central Pollution Control Board](#), [Central Pollution Control Board, Plastic Waste Management \(Amendment\) Rules, 2022](#), [Plastic Waste Management \(Amendment\) Rules, 2024](#), [Food Safety and Standards Authority of India](#), [Eutrophication](#), [Bioaccumulation](#).

For Mains: Current Framework Related to Plastic Waste Management in India, Major Issues Arising from Mismanaged Plastic Waste in India.

India generates approximately **4 million tonnes of plastic waste annually**, with only **a quarter being recycled or treated**. To address this issue, the government implemented the [Extended Producer Responsibility \(EPR\) rules](#), mandating that plastic users are responsible for collecting and recycling their waste. This system operates through an online EPR trading platform, where recyclers receive certificates for recycled plastic that can be purchased by companies falling short of their recycling targets.

However, the EPR system has faced significant challenges. In 2022-23, nearly **3.7 million tonnes of recycled plastic certificates were generated**, but a substantial number were found to be fraudulent. While the market-driven approach shows promise, it has limitations. **Addressing India's plastic waste problem requires not only improving the recycling system** but also focusing on reducing plastic production and promoting sustainable alternatives.

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 PET	 HDPE	 PVC	 LDPE	 PP	 PS	 OTHER
POLYETHYLENE TEREPHTHALATE	HIGH-DENSITY POLYETHYLENE	POLYVINYL CHLORIDE	LOW-DENSITY POLYETHYLENE	POLYPROPYLENE	POLYSTYRENE	OTHER
WATER BOTTLES; JARS; CAPS	SHAMPOO BOTTLES; GROCEY BAGS	CLEANING PRODUCTS; SHEETINGS	BREAD BAGS; PLASTIC FILMS	YOGURT CUPS; STRAWS; HANGERS	TAKE-AWAY AND HARD PACKAGING; TOYS	BABY BOTTLES; NYLON; CDS
						

What are the Major Issues Arising from Mismatched Plastic Waste in India?

- **Choking the Environment:** Plastic waste in India causes severe environmental degradation.
 - It clogs waterways, leading to flooding in urban areas during monsoons.
 - For instance, **Mumbai's 2005 floods** were exacerbated by plastic-clogged drains.
 - **Marine pollution** is another critical issue, with an estimated **0.6 million tonnes** of plastic entering India's oceans annually leading to issues like **Eutrophication** and **Bioaccumulation**
 - Already **88% of marine species** studied have been negatively impacted by plastic pollution and it is estimated that up to **90% of seabirds** and **52% of sea turtles ingest plastic**.
 - The **burning of plastic waste**, a common disposal method, releases harmful **dioxins and furans**, contributing to **air pollution**.
- **Public Health Concerns:** Plastic waste poses significant health risks to the Indian population.
 - **Microplastics** have been found in drinking water sources and food products, with potential long-term health effects still being studied.
 - The accumulation of plastic waste leads to clogging and potential **breeding grounds for disease vectors like mosquitoes**, contributing to the spread of dengue and malaria.
 - The burning of plastic waste releases carcinogens and other toxic substances, leading to **respiratory issues and other health problems in nearby communities**.
- **Economic Challenges:** The plastic waste problem has significant economic implications for India.
 - According to a FICCI report, India could lose over **USD 133 billion worth** of material value used in **plastic packaging by 2030**.
 - Uncollected plastic packaging waste accounts for **USD 68 billion of this loss**.
- **E-commerce and Packaging Waste:** The rapid growth of e-commerce in India, accelerated by the **Covid-19 pandemic**, has led to a surge in packaging waste.
 - India's e-commerce market is expected to reach **USD 200 billion by 2026**, up from **USD**

38.5 billion in 2017.

- This growth corresponds with **increased use of plastic packaging materials**, including bubble wrap, air pillows, and polybags.
 - Many of these materials are difficult to recycle and often end up in landfills or as litter.
- **Regulatory and Enforcement Challenges:** While India has implemented various regulations to address plastic waste, enforcement remains a major challenge.
 - The **Plastic Waste Management Rules 2016 (amended in 2022) ban certain single-use plastics**, but implementation is inconsistent across states.
 - The **Extended Producer Responsibility** system faces issues with fraudulent certificates and inadequate monitoring.
 - The **informal nature of much of the recycling sector** makes it difficult to regulate and improve practices.
 - India is among the 12 countries responsible for **60% of the planet's mismanaged plastic waste**.
- **Technological and Infrastructure Gaps:** India faces significant technological and infrastructure deficits in managing plastic waste.
 - Many municipalities **lack modern waste segregation and processing facilities**.
 - Only **60% of the total collected plastic waste** is recycled in India.
 - Advanced recycling technologies for handling multi-layered plastics and other **difficult-to-recycle materials** are not widely available.
 - The lack of a comprehensive waste tracking system makes it difficult to monitor the flow of plastic waste from generation to disposal or recycling.
- **Microplastic Pollution in Agriculture:** The use of **plastic mulch** and the **application of sewage sludge** containing microplastics in agriculture is an emerging concern.
 - Studies have shown that microplastics can accumulate in agricultural soils, potentially affecting soil health, crop yields, and food safety.
 - While comprehensive data for India is lacking, global trends indicate widespread use of plastic in agriculture and **inadequate wastewater treatment**.
- **Biodegradable Plastics Controversy:** The promotion of biodegradable plastics as a solution to plastic waste has created new challenges.
 - **Many so-called biodegradable plastics** require **specific conditions to break down**, which are not met in natural environments or standard waste management systems.
 - Moreover, the mixing of biodegradable plastics with conventional plastics can complicate recycling processes.
 - India lacks **clear standards and certification processes** for biodegradable plastics adds to this issue.

What is the Current Framework Related to Plastic Waste Management in India?

- **Plastic Waste Management Rules, 2016**
 - Mandates steps to **minimize plastic waste generation, prevent littering**, and ensure segregated storage and handover of waste.
 - Extends **responsibility to producers**, importers, and brand owners for both pre-consumer and post-consumer plastic packaging waste under **Extended Producer Responsibility (EPR)**.
 - Increases the minimum thickness of plastic carry bags and sheets to **50 microns**.
 - **Expands jurisdiction from municipal areas to rural areas**, with Gram Panchayats responsible for implementation.
 - Introduces waste segregation at source for individual and bulk generators.
- **Plastic Waste Management (Amendment) Rules, 2018**
 - Applies phasing out of **multi-layered plastic (MLP)** to those that are non-recyclable, non-energy recoverable, or have no alternate use.
 - Establishes a central registration system by the **Central Pollution Control Board (CPCB)** for producers, importers, and brand owners.
 - It omitted the rule of **explicit pricing of carry bags** mentioned in the 2016 rule.
- **Plastic Waste Management Amendment Rules, 2021**
 - Prohibits **specific single-use plastic items by 2022** due to low utility and high littering

- potential.
- Bans **manufacture, import, stocking, distribution, sale, and use of certain single-use plastics**, including **polystyrene**, from 1st July 2022.
- **Enforces collection and environmental management** of plastic packaging waste through **EPR**.
- Increases plastic carry bag thickness from **50 microns to 75 microns** by September 2021 and to **120 microns by December 2022**.
- **Plastic Waste Management (Amendment) Rules, 2022**
 - Introduces **EPR guidelines with mandatory targets for recycling**, reuse of rigid plastic packaging, and use of recycled plastic content.
 - Imposes environmental compensation on those failing to meet EPR targets, based on the polluter pays principle.
 - Provides a framework to strengthen the circular economy of plastic packaging waste.
- **Plastic Waste Management (Amendment) Rules, 2024:**
 - The rules outline specific forms and procedures for registration, reporting, and certification related to plastic waste management and EPR obligations.
 - **Expanded Definitions:**
 - **Importer:** Now includes imports of various **plastic-related materials for commercial use**, beyond just plastic packaging and similar items.
 - **Producer:** Also Encompasses the production of intermediate materials for plastic packaging and contract manufacturing for brand owners.
 - Manufacturers of carry bags and commodities from compostable or biodegradable plastics must **obtain certification from the Central Pollution Control Board (CPCB)** before marketing or selling.
 - These items must adhere to mandatory labeling requirements and comply with **Food Safety and Standards Authority of India (FSSAI) regulations** for food contact applications.
 - Manufacturers must **process pre-consumer plastic waste** generated during production and report it to the State Pollution Control Board or Pollution Control Committee.
 - Compostable plastics must bear a **label indicating they are only compostable** under industrial conditions.
 - Biodegradable plastics must specify the number of days they take to biodegrade and the environment in which they will biodegrade.
- **Mandatory Jute Packaging Act, 2010:** An Act enacted to ensure the **mandatory use of jute packaging** and to make provisions for the prevention of environmental pollution caused by the use of artificial packaging like **plastics** in the supply and distribution of certain products.

Alternatives to Plastics:

- **Bagasse:** Made from sugarcane or beet pulp. It is compostable and eco-friendly.
- **Bioplastics:** Plant-based plastics used primarily in food packaging.
- **Natural Textiles:** Includes materials such as cotton, wool, and hemp.
- **Edible Seaweed Cups:** Seaweed grows rapidly, up to **60 times faster than land-based plants**, making it a sustainable option.
- **Algae-Blended Ethylene-Vinyl Acetate:** Utilizes algae to convert air and water pollutants (**ammonia, phosphates, and carbon dioxide**) into plant biomass rich in proteins.
- **Compostable Plastics:** Can be plant-based or fossil fuel-based and degrade through biological processes into CO₂, water, inorganic compounds, and biomass, without leaving toxic residues. For example, **BASF's Ecoflex**.

What Measures can be Adopted for Better Management of Plastic Waste in India?

- **"Trash to Treasure":** Implement a comprehensive circular economy approach to plastic waste management.

- Encourage **design for recyclability in product development**.
- Establish **material recovery facilities** in every major city to efficiently sort and process plastic waste by promoting **4R's: reduce, reuse, recycle, and recover**.
- Incentivize the **use of recycled plastics in manufacturing through tax breaks or subsidies**.
- Create a robust market for recycled plastics by mandating **minimum recycled content in certain products**, driving demand and closing the loop in plastic consumption.
- **Smart Waste, Smart Cities:** Integrate smart technology into waste management systems across urban India.
 - Implement **IoT-enabled smart bins** that can alert authorities when full, optimizing collection routes.
 - Use **AI and machine learning** for better waste sorting and recycling processes.
 - Develop **mobile apps for citizens to report illegal dumping** and locate nearest recycling centers.
- **Greening the Supply Chain:** Strengthen and expand the **Extended Producer Responsibility (EPR) system**.
 - Implement a **graded fee structure** where harder-to-recycle plastics incur higher EPR fees.
 - Introduce a **plastic credit trading system** to incentivize over-achievement of recycling targets.
 - **Extend EPR to cover the informal sector**, providing social security and better working conditions for waste pickers while formalizing their crucial role.
- **Nationwide Awareness and Education Campaign:** Launch a comprehensive, multi-lingual national awareness campaign on **plastic waste**.
 - Integrate plastic waste management into school curricula from primary to higher education.
 - Conduct **regular community workshops** on waste segregation and recycling practices.
 - Use **social media influencers and celebrities** to promote plastic-free lifestyles.
 - Establish a **national plastic waste innovation challenge** to engage youth in finding creative solutions to plastic pollution.
- **"Waste-to-Energy 2.0":** Invest in advanced waste-to-energy technologies for plastics that cannot be recycled.
 - Implement **pyrolysis and gasification plants in outskirts of major cities** to convert plastic waste into fuel or energy.
 - Ensure **strict emissions control and monitoring** for these plants to prevent air pollution.
 - Use the energy generated **to power waste management facilities**, creating a self-sustaining system. Continuously research and adopt new technologies for handling difficult-to-recycle plastics.
- **Plastic Footprint:** Introduce mandatory annual **plastic footprint audits for large and medium-sized companies**.
 - Require public disclosure of plastic usage, waste generation, and recycling rates in annual reports.
 - Develop a standardized methodology for **calculating and reporting plastic footprints**.
 - Use this data to inform policy decisions and track progress in plastic waste reduction. Implement a rating system for companies based on their plastic footprint management.
- **Green Procurement:** Implement strict plastic waste reduction criteria in all government procurement policies.
 - Mandate the use of **recycled plastic content** in government-purchased products where feasible.
 - Prioritize **vendors with strong plastic waste reduction** and recycling practices.
 - Use government buildings as role models for **plastic-free buildings**. Extend these procurement policies to state-owned enterprises and encourage adoption by the private sector.
- **Waste-preneurs:** Launch a national incubator program specifically for waste management startups.
 - Provide **seed funding, mentorship, and networking opportunities** for innovative recycling businesses.
 - Create **mini special economic zones** with tax benefits for recycling and upcycling

industries.

- **Towards Plastic-Free Farming:** Develop and subsidize **biodegradable alternatives to plastic mulch and greenhouse covers.**
 - Implement a **take-back program for agricultural plastics** like pesticide containers.
 - Promote the use of organic mulch and other sustainable farming practices.
 - Create a certification for "**Plastic-Free Farms**" to add value to their produce. Establish regional centers for recycling and proper disposal of agricultural plastics.
- **Plastic in Road Construction- Paving the Way with Waste:** Expand the use of plastic waste in road construction nationwide.
 - Develop standardized guidelines for the **optimal mix of plastic waste in road materials.**
 - Establish regional plastic processing centers to convert waste into **road-ready materials.** Train local construction workers in plastic road-building techniques, creating new green jobs.
 - **Thiagarajar College of Engineering in Madurai** has patented a method to create durable tiles and blocks from waste plastic, suitable for use as construction material and can serve as a model.

Drishti Mains Question:

Plastic pollution has emerged as a critical environmental challenge. Examine the various dimensions of this issue in India, including its sources and impacts on ecosystems and human health.

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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