



KAMARAJ IAS ACADEMY
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PATHWAY TO PLASTIC-FREE INDIA

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Introduction

India, as one of the fastest-growing economies, is witnessing an alarming rise in plastic waste. As per the CPCB (2019-20), India generates about 3.4 million tonnes of plastic waste annually, of which nearly 40% remains uncollected, leading to pollution of land, water, and air.

Causes of Plastic Waste in India

- 1. Rapid Urbanization and Lifestyle Changes** – Increasing demand for packaged food, e-commerce deliveries, and disposable products.
- 2. Single-use Plastics** – Bottles, straws, carry bags, and multilayered packaging dominate urban waste streams.
- 3. Inefficient Waste Management Systems** – Lack of segregation at source, poor collection infrastructure, and low recycling capacity.
- 4. Informal Recycling Sector** – Dominance of unregulated kabadiwalas with limited scientific processing methods.
- 5. Low Public Awareness** – Improper disposal habits and limited awareness about alternatives.
- 6. Industrial and Agricultural Use** – High dependency on plastics in packaging, construction, and drip irrigation systems.

Mechanisms and measures taken to plastic waste management

1. Legal & Regulatory Framework

Plastic Waste Management Rules, 2016 (amended 2018 & 2022):

Extended Producer Responsibility (EPR) for producers, brand owners, and importers.

Mandatory segregation and collection at source.

Example: 2022 amendments mandated phasing out single-use plastics (SUPs).

Ban on Single-use Plastics (2022):

19 identified SUP items (like straws, plates, earbuds) prohibited.

Example: CPCB monitoring teams conduct surprise inspections on manufacturers.

2. Institutional Mechanisms

Central Pollution Control Board (CPCB) & State PCBs:

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Monitoring compliance of plastic bans, authorizing recycling units.

Example: CPCB's Plastic Waste Annual Report 2022-23 highlighted state-level collection efficiency.

National Green Tribunal (NGT):

Judicial interventions to enforce rules.

Example: NGT fined states/UTs for failing in waste segregation and plastic ban enforcement (2023 orders).

3. Economic & Market-based Instruments

Extended Producer Responsibility (EPR):

Producers must collect a proportion of plastic waste equivalent to their market sales.

Example: Amazon, Coca-Cola, PepsiCo submitted EPR compliance plans in 2023.

Deposit Refund Schemes (Pilot level):

Consumers return plastic bottles to get small refunds.

Example: Kerala's Suchitwa Mission testing bottle buyback schemes.

4. Technological & Recycling Measures

Plastic-to-Fuel Conversion (Pyrolysis, Co-processing):

Waste plastic converted into fuel or used in cement kilns.

Example: Indian Oil & NTPC plastic-to-fuel pilot plants (2023).

Road Construction Using Plastic Waste:

Plastic mixed with bitumen for durable roads.

Example: Over 1 lakh km of roads in India built with plastic waste (MoRTH report 2022).

Material Recovery Facilities (MRFs):

Sorting and recycling hubs for municipal waste.

Example: Indore Municipal Corporation operates advanced MRFs.

5. Community & Behavioral Interventions

Swachh Bharat Mission & Plastic Free India Campaigns:

Awareness programs on segregation, reuse, and cloth/jute bag adoption.

Example: Plastic Free Ladakh Campaign (2023) to protect fragile Himalayan ecosystem.

Integration of Informal Waste Pickers:

Formalizing ragpickers' roles in recycling.

Example: Pune's SWaCH Cooperative collects and segregates waste at household level.

6. Innovation & Alternatives

Promotion of Biodegradable Packaging:

Incentives for startups producing eco-friendly alternatives.

Example: Startups like Bakeys (edible cutlery), Chuk (compostable tableware).

Government R&D Support:

National Centre for Sustainable Coastal Management testing marine plastic alternatives.

Example: IIT Madras & HPCL collaboration on biodegradable plastics (2023).

Challenges in implementing plastic waste management in India

1. Weak Enforcement of Rules

Despite bans, single-use plastics (SUPs) are still widely available.

Example: CPCB (2023) found widespread non-compliance with SUP ban in Delhi, UP, and Rajasthan markets.

2. High Dependence on Plastics

Cheap, lightweight, and convenient plastic packaging has no equally affordable alternative for small vendors.

Example: Street food vendors in Mumbai and Chennai continue to rely on banned plastic cutlery despite fines.

3. Lack of Infrastructure for Segregation & Collection

Only about 60% of plastic waste is collected, rest leaks into rivers and landfills.

Example: Yamuna river study (2023) found significant microplastic pollution due to uncollected waste in Delhi NCR.

4. Informal Sector Exclusion

Ragpickers and kabadiwalas handle nearly 70% of recycling but are not formally integrated.

Example: In Bengaluru, waste pickers protested in 2023 against exclusion from new government MRF contracts.

5. Low Recycling Rates

Only ~50-60% of collected plastic is recycled, the rest is incinerated or dumped.

Example: CPCB report (2022) noted multilayered packaging (like chips packets) is almost non-recyclable.

6. Economic Burden on Small Businesses

Transitioning to alternatives (biodegradable, jute, cloth) is costly.

Example: Small kirana shops in Uttar Pradesh opposed the SUP ban in 2022 due to higher packaging costs.

7. Limited Public Awareness & Behavior Change

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ICitizens still use plastics out of habit and lack of awareness.

IExample: Swachh Survekshan 2022 survey revealed poor public participation in segregation at source.

8. Technological & Financial Gaps

IPyrolysis, waste-to-fuel, and biodegradable plastics are still expensive and not widely adopted.

IExample: Only 11 large-scale pyrolysis plants operational across India by 2023.

9. Urban-Rural Divide

ICities are slowly improving in segregation, but rural areas lack formal waste management systems.

IExample: Plastic litter in rural Assam and Meghalaya (2023) continues to choke rivers and grazing lands.

10. Global Trade & Imports

IIndia still imports plastic packaging materials and scrap despite domestic waste overflow.

IExample: Import of plastic scrap from China and the US (2022) added to recycling challenges.

Steps that can be adopted to strengthen the management

1. Strengthen Enforcement of Laws

IStrict monitoring of the Plastic Waste Management Rules (2016, amended 2022).

IUse of digital tools like QR codes & tracking apps to monitor producers' Extended Producer Responsibility (EPR) compliance.

2. Improve Collection & Segregation at Source

IMandatory 3-bin segregation (wet, dry, hazardous) at household and institutional levels.

IReplication of Indore model of door-to-door collection in other cities.

3. Integrate Informal Sector

IFormalize waste pickers into cooperatives, provide health insurance and safety gear.

IExample: Pune's SWaCH Cooperative can be scaled up nationally.

4. Expand Recycling & Recovery Infrastructure

IInvest in Material Recovery Facilities (MRFs) in every urban local body.

IPromote plastic-to-fuel technologies with viability gap funding.

5. Promote Alternatives to Plastics

ISubsidize production of biodegradable, compostable, and edible packaging.

ISupport startups producing eco-friendly cutlery, jute, and cloth bags.

6. Adopt Circular Economy Approach

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II Encourage industries to design products with recyclability in mind (“design for environment”).

II Promote refill and reuse models in FMCG and e-commerce sectors.

7. Public Awareness & Behavioural Change

II Campaigns like “Refuse Single-Use Plastic” in schools, colleges, and markets.

II Incentives for consumers who use reusable bags/bottles.

8. Leverage Technology & Innovation

II Use of AI and robotics for waste segregation in big cities.

II Support R&D in biodegradable polymers (e.g., IIT Madras–HPCL project on bioplastics).

9. Strengthen Urban-Rural Coordination

II Rural local bodies should be equipped with decentralized waste management systems.

II Ban open burning of plastics in villages and provide alternative disposal mechanisms.

10. International Cooperation

II Align with global frameworks like the UN Plastics Treaty (2024 negotiations).

II Collaborate with countries that have advanced recycling systems (e.g., Japan, Germany).

Conclusion

Plastic waste management in India demands a shift from a linear “use-and-dispose” model to a circular economy built on reduction, reuse, and recycling. Stronger enforcement, citizen participation, and eco-friendly innovations are key. With coordinated efforts, India can turn the plastic challenge into an opportunity for sustainable growth and environmental resilience.