



## Original Research Article

# Assessing community participation in solid waste management: A study of mattannur municipality

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## Abstract

Waste generation, an inevitable outcome of human activity, has intensified in volume and complexity due to economic growth and rising living standards. Efficient waste management, involving collection, transportation, processing, recycling, and monitoring, is critical for sustainability. Urban areas, particularly in developing countries like India, face pronounced challenges in solid waste management (SWM) due to rapid urbanization, limited infrastructure, and inadequate resources. In Kerala, despite a literate population, public apathy and the "Not in My Backyard" (NIMBY) syndrome hinder sustainable waste management efforts, leaving municipalities like Mattannur grappling with irregular collection, inadequate segregation, and low community participation. Mattannur Municipality, a semi-urban area, generates approximately 15 tons of waste daily, managed primarily by community-led initiatives like Haritha Karma Sena (HKS) and Kudumbashree units. However, waste collection remains inconsistent, with monthly pickups for households and limited vehicle support. While efforts in waste segregation, particularly of organic and recyclable materials, are commendable, irregular collection and inadequate workforce hinder the system's efficiency. Survey data reveal dissatisfaction among residents, with no daily waste collection and uncertainties in scheduling undermining public trust. Awareness levels about SWM practices show significant gaps, especially in understanding the long-term environmental impacts of improper disposal. While most residents recognize the hazards of burning waste and improper SWM, awareness about overuse of plastics and biodiversity loss remains low. Despite challenges, the community exhibits willingness to support improved services. Currently charged a modest ₹30 monthly fee for waste collection, 70% of respondents are ready to pay an additional ₹47.63 on average for enhanced SWM systems. Strengthening infrastructure, ensuring regular collection, and fostering participatory approaches can enhance the municipality's SWM framework, ensuring environmental sustainability and improved public health.

**Keywords:** Sustainability, Solid Waste Management (SWM), Urbanization, Public Participation, Waste Segregation.

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## 1. Introduction

Waste generation is an inevitable by-product of human activities. With economic growth and improved living standards, the volume and complexity of waste generated have increased significantly. Solid waste, comprising both organic and inorganic materials, originates from domestic, commercial, and industrial activities. Effective waste management entails the collection, transportation, processing, recycling, and monitoring of waste materials. Solid waste can broadly be categorized into three types based on its source: municipal solid waste (MSW), industrial solid waste (ISW), and biomedical waste. MSW includes household and street waste, ISW is often hazardous due to toxic substances, and biomedical waste includes chemical waste and body fluids.

The challenges of solid waste management (SWM) are particularly pronounced in urban areas due to population density and unplanned urban development. Developing countries, like India, face severe constraints in resources and infrastructure, making waste management a persistent issue. In Kerala, despite a highly literate population, municipal administrations often struggle to manage waste effectively due to inadequate technical and financial support. Public apathy, reflected in the 'Not in My Backyard' (NIMBY) syndrome, aggravates the problem. The lack of public participation and responsibility undermines municipal efforts to manage waste sustainably.

Kerala generates approximately 6,000 tons of waste daily, with MSW accounting for a significant share. Kannur district, for instance, has municipalities generating

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substantial waste daily, with Kannur and Mattannur municipalities ranking fourth and fifth, respectively. Rapid urbanization and inefficient SWM systems not only pose environmental risks but also threaten public health and economic stability. Integrated Solid Waste Management (ISWM) is increasingly recognized as a comprehensive solution to these challenges, emphasizing waste reduction, reuse, and recycling.

2. Review of Literature

Numerous studies have explored the challenges and strategies of solid waste management (SWM) across different municipalities in India. Ambat (1999) evaluated the waste management system in Thiruvananthapuram Corporation, proposing a pilot model with an emphasis on efficient waste transportation. Similarly, Raj Mohan et al. (1999) examined Palakkad Municipality’s engineered SWM system and suggested composting and incineration as effective disposal methods. Jishi (2000) highlighted the potential of decentralized waste collection and eco-friendly composting, specifically for Thiruvananthapuram, while Mahadevan Pillai (2000) identified inefficiencies in Palakkad Municipality’s collection system, where nearly half of the waste remained uncollected.

Further research emphasizes sustainable practices and systemic improvements. Moorthy (2005) stressed the significance of source reduction, reuse, and recycling to achieve sustainable development. Varma (2006) highlighted the inadequate SWM capacity in Kerala and the unreliability of waste generation data, whereas Ahmed (2006) underlined the importance of waste segregation at the source to enhance economic and environmental outcomes. Ramachandra (2006) emphasized the role of waste stream assessments in sustainable planning, and Shashikumar (2009) assessed the levels of public awareness and involvement in SWM across Kerala’s major municipal corporations. Lastly, Thanooja (2010) advocated for a shift in public attitudes toward waste management, underscoring the need for environmental preservation for future generations. These studies collectively highlight the necessity of integrated and participatory approaches to address SWM challenges effectively.

3. Statement of the Problem

Under the MSW (Management and Handling) Rules 2000, municipalities are responsible for the collection, transportation, and disposal of waste. However, in Mattannur Municipality, challenges such as irregular waste collection, lack of segregation at source, and inadequate community awareness hinder the effectiveness of SWM. In this backdrop, the study seeks to address the following questions:

- 1. How effective is the municipality’s waste collection and disposal system?

- 2. To what extent are residents aware of and participating in sustainable SWM practices?
- 3. What improvements are required to enhance the municipality’s waste management framework?

4. Objectives of the Study

- 1. To evaluate the current waste management practices in Mattannur Municipality.
- 2. To assess the level of awareness among households regarding SWM.
- 3. To identify residents’ willingness to support and pay for improved waste management systems.

5. Materials and Methods

The study adopts a mixed-method approach, integrating both primary and secondary data to ensure a holistic understanding of waste management practices in Mattannur Municipality. Primary data were gathered using a structured interview schedule administered to 70 respondents, comprising 40 households and 30 shop owners, selected to represent diverse waste generation and management practices within the municipality. Secondary data sources, including Municipal Reports, scholarly journals, books, and official publications, were utilized to corroborate and contextualize the primary data findings. Statistical tools such as percentage analysis and Likert scales were applied for quantitative analysis. The study area, Mattannur Municipality, is characterized as a semi-urban region with a population of approximately 47,078 (Census 2011) and an average daily waste generation of 300 grams per person, emphasizing the critical need for efficient waste management practices. This methodological framework not only facilitates a detailed exploration of existing waste management systems but also provides actionable insights tailored to the municipality’s socio-economic and demographic context.

6. Results and Discussion

6.1. Waste collection practices in mattannur municipality

Effective waste collection forms the backbone of a sustainable Solid Waste Management (SWM) system, and in Mattannur Municipality, this responsibility is shared by Haritha Karma Sena (HKS) and Kudumbashree units, two prominent community-led initiatives. **Table 1** summarizes the current operational setup:

Table 1: Current operational setup

Aspect	Details
Number of Workers (HKS)	36 workers, including 14 sweepers (13 female, 1 male)
Additional Employees	14 workers at the dumping site
Vehicle Support	1 municipal truck with a driver
Waste Collection Frequency	Monthly for households, biannual for clothes, shoes, and bags
Fee Collected	₹30 per household per month

Source: Municipal Records

The HKS unit comprises 36 workers, including 14 sweepers who are tasked with maintaining street cleanliness. Among these sweepers, 13 are women, reflecting the municipality’s focus on involving women in SWM initiatives. In addition to the HKS workforce, 14 employees are stationed at the dumping site to handle waste sorting and disposal. The active involvement of Kudumbashree and HKS promotes community engagement and employment, especially for women. However, the current workforce may not be sufficient to handle the municipality’s growing waste generation (15 tons daily), leading to delays in collection and processing. Moreover, limited resources restrict the expansion of services to meet the community's needs.

**Table 2:** Perceptions of respondents regarding the regularity of waste collection services

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Score
Waste is collected daily	0	0	0	0	40	1.00
No uncertainty in collection services	0	0	27	40	11	1.95
Organic/recyclable waste is collected separately	65	108	0	0	0	4.325

Source: Sample Survey

The analysis of respondents' perceptions regarding the regularity of waste collection services reveals a significant disparity in service quality. The first statement, "Waste is collected daily," scored the lowest possible rating (1.00), with all respondents strongly disagreeing. This indicates an absence of daily waste collection and a widespread dissatisfaction among residents. Similarly, the statement "No uncertainty in collection services" also scored poorly (1.95), with half of the respondents disagreeing and a notable portion strongly disagreeing. This suggests irregular and unpredictable scheduling of waste collection, which undermines public trust and creates frustration. These low scores highlight systemic inefficiencies in basic waste management practices.

In contrast, the statement "Organic/recyclable waste is collected separately" scored exceptionally high (4.325), with all respondents either agreeing or strongly agreeing. This indicates that the authorities have successfully implemented and managed waste segregation practices. The high score for

this aspect reflects a positive step toward sustainability and effective resource management. However, the stark contrast between the high performance in waste segregation and the poor performance in regular waste collection points to a need for a more balanced approach. Addressing the inconsistencies in daily collection and improving the predictability of services, while maintaining the current efficiency in segregation, can significantly enhance overall satisfaction and trust in waste management systems.

Understanding the level of awareness about Solid Waste Management (SWM) among households is critical to evaluating the effectiveness of the current SWM system and identifying gaps in public education and engagement. Awareness can influence the degree of participation in waste segregation, reduction practices, and other environmentally friendly behaviours. This section analyses data collected from households in Mattannur Municipality, with a focus on awareness about waste types, management practices, and environmental consequences. One of the most fundamental components of SWM is understanding the composition of waste. Households play a pivotal role in the generation of waste, particularly in urban areas, where consumption patterns often lead to an increased production of non-biodegradable materials. **Table 3** provides insights into the types of waste generated by households in Mattannur:

**Table 3:** Types of waste generated by households

Type of Waste	Very High	High	Neutral	Low	Very Low	Score
Kitchen Waste	5	28	42	24	6	2.625
Plastic Waste	85	56	27	0	0	4.20
Garden Waste	0	0	0	14	33	1.175
Paper Waste	0	0	0	40	20	1.50
Other Waste	0	0	0	0	40	1.00

Source: Sample Survey

The analysis of household waste generation highlights significant variation in the types and volumes of waste produced. Kitchen waste, with a moderate score of 2.625, shows a balanced distribution across response categories, indicating that while some households generate high amounts, many produce neutral or low levels of kitchen waste. This variability reflects differences in household size, food consumption habits, or composting practices. In stark contrast, plastic waste emerges as the predominant category, scoring a high 4.20, with a majority of respondents rating it as "very high" or "high." This suggests widespread use of plastic in household activities, emphasizing the urgent need

for targeted waste reduction strategies and sustainable alternatives.

Garden waste, paper waste, and "other waste" types score significantly lower, with ratings of 1.175, 1.50, and 1.00, respectively. The consistently low scores across these categories indicate minimal generation, likely influenced by urban living spaces with limited gardens or reduced reliance on paper in digitalized households. However, the low score for "other waste" points to efficient segregation or a lack of awareness regarding uncommon waste types. The stark contrast between high plastic waste generation and low scores for other types underscores the need for focused waste management interventions, particularly for high-volume categories like plastics, while maintaining efforts to educate households about sustainable practices for all waste types.

## 7. Awareness About Waste Management Practices

To gauge how well residents, understand the principles of SWM, households were asked a series of questions regarding their awareness of sustainable waste management practices.

**Table 4:** Awareness about waste management practices

Statement	Yes (%)	No (%)	Don't Know (%)
Concerned about waste generation at the point of purchase	0	100	0
Insist on using reusable and eco-friendly materials	37.5	62.5	0
Aware that plastic cannot be destroyed by burning	57.5	42.5	0
Knowledge of prevention, reduction, reuse, and recycling practices	37.5	42.5	20.0

Source: Sample survey

The analysis of awareness about waste management practices among respondents reveals a mixed understanding of sustainable habits and principles. Alarming, none of the respondents are concerned about waste generation at the point of purchase, with 100% answering "No." This suggests a significant gap in environmental consciousness and a lack of consideration for long-term waste implications when making purchase decisions. Similarly, only 37.5% insist on using reusable or eco-friendly materials, indicating limited adoption of sustainable consumption habits, while 62.5% do not prioritize these practices, which hinders efforts to reduce waste generation at the source.

On the other hand, there is relatively better awareness about the non-destructive nature of plastic burning, with 57.5% of respondents acknowledging this fact. However, this still leaves a considerable portion (42.5%) unaware, highlighting the need for targeted education on the environmental hazards of improper plastic disposal.

Awareness of the "4Rs" of waste management—prevention, reduction, reuse, and recycling—is also moderate, with 37.5% demonstrating knowledge, 42.5% lacking it, and 20% being uncertain. The significant proportion of respondents in the "Don't Know" category suggests that while some awareness campaigns might exist, they are not comprehensive or impactful enough to fully engage the community. Addressing these knowledge gaps through consistent and practical education initiatives could greatly enhance participation in effective waste management practices.

## 8. Awareness Regarding Environmental Impact

Understanding the environmental consequences of improper waste management is crucial for fostering responsible behaviour. **Table 6.** 5 illustrates how well households in Mattannur understand the environmental impact of their waste disposal practices.

**Table 5:** Awareness about the environmental consequences of improper waste management.

Statement	Yes (%)	No (%)	Don't Know (%)
Burning waste contaminates air	100	0	0
Improper SWM leads to air and water pollution	100	0	0
Overuse of disposable plastic and packaging degrades the environment	55	45	0
Improper SWM leads to the eradication of certain species	52.5	2.5	45.0

Source: Sample Survey

The data in **Table 5** highlights the varying levels of awareness among households in Mattannur about the environmental consequences of improper waste management. The unanimous acknowledgment of the harmful effects of burning waste and improper solid waste management (SWM) on air and water pollution (100% "Yes") demonstrates a strong foundational understanding among respondents regarding these specific environmental issues. This indicates that campaigns or educational efforts addressing these topics may have been particularly effective in raising awareness. However, the perception begins to waver regarding the impact of overusing disposable plastics and packaging, with only 55% recognizing its environmental degradation effects. This division suggests a need for targeted awareness initiatives to emphasize the long-term consequences of excessive reliance on non-biodegradable materials.

The lack of clarity becomes even more evident in responses related to biodiversity loss caused by improper SWM, where only 52.5% of respondents acknowledged the link, while a significant 45% admitted uncertainty ("Don't Know"). This highlights a critical gap in understanding the broader ecological repercussions of waste mismanagement.

It underscores the importance of educating the community about how environmental degradation, driven by poor waste practices, can disrupt ecosystems and threaten species. By bridging these gaps in awareness, stakeholders can encourage more comprehensive environmental stewardship among households in Mattannur.

9. Service Fees and Willingness to Pay for Enhanced SWM Services

An effective solid waste management (SWM) system requires not only efficient operations but also financial sustainability. The municipality currently charges households a modest monthly service fee of ₹30 for waste collection. While this fee is affordable, its adequacy hinges on public satisfaction with the service and their willingness to contribute more for improved facilities. To better understand these factors, **Table 6.** 6 presents household opinions regarding the reasonableness of the current service fee and their willingness to pay for enhancements.

**Table 6:** Opinion regarding the current service fee and their willingness to pay more for an enhanced SWM system

Statement	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)	Average Score
The service fee of ₹30 is reasonable	65	28	3	18	0	3.125
Willing to pay more for better services	-	70% agree	-	-	-	₹47.63 (average)

Source: Primary data

The affordability of the current service fee of ₹30 per month is affirmed by a significant majority of respondents, with 65% strongly agreeing and 28% agreeing that it is reasonable for the waste collection services provided. This indicates that the fee is perceived as fair and accessible, reflecting its adequacy for the existing monthly collection schedule. However, while respondents are satisfied with the affordability, this does not necessarily translate into satisfaction with the quality or frequency of the services. The limited scope of the current fee may not cover necessary upgrades, such as more frequent collections, improved waste segregation mechanisms, or expanded infrastructure. As such, while the current fee serves as a solid foundation, there is room to re-evaluate its sufficiency in addressing the broader needs of an efficient SWM system.

The willingness to pay more for enhanced services highlights the community’s recognition of the need for improvements in waste management. A notable 70% of respondents express readiness to contribute beyond the

current fee, with an average additional amount of ₹47.63 proposed. This reflects a clear demand for higher service standards, including increased collection frequency, better infrastructure, and more effective waste processing practices. The expressed willingness to pay suggests that residents value a robust and efficient SWM system and are prepared to support its financial sustainability. Leveraging this willingness can be instrumental in implementing improvements that align with public expectations, ensuring both environmental benefits and greater community satisfaction.

10. Overall Satisfaction with SWM Services

Public satisfaction is a critical indicator of the effectiveness of SWM practices. Satisfaction levels provide valuable insights into the strengths and weaknesses of the current system, and public opinion can guide efforts to improve services. Table 7 presents the satisfaction levels of households with the waste management services provided by Mattannur Municipality.

**Table 7:** Satisfaction levels of households with the waste management services provided by Mattannur Municipality

Satisfaction Level	Frequency	Percent
High	28	70
Low	9	22.5
Poor	3	7.5

Source: Sample Survey

A significant 70% of respondents express high satisfaction with the municipality’s waste collection services, suggesting that the system meets the expectations of a majority of households. This satisfaction likely stems from factors such as the professionalism of workers, adherence to the monthly collection schedule, and the general cleanliness maintained in the serviced areas. Despite the limited frequency of waste collection, the overall efficiency and reliability of the service appear to resonate positively with most residents. This high level of satisfaction indicates that the foundational structure of the SWM system is sound, providing a solid base upon which further enhancements can be built to address evolving community needs.

However, 22.5% of respondents report low satisfaction, pointing to key areas requiring improvement. The monthly collection schedule, while adequate for some, results in waste accumulation for others, leading to issues such as foul odors, pest infestations, and environmental contamination. Additionally, the lack of an effective waste segregation system hinders the overall efficiency of waste processing and disposal. A smaller yet significant 7.5% of respondents express poor satisfaction, possibly due to more severe challenges such as inconsistent service, delayed collections, or inadequate customer support. This minority, though smaller in number, likely experiences the greatest adverse impact of system inefficiencies and highlights the need for

targeted interventions. Addressing these concerns—such as increasing collection frequency and implementing waste segregation—can bridge the satisfaction gap and foster greater public trust in the SWM system.

### 11. Suggestions

To enhance the effectiveness of Solid Waste Management (SWM) in Mattannur Municipality, several measures are recommended.

1. Increasing the frequency of waste collection, particularly for biodegradable and plastic waste, is crucial to address resident dissatisfaction.
2. Introducing source segregation with clear guidelines and providing households with separate bins for recyclables and non-recyclables can improve recycling rates and reduce landfill waste.
3. Public awareness campaigns emphasizing sustainable consumption, the environmental impacts of improper waste disposal, and the importance of recycling should be conducted through community meetings and media platforms.
4. Expanding community participation through incentives and collaborations with local groups like Haritha Karma Sena and Kudumbashree can strengthen waste management efforts.
5. The municipality should explore adopting decentralized waste processing methods, such as composting units and biogas plants, to manage organic waste sustainably and reduce transportation costs.

### 12. Conclusion

The study reveals that while Mattannur Municipality has taken significant steps in waste management, critical gaps remain in collection frequency, public awareness, and sustainable practices. The predominance of plastic waste and limited understanding of waste reduction and segregation highlight the need for focused interventions. Despite these challenges, the willingness of residents to pay for improved services and their receptiveness to recycling initiatives reflect a strong potential for community-driven solutions. By addressing operational inefficiencies and fostering greater public engagement through targeted education and participatory approaches, the municipality can develop a more efficient and sustainable SWM system, contributing to environmental preservation and enhanced public health.

### 13. Source of Funding

None.

### 14. Conflict of Interest

None.

### References

1. Anderson C, Stage J. Direct and indirect effects of waste management policies on household waste behavior: The case of Sweden. *Waste Manag*, 2018;76:1–11.
2. Barr S. Factors Influencing Environmental Attitudes and Behavior: A UK case study of household waste management. *Environ Behav*. 2007;39(4):435–73.
3. Barr S, Gilg AW, Ford NJ. A conceptual framework for understanding and Analyzing Attitudes towards Household Waste Management. *Environment and Planning A: Economy Space*, 2001;33(11):2025–48.
4. Barr S, Gilg A, Ford N. Defining the Multi-dimensional Aspects of Household Waste Management: A study of Reported Behavior in Devon. *Resources, Conserv Recycl*, 2005;45(2):172–92.
5. Birhanu S. Practices and Challenges of Household Solid Waste Management in Woldia Town, Northeastern Ethiopia. *Sustainability*, 2021;13(5903).
6. Choe C, Fraser I. An Economic Analysis of Household Waste Management. *J Environ Econ Manag*, 1990;38(2):234–46.
7. Dubey S, Singh P, Yadav P, Singh K.K. Household Waste Management System using IoT and Machine Learning. *Materials Today: Proceedings*, 2020;167(4):1950–9.
8. Goel S. Municipal Solid Waste Management (MSWM) in India: A critical review. *J Environ Health*, 2008;50(4):319–28.
9. Sharholi M, Ahmad K, Mahmood G, Trivedi RC. Municipal Solid Waste Characteristics and Management in Allahabad, India. *Waste Manag*. 2007;27(4):490–6.
10. Subramani T. Study of Pollution Prevention Strategies for Reclamation and Waste Management. *Int J Environ Sci*, 2010;1(1).
11. Sujauddin M, Huda SMS, Hoque ATMR. Household Solid Waste Characteristics and Management in Chittagong, Bangladesh. *Waste Manag*, 2008;8(9):1688–95.
12. Talyan V, Dahiya RP, Sreekrishnan TR. State of Municipal solid waste Management in Delhi, the capital of India. *Waste Manag*, 2008;28(7):1276–87.
13. Trivedi J, Soni BK. A Study on Waste Management of Household with special reference to Uzhavoor Panchayath-Kottayam. *Int J Waste Manag Res.*, December 2020 Issue.
14. Tucker P, Speirs D. Attitudes and Behavioural change in Household Waste Management Behaviours. *J Environ Plan Manag*, 2003;46(2):289–307.
15. Viljoen JMM. Household Waste Management Practices and Challenges in a Rural Remote Town in the Hantam Municipality, Northern Cape, South Africa. *Sustainability*, 2021;13(11):5903.

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