Government of Puducherry

Department of Science, Technology & Environment
Puducherry Pollution Control Committee

EIACP HUB NEWSLETTER

Status of Environment Related Issues in Puducherry

SOLID WASTE MANAGEMENT
IN THE U.T. OF PUDUCHERRY

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Solid Waste Management in the U.T. of Puducherry

Introduction:

India, the world's second-most populous country, faces growing pressure on its natural resources, leading to serious environmental issues such as solid waste management. Solid Waste Management (SWM) refers to the entire process of managing waste, from its generation to disposal. This includes segregation, handling, collection, treatment, and disposal. India has taken important steps to address waste management through initiatives like Swachh Bharat Abhiyan, which promotes waste reduction, segregation, and environmentally-friendly practices. SWM is also aligned with the United Nations' Sustainable Development Goals (SDGs), although research specific to India in this area remains limited.

Solid waste encompasses the various types of refuse generated by homes, businesses, and industries. Effective waste management involves collecting, transporting, processing, recycling, and disposing of waste in a manner that minimizes harm to the environment and public health. Improper waste disposal can lead to unsanitary conditions, pollution, and the spread of diseases. The SWM process includes collection, transportation, treatment, analysis, and disposal, all of which need to be closely monitored to ensure compliance with strict regulations.

Urban solid waste management is a major challenge for municipalities, especially with the rapid pace of urbanization. The SDGs aim to reduce waste, promote recycling, and ensure that proper waste management practices are followed to avoid environmental and health risks. Proper SWM can also help recover valuable resources and bring environmental, economic, and social benefits to communities, contributing significantly to the achievement of these goals..

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Sources of Solid Waste

Residential (Household) Sources:

Types of Waste: Food scraps, packaging materials, newspapers, plastics, glass, metals, old clothes, broken furniture, and electronics.

Characteristics: Generally includes a mix of biodegradable (organic) and non-biodegradable materials.

Commercial Sources:

Types of Waste: Paper, cardboard, plastics, packaging materials, food waste, and electronics.

Examples: Waste from stores, restaurants, offices, hotels, markets, and service businesses.

Industrial Sources:

Types of Waste: Chemicals, plastics, metals, glass, wood, food processing waste, hazardous waste, and scrap materials.

Examples: Waste generated by manufacturing plants, refineries, chemical plants, construction sites, and other industrial facilities.

Institutional Sources:

Types of Waste: Paper, plastics, food waste, hazardous materials, and general waste.

Examples: Waste from schools, hospitals, prisons, government buildings, and other institutions.

Construction and Demolition (C&D) Sources:

Types of Waste: Concrete, wood, metals, glass, plastics, asphalt, and soil.

Characteristics: Typically bulky and heavy materials generated during construction, renovation, and demolition of buildings and infrastructure.

Agricultural Sources:

Types of Waste: Crop residues, manure, pesticides containers, plastics, and organic waste.

Examples: Waste from farms, orchards, vineyards, and livestock operations.

Municipal Services:

Types of Waste: Street sweepings, landscape and tree trimmings, sewage sludge, and waste from parks and public areas.

Characteristics: Generally includes a variety of organic and inorganic materials.

Healthcare Facilities:

Types of Waste: Biomedical waste, pharmaceuticals, chemicals, and general waste.

Examples: Waste from hospitals, clinics, research labs, and veterinary facilities.

Electronic (E-Waste) Sources:

Types of Waste: Old computers, televisions, mobile phones, batteries, and other electronic devices.

Characteristics: Often contains hazardous materials like lead, mercury, and cadmium.

Mining Activities:

Types of Waste: Overburden, tailings, slag, and chemicals.

Characteristics: Large volumes of waste, often including toxic and hazardous materials..

Details of Solid Waste Generation in Urban Local Bodies (Municipalities):

Landfilling municipal solid waste (MSW) is a cost-effective method for waste management in many countries, including India, where approximately 70 million tons of MSW are generated annually. However, with rapid urbanization and increasing migration, the amount of MSW is rising every day. By the next decade, urban India is expected to produce 920 million tons of MSW, which could severely impact air, water, and land resources. Currently, over 90% of MSW is improperly disposed of in low-lying areas, leading to serious risks to public health, environmental quality, and aesthetics. Additionally, landfill leachate has been a major cause of groundwater contamination and pollution of surface water ecosystems globally.

The generation of solid waste occurs when materials become useless to one individual but may still hold value for another. The specifics of solid waste generation in urban local bodies are as follows:

Sl. No.	Name of the Municipality	Total Population	Total Quantity of waste generation in TPD
1.	Puducherry	9,50,289	310
2.	Karaikal	86,838	40
3.	Mahe	41,816	12.5
4.	Yanam	55,628	12
	Total		**382.5**

Collection and segregation at source:

Garbage accumulation was not a significant concern in the past, but with globalization and industrialization, there is now a greater need for more efficient waste disposal methods. Many communities have implemented source separation and recycling programs, where residents and businesses sort recyclable materials from regular waste and place them in designated containers for collection. Additionally, some areas have drop-off centers where residents can bring their recyclables.

In Puducherry, solid waste is collected door-to-door, transported, and disposed of at the Kurumbapet Resource Recovery Park (KRRP). At this facility, authorized rag pickers segregate recyclable materials, and plastic waste is sent to recycling units. A portion of the vegetable waste undergoes biomethanation, processing about 1 ton per day (TPD).

Types of waste	Daily	Sometimes	Never
Kitchen/food wastes	97	3	0
Papers	15	57	28
Thin Polythene covers	23	61	16
Thicker Polythene covers	5	52	43
Milk covers	75	16	9
Sanitary napkins/diapers	2	56	16
Plastic	6	66	28
Expired medicines/chemical	10	45	45
Pricks/needles	2	13	85
Metals	0	32	68
Glasses	0	30	70
Textiles/cotton wastes	1	45	54
Others	4	0	96

Table: Frequency of solid waste generated in a normal day

Processing:

Integrated Municipal Solid Waste Management (IMSWM) projects are being implemented across Puducherry Union Territory (UT) to manage the 610 metric tons of garbage generated daily by urban local bodies and Commune Panchayats. M/s Swachhata Corporation from Bangalore is responsible for door-to-door waste collection, while M/s Green Warrior from Chennai has been contracted for solid waste processing. Preliminary work has already begun, with Green Warriors manually segregating waste and working on Refuse-Derived Fuel (RDF) and pyrolysis processes. They have secured 4 acres of land for initial processing, with plans to expand to 14.5 acres for full-scale operations.

In Kurumbapet, HR Square LLP collects nearly 180 tons of waste daily, segregating heavy particles and biodegradable materials for windrow composting. Non-recyclable waste is processed using compactor and baler machines, and a small-scale incinerator is planned. Leachate from composting is collected for treatment, and manual plastic collectors segregate recyclable plastics. HR Square LLP, based in Hyderabad, has also received a work order for

processing solid waste in rural areas. They have completed the construction of a Material Recovery Facility (MRF) shed, compost platform, and other necessary equipment. The processing of wet solid waste began in 2024. These initiatives aim to reduce waste volume, lower toxicity, and convert waste into valuable products such as compost and energy.

Details of Solid Waste Generation in Urban Local Bodies

Sl. No	Name of the Municipality	Quantity of Solid waste generation in TPD
1.	Puducherry	155
2.	Oulgaret	155
	Total	**310**

Details of Solid Waste Generation in Rural Local Bodies

Sl. No	Name of the Local Body	Quantity of Solid waste generation TPD
1	Villianur Commune Panchayat	5
2	Nettapakkam Commune Panchayat	15
3	Ariyankuppam Commune Panchayat	8
4	Mannadipet Commune Panchayat	22
5	Bahour Commune Panchayat	20
	Total	**70**

Garbage dumpsites and Sanitary Landfills:

Land disposal is the most common management strategy for municipal solid waste. Refuse can be safely deposited in a sanitary landfill, a disposal site that is carefully selected, designed, constructed, and operated to protect the environment and public health. The methane-rich biogas is produced due to the anaerobic decomposition of organic matter in solid wastes. Garbage has the potential to generate about 150-250 cubic meters of biogas per tonne of waste depending upon the quality. In Puducherry, 3 Nos. of controlled landfill dumpsites and Sanitary landfills are present.

Puducherry	23.0 acre
Karaikal	8.32 acre
Yanam	0.618 acre
Total	31.938 acres

Legacy Waste Management:

Legacy wastes refer to the accumulated waste stored for years on barren ground or in landfills, classified into containment and storage of wastes, buried garbage, soil and groundwater contamination and waste from contaminated construction materials and buildings. These wastes pose significant risks, including greenhouse gas emissions, environmental contamination and potential uncontrollable fires. The Puducherry region has successfully mined 5.53 lakh tons of legacy waste. In the Karaikal Region, about 85,350 MT of waste. In the Yanam Region, 21,600 MT has accumulated as legacy waste. In the Mahe region, wet waste is composted in backyards, while segregated dry waste is sent to recyclers/reprocessors. M/s. Zigma (P) Ltd., Kurumbapet, is processing the second phase of legacy waste, with 3.48 lakhs MT allotted and nearly 2.0 lakhs MT processed thus far. The remaining legacy waste is 1.48 lakhs MT. Segregated waste, such as tyres, metals, and glass, is sent to reprocessors, while LDPE and HDPE plastics are transported to a cement kiln in Andhra Pradesh.

Solid Waste Management and SDG Progress:

The Government of Puducherry is actively tracking the progress on Sustainable Development Goals (SDGs) with respect to Waste Management, encompassing, solid waste, hazardous waste, bio-medical waste etc. SDG has certain ecological goals with specific targets on waste management quantified by designated indicators. **Goal 6 (Clean Water and Sanitation)** and **Goal 12 (Responsible Consumption and Production)** in the SDGs particularly deal with the progress of waste management. **Plastic waste generation per 1,000 population** was recorded at **5.694 tonnes/annum in 2020**, slightly increasing to **8.29 tonnes in 2021**. The target for 2025 is **4.78 tonnes**, and for 2030, it is **1.27 tonnes**, necessitating a robust reduction strategy. Continued efforts in waste management policies, public participation, and industrial accountability are essential to meeting the **2025 and 2030 SDG targets**.

Challenges in Solid Waste Management:

1. **Increasing Waste Volumes**:
   - Rapid urbanization and changing consumption patterns have led to a significant increase in the volume of waste generated. Managing this growing volume is a major challenge for municipalities and governments.

2. **Financial Constraints**:
   - Solid waste management requires substantial investment in infrastructure, technology, and human resources. Financial constraints often limit the ability of local governments to implement comprehensive waste management systems.

3. **Public Awareness and Participation**:
   - Effective waste management relies on the active participation of the community. Lack of awareness and education about proper waste disposal and recycling practices hampers the effectiveness of waste management programs.

4. **Environmental and Health Impacts**:
   - Improper waste management can lead to severe environmental and health problems. Open dumping and burning of waste release toxic pollutants, while poorly managed landfills can contaminate soil and groundwater.

Legacy Waste Management:

Solid waste can be transformed into valuable resources through various processes, aligning with the concept of "wealth from waste." Recycling recovers materials like plastics, metals, glass, and paper, turning them into new products while conserving natural resources and generating revenue. Composting organic waste creates nutrient-rich compost and bio-fertilizers, improving soil health and boosting agricultural productivity. Waste-to-energy (WtE) technologies, including incineration and anaerobic digestion, produce renewable energy. Material Recovery Facilities (MRFs) utilize advanced sorting technologies to recover valuable materials, creating jobs and providing raw materials to industries.

A circular economy approach enhances resource efficiency, fosters innovation, and promotes entrepreneurship. Bio-remediation and bio-mining technologies help convert legacy waste into useful materials, reclaiming land and generating economic returns. Public-private partnerships attract investments in waste management infrastructure, driving economic growth and fostering sustainable business models. These strategies address environmental and health challenges while creating economic opportunities, transforming waste into a valuable resource, and contributing to sustainable development.

Conclusion:

Household waste constitutes a significant portion of the overall solid waste, making the study of Solid Waste Management (SWM) crucial for sustainable development. In India, urban areas often lack adequate planning for civil amenities and infrastructure, leading to inefficient waste management practices. This study provides a framework for both governmental and non-governmental agencies to identify key areas requiring improvement. Evidence-based policy formulation, implementation, and enforcement are essential to address these challenges effectively. Recognizing the contributions of students and participants in this process is important.

Humans produce various types of waste daily, which can have adverse effects on both health and the environment. Embracing innovative approaches and encouraging public participation in reducing, recycling, and reusing waste are vital steps toward a cleaner, healthier future. Consistent efforts in waste reduction and recycling will significantly improve public health and environmental quality.

In the Puducherry Urban Agglomeration Area (PUAA), approximately 495 tons of waste are generated daily. Currently, around 350-360 tons of this waste are collected and transported to the dumping site at Kurumbapet. Implementing waste segregation at the source can be an effective solution to mitigate this issue to a large extent.

Sources of information on SWM*
Internet
Mass Media
Family members
Relatives
Friends
Neighbours
Municipality officials
Social welfare organisations/RWA
Seminars/conferences/other academic events
Others

Table: Steps taken to inculcate the habit of sorting at source

Reference:

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5. Sukumar, J., Arunachalam, J., & Rajamanickam, M. The feasibility of incineration on Solid Waste Management in Puducherry–A Case Study.

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Manage Waste Wisely: Our Planet, Our Responsibility!"

Puducherry EIACP Hub Environment Events

Event: Tree plantation drive under the **Ek Ped Maa Ke Naam** (**Plant4Mother**) national campaigns at Poornakuppam & Chinnaveerampattinam, Puducherry, as part of the **'One Home, One Tree'** initiative on 03.01.2025. **Chief Guest:** Hon'ble Speaker of Puducherry **No. of saplings:** 1000	
	Event: Puducherry EIACP Hub showcased awareness materials at Regional & State Level Science Exhibitions organized by School Education, Puducherry.at Sri Marimalai Adigal Government Higher Secondary School, Embalam, Puducherry held from Jan 2-7, 2025. **No. of saplings:** 9500+
Event: Inauguration of 2 GSDP courses on **"Apiculturist (Wild Bee) - NTFP (Non-Timber Forest Produce)"** and **"Solar Enterprise Assistant Manager"** on 8th January, 2025 at Dr. Abdul Kalam Science Centre & Planetarium, Lawspet, Puducherry. **No. of participants:** 100	
	Event: Tree plantation drive under the **Ek Ped Maa Ke Naam** (**Plant4Mother**) national campaigns at Thanampalayam & Korukkumedu, Puducherry, as part of the **'One Home, One Tree'** initiative on 20.01.2025. **No. of saplings:** 1000
Event: Tree plantation drive under the **Ek Ped Maa Ke Naam** (**Plant4Mother**) national campaigns at **Abishegapakkam, Puducherry**, as part of the **'One Home, One Tree'** initiative on 22.01.2025. **No. of saplings:** 1000	

Event: Tree plantation drive under the **Ek Ped Maa Ke Naam (Plant4Mother)** national campaigns at **Thirubhuvanai, Puducherry**, as part of the **'One Home, One Tree'** initiative on 23.01.2025.

No. of saplings: 910

Event: Village Sensitization Programme on the topic: Micro Greens Entrepreneurship for Women Empowerment held on 28th and 29th January 2025 at Villianur Block to promote the themes of 'Naari Shakti Se Jal Shakti (Jal Shakti Abhiyan 2024)' and Mission LiFE (Lifestyle for Environment) among MGNREGA workers and Self-Help Group (SHG) members.

Resource Person: Mrs. Samundeeswari, Founder, Ms. Pavithra, Co-ordinator, Ms. Charumathi, Co-coordinator of Samu MicroGreens, Panruti, Tamil Nadu and Mrs. Manjula, Entrepreneurs Trainer, Puducherry.

No. of Participants: 75

Event: Tree plantation drive under the **Ek Ped Maa Ke Naam (Plant4Mother)** national campaigns at **Madagadipet & Madagadipetpalayam, Puducherry**, as part of the **'One Home, One Tree'** initiative on 31.01.2025.

No. of saplings: 970

Event: Puducherry EIACP Hub, in collaboration with Svarnim Puducherry - Sri Aurobindo Society, celebrated Water Fest '25 on 02.02.2025 at Thengai Thittu Estuary, marking World Wetlands Day. The following events were organized:

- **Water Sports** to engage the community and promote awareness of aquatic ecosystems.
- **Wetlands Exhibition** at Nallavadu Estuary.
- **Kayaking for a Plastic-Free Planet – Estuary Clean-Up Drive.**
- **Citizen Science Workshops** to encourage hands-on learning and public participation in environmental conservation efforts.

No. of Participants: 500

Event: Tree plantation drive under the **Ek Ped Maa Ke Naam (Plant4Mother)** national campaigns at **Pillaichavady, Puducherry**, as part of the **'One Home, One Tree'** initiative on 05.02.2025.

Chief Guest: Hon'ble MLA of Kalapet, Puducherry

No. of saplings: 750

Event: Tree plantation drive under the **Ek Ped Maa Ke Naam (Plant4Mother)** national campaigns at **Pillaiyarkuppam, Puducherry**, as part of the **'One Home, One Tree'** initiative on 27.02.2025.

No. of saplings: 500

Event: Puducherry EIACP Hub, in collaboration with Svarnim Puducherry - Sri Aurobindo Society, jointly conducting the **Integrated Training on Livelihoods Related to Water Hyacinths** as part of WaterFest'25 and Mission LiFE (Waste Reduced & Sustainable Lifestyle adopted) programme from **February 27 to March 22, 2025** at Puduvai Kalanjiyam Iyarkai Vivasayigal Sangam, Bahour, Puducherry.

No. of Participants: 30

Event: Valedictory function for the GSDP course on **"Apiculturist (Wild Bee) - NTFP (Non-Timber Forest Produce)"** was held on 19.02.2025 at Dr. Abdul Kalam Science Centre & Planetarium, Lawspet, Puducherry.

No. of participants: 100

EIACP PC HUB PUDUCHERRY

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