

7. Urban Waste Management- Environment

Transforming a waste-ridden urban India with urban India projected to generate 436 million tonnes of waste by 2050, the focus has shifted to a Circular Economy model (treating waste as a resource) and initiatives like "Mission LIFE" to tackle methane emissions and resource inefficiency. Global platforms like COP30 are pushing for this transition, while domestic frameworks like the Swachh Bharat Mission and new C&D rules aim to enforce segregation and processing.

Urban Waste Management and the Circular Economy Shift

1. Global Context and Strategic Importance

COP30 Focus (Belem, 2025)- The negotiations placed waste and circularity at the center of the global climate agenda.

"No Organic Waste (NOW)"- A specific initiative emphasizing the reduction of methane emissions from organic waste.

Call to Action- Cities were urged to accelerate circularity initiatives by recognizing waste fundamentally as a resource rather than refuse.

India's Mission LiFE- Announced at COP26, the Lifestyle for Environment (Mission LiFE) promotes conscious consumption and sustainable lifestyles. It is strongly grounded in the philosophy of the circular economy, advocating for behavioral change.

2. The Urban Waste Challenge in India

Rapid Urbanisation Dilemma- Expanding cities face a critical choice between creating liveable, clean spaces or succumbing to waste-ridden environments. Many urban centers currently struggle to meet global environmental health standards.

Exploding Waste Volumes

Current Projection- Urban India is set to generate 165 million tonnes of waste annually by 2030.

Future Outlook- This is expected to surge to 436 million tonnes by 2050, driven by an urban population reaching 814 million.

Climate and Health Crisis

Emissions- Waste-related emissions could exceed 41 million tonnes of greenhouse gases, threatening climate targets.

The Methane Threat- Decomposing organic waste in landfills releases methane, a potent greenhouse gas with a higher global warming potential than CO₂. This makes efficient waste management a critical climate mitigation strategy.

Public Impact- Poor management poses severe risks to public health and economic productivity.

3. Economic Models- Linear vs. Circular

Feature	Linear Economy Model	Circular Economy Model
Concept	Follows a "take, make, and dispose" approach. Resources are extracted, used, and then discarded.	Treats waste as a resource. Aims to keep materials in use for as long as possible.
Process	Resource Extraction → Production → Consumption → Disposal.	Reuse → Recycling → Recovery → Regeneration.
Outcome	Results in excessive resource extraction, high waste volumes, and environmental degradation.	Focuses on minimizing waste generation and maximizing resource recovery.
Sustainability	Highly resource-inefficient and environmentally damaging.	Supports inclusive growth, creates green jobs, reduces emissions, and improves urban quality.
Social Example	N/A	Pune's SWaCH Model- Integrates waste-pickers into a pro-poor partnership for door-to-door collection, proving circularity can be socially inclusive.

4. Trends and Status of Urban Waste in India

Organic Waste Dominance

Composition- Over 50% of municipal waste in India is organic (wet waste).

Solution- It can be effectively managed through composting and bio-methanation.

Green Energy Potential- Compressed Biogas (CBG) plants can convert wet waste into green fuel, while combustion can generate electricity.

Success Story (Indore)- Achieved 100% door-to-door collection and segregation with dedicated wet-waste processing, showcasing how strong governance and infrastructure drive circularity.

The Dry Waste Challenge

Composition- Approximately **one-third** of urban waste is dry (plastics, metals, paper).

Requirement- Demands robust segregation mechanisms and efficient material recovery facilities (MRFs) for recycling.

Construction and Demolition (C&D) Waste

Volume- Around 12 million tonnes are generated annually.

Impact- A major contributor to urban dust pollution and land degradation.

Enforcement Example- Greater Chennai Corporation has adopted strict enforcement by penalizing and seizing vehicles caught dumping debris illegally.

5. Regulatory Frameworks in India

Swachh Bharat Mission (Urban)- Provides the overarching national policy framework aimed at improving urban sanitation, solid waste management, and overall cleanliness.

Solid Waste Management (SWM) Rules, 2016- Mandates segregation at source, door-to-door collection, and scientific disposal.

Compliance Example- Bidhannagar Municipal Corporation (Kolkata) introduced structured user fees and penalties linked to SWM rules to enforce compliance.

C&D Waste Management Rules

2016 Rules- Assign responsibility to bulk generators and mandate local bodies to set up processing facilities.

Environment (C&D) Waste Rules, 2025- Effective from April 1, 2026, these rules aim to further strengthen accountability and compliance in the sector.

Extended Producer Responsibility (EPR)- A policy approach that makes producers financially and physically responsible for the collection, recycling, and disposal of plastic and dry waste.

Wastewater Reuse Framework- Missions like AMRUT and Swachh Bharat promote wastewater recycling to enhance water security.

Surat Model- Established tertiary treatment capacity to convert wastewater into a reusable economic resource.

Nagpur Model- Supplies treated municipal wastewater to the Koradi Thermal Power Plant for cooling, recognized by the World Bank as a successful water circularity case.

6. Challenges in Achieving Circularity

Source Segregation Deficit- The fundamental step of segregating waste at the source remains weak due to limited public awareness and inconsistent citizen participation.

Municipal Capacity Constraints- Urban Local Bodies (ULBs) suffer from chronic shortages in finance, technical expertise, and manpower to run complex circular systems.

Infrastructure Gaps- There is a critical lack of Material Recovery Facilities (MRFs), recycling plants, and waste-to-energy infrastructure.

Market Viability- Recycled products often face issues regarding quality assurance, low consumer trust, and weak market linkages.

EPR Implementation Gaps- Enforcement of Extended Producer Responsibility is non-uniform across different categories of dry waste.

C&D Traceability- Construction waste lacks proper identification and tracking mechanisms, often bypassing building regulations.

Institutional Fragmentation- Poor coordination between municipalities, pollution control boards, and urban planning authorities leads to policy paralysis.

Behavioral Barriers- Rising consumerism and rapid product obsolescence work against the principles of "Reduce and Reuse."

Data & Monitoring- The lack of robust data systems affects the credibility and scalability of circular initiatives.

7. Case Study- Ambikapur Model (Chhattisgarh)

SLRM Model- Ambikapur implemented a highly effective Solid and Liquid Resource Management (SLRM) model.

Social Inclusion- The initiative is led by women from Self Help Groups (SHGs) who manage door-to-door collection and scientific disposal.

Transformation- The city successfully converted a 16-acre dumpsite into a "Sanitation Awareness Park" and achieved the status of a bin-free city.

Impact- The model created green jobs, eliminated land acquisition costs for landfills, and successfully promoted home and community composting.

Source- <https://www.thehindu.com/opinion/lead/transforming-a-waste-ridden-urban-india/article70464788.ece>

