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Household Waste Collection and Management in Urban Low-Income Areas: Insights from Mumbai's Central Suburbs

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Abstract
Waste management is the need of an hour. It is one of the major concern for highly populated country like India. This paper looks at the challenges and practices of household waste collection and management in low-income urban areas, focusing on the central suburbs of Mumbai. Rapid urban growth, high population density, and poor infrastructure have made waste problems worse in these communities, where official municipal services often fall short. The study is empirical in nature. It aims to examine the various factors associated with the waste collection and management in Mumbai. The study explores waste sorting habits, how often waste is collected, the role of informal waste workers, and residents' awareness of waste management rules. The findings show inconsistent service, low community involvement, and a strong dependence on informal collection networks. The study emphasizes the urgent need for inclusive, local, and community-led waste management approaches that consider economic challenges. Recommendations include raising public awareness, improving local governance, and formally including informal waste collectors. This paper offers practical ideas to improve sustainability and sanitation in underserved urban areas.

Keywords:
Lower-Income Households, domestic waste management, Waste Collection, Solid Waste Segregation, Waste Disposal Practices

1. Introduction
Almost half of Maharashtra's population lives in urban areas, making it one of the most urbanized states. (MPCB, 2018) We encounter the necessity of efficient waste management when navigating the domains of sustainability and environmental care. It's an important, comprehensive practice that not only determines our current environment and health but also the course of our world in the future. By making sure that the garbage we produce is handled, cleaned, and disposed of with the highest care and precision, waste management positions itself as a protector of environmental holiness. Waste management is the strategic coordination of waste collection, transportation, treatment, and disposal activities to promote sustainability and environmental conservation.

There is inherent value in every step of the waste management process. In order to prepare waste for its voyage through the waste management cycle, the collection step entails acquiring waste from a variety of sources. The gathered garbage is then transported to facilities that specialize in its removal and treatment. Here, garbage is transformed using a variety of carefully planned techniques to minimize environmental damage and maximize resource recovery, including recycling, landfill disposal, incineration, and more. The foundation of efficient waste management

is regulation and monitoring, which guarantee compliance with legal requirements and promote accountability and responsibility in waste management procedures. These rules serve as a framework for decisions and actions, fostering a culture of excellence and compliance in waste management operations. In essence, waste management is a holistic approach to waste, viewing it not merely as a byproduct to be discarded but as a resource to be managed, valued, and integrated into a sustainable environmental cycle. It is a reflection of our commitment to nurturing and preserving our environment, guiding us towards practices that resonate with responsibility, foresight, and a steadfast dedication to sustainability. Understanding its significance opens doors to appreciating the delicate balance and harmony it brings to our ecosystems and the pivotal role it plays in fostering a resilient environment for future generations (Biswas, 2023). The government and other organizations frequently define the Low-Income Group (LIG) as households earning between Rs. 3,00,001 and Rs. 6,00,000 annually (Barr, 2025).

2. Background of Study:

Managing urban waste has become a major challenge in fast-growing cities, especially in developing countries like India. The problem is even more serious in low-income neighborhoods, where crowded living conditions, poor infrastructure, and economic hardships lead to messy and unsafe waste disposal. In Mumbai's central suburbs, home to many of the city's poorer residents, gaps in waste collection and sorting are very clear. Although the Brihanmumbai Municipal Corporation (BMC) has launched large-scale reforms to improve waste management, these efforts often fall short or are inconsistent at the community level, particularly in informal settlements and densely populated areas. (Times of India, 2025).

3. Review of Literature:

Research shows that community involvement and local ownership are key to making waste management systems sustainable in under-resourced urban areas. For example, the Earth5R project at Powai Lake has shown that training residents, setting up local sorting centers, and using small-scale composting can lead to lasting changes in behavior (Earth5R, 2025). Informal waste workers play an important role in these areas, but they are often left out of formal policies, which weakens the overall collection system. A data-driven, collaborative approach that includes low-income households, informal workers, and local municipal staff can help close these gaps (Hassan, 2025).

Many studies have shown that poor infrastructure is a major obstacle to effective waste management in low-income neighborhoods. Problems are made worse by narrow streets and unauthorized settlements, which make it hard for garbage trucks and street sweepers to access these areas. Additionally, the Praja Foundation (2025) suggested that decentralized waste processing at the local ward level could greatly reduce the burden on municipal landfills, especially when combined with community involvement and smaller-scale infrastructure. The study recommends that city officials include sanitation planning in urban development efforts and conduct regular audits to ensure rules are followed. Without improving physical infrastructure in informal settlements, waste management reforms are likely to have little real impact.

The results of the study by (Mainul Sk, Qamar, & Sethy, 2023) show that even while there has been progress, there are still a lot of gaps and challenges that prevent the nation from managing trash effectively. The review emphasized the rising rates of trash generation and the variations in

solid waste composition across India's various regions. It highlighted the necessity of focused actions by identifying the main waste sources and their relative contributions. Issues with coverage, efficiency, and infrastructure constraints were identified through the examination of garbage collection and transportation systems. The assessment also looked at the various approaches to garbage treatment and disposal, emphasizing the effects each has on the environment and society.

A study by (K, SJ, & Suresh, 2024) highlight the need for focused interventions for better practices and throw light on the intricacies of waste management in Gadag City.. This study clarifies Gadag City's waste collection procedure as well as the knowledge, attitudes, and behaviors of its citizens. It emphasizes how urgently waste management concerns must be resolved if India is to experience sustainable development. Gadag City, however, has difficulties maximizing trash revenue, underscoring the need for better tactics. Given that garbage output is predicted to treble in the next ten years due to India's rapid population expansion, waste management is becoming increasingly difficult. In line with the objectives of the Swachh Bharat campaign, this study tackles important waste management challenges. Health concerns are increased by issues such inappropriate disposal methods, poor infrastructure, and little knowledge. This study clarifies Gadag City's waste collection procedure as well as the knowledge, attitudes, and behaviours of its citizens. It emphasizes how urgently waste management concerns must be resolved if India is to experience sustainable development. Gadag City, however, has difficulties maximizing trash revenue, underscoring the need for better tactics. With garbage output predicted to treble in ten years due to India's rapid population increase, waste management is becoming a significant concern. In line with the objectives of the Swachh Bharat campaign, this study tackles important waste management challenges. Health concerns are increased by issues such inappropriate disposal methods, poor infrastructure, and little knowledge (Barr, 2025).

The Ministry of Urban Development's expert committee estimated that the class 1A cities' considerable capital and maintenance costs were Rs. 900 and Rs. 269 per capita annually. Without comprehensive strategy, the waste sector lacks a financial and management structure, which is causing municipalities and urban local bodies to struggle. Therefore, unsegregated garbage has not been used and has been set aside since it is not lucrative. With reference to initiatives like JnNURM and UIDSSMT, the Government of India has approved grants and funds under the 12th and 13th finance commissions totalling Rs. 20,000 crores allotted under the Swatch Bharath Mission in order to advance SWMS across the nation.

According to Nivya Noonjiyil Kaithery & Usha Karunakaran in research paper “Study on attitude of household waste management in a rural area of Northern Kerala” , 6.2% of the study population had a below-average attitude, whereas 93.8% of the study population had an above-average attitude. They all firmly agreed that the community should hold an awareness class on waste management. Nearly 70% of respondents said the government was doing little to address the trash issue. Approximately 92%, 88.6%, and 97% of respondents were open to recycling, composting, and trash segregation, respectively. They were all quite worried about diseases linked to inappropriate trash storage and disposal as well as unlawful waste dumping (Biswas, 2023).

The local body made the decision to revise the solid waste management regulations in order to enforce them more strictly because they haven't been changed in almost 19 years. Penalty increases and the addition of a user fee are two of the main changes. The BMC has raised the fine for spitting and littering on highways from Rs 200 to Rs 500 and Rs 250, respectively, in accordance with the proposed norms. The cost of taking a bath in a public area will increase from Rs 100 to Rs 300. The punishment for open urination and defecation has been increased from Rs 100 to Rs 500. For transporting non-segregated rubbish, the BMC has also suggested a fine of Rs 200 for individual waste providers and Rs 1,000 for bulk waste generators.

4. Objectives of the study:

1. To Analyze the Awareness and Knowledge Levels of Residents Regarding Waste Segregation
2. To Assess the Current Domestic Waste Management Practices

5. Research Methodology: A Case Study

The study found that residents' attitudes, practices, and knowledge of residential trash management varied. Although most participants showed awareness of appropriate waste treatment and segregation, there were clear knowledge gaps on certain waste kinds and how to handle them. Demographic factors like age, gender, income, and education all had an impact on these knowledge gaps, underscoring the necessity of specialized interventions. Given these results, the study suggests that Gadag City investigate the waste management and revenue creation strategy that Bangalore has effectively adopted. To evaluate the financial benefits of better waste management techniques in Gadag, detailed calculations for possible profits from various waste categories, such as dry, moist, and medical waste, should be carried out. Converting an abandoned landfill into a useful waste management facility has the potential to significantly increase revenue and advance environmental sustainability.

Improper garbage management is one of the most important and overlooked issues. Even though each has a certain job to play, stakeholders in the policy document created by relevant authorities, while the majority of them do not, according to the data. The ever-growing amount of rubbish in the city and landfills can be mostly attributed to households. With the right infrastructure, consistent assistance, and education for locals, every geographic division of a city may become a model for reducing, recycling, and reusing household waste. According to the study, the majority of locals have serious concerns about solid waste.

If local authorities make sure that families' separated waste is regularly collected, closed waste collection vehicles (which prevent dripping across the city roadways) and keep public areas clean and stocked with enough trash cans. By doing this, they can gain the support and gratitude of the local populace for the strict enforcement of the law and the heavy penalties imposed on violators. Waste management technology advancements have the potential to significantly address the existing problem of the growing amount of trash in the municipality, but they also need the cooperation and support of the local population. To prevent cities from becoming landfills, policymakers must coordinate the roles of households, technology, and the legal system.

- **Hypothesis of the Study:**

H1 There is a significant relationship between the level of awareness about waste segregation and the implementation of proper waste segregation practices in lower-income households in the central suburbs of Mumbai.

H_1 There is a significant difference between the process of Domestic Waste Management practiced in lower- income households in the central suburbs of Mumbai as compared to process prescribed by BMC.

Research Gap

- There is a knowledge gap of Waste Segregation.
- Research in the area of Mumbai Suburbs has not been done.
- **Scope of The Study**

The "Domestic Waste Management System and Collection in Lower-Income Households with Special Reference to Central Suburbs of Mumbai" study examines a number of waste management-related topics, including policy efficacy, potential remedies, and current problems. Lower-income people' awareness of appropriate recycling and garbage disposal practices. Participation of households in sustainability and waste reduction initiatives

6. Results and Findings

H1 There is a significant relationship between the level of awareness about waste segregation and the implementation of proper waste segregation practices in lower-income households in the central suburbs of Mumbai. Purpose of One-Sample Kolmogorov-Smirnov test is to verify whether the data (Awareness and Implementation) follow a normal distribution.

One-Sample Kolmogorov-Smirnov Test

		Awareness	Implementation
N		23	23
Normal Parameters[a,b]	Mean	5.8261	5.6087
	Std. Deviation	7.82567	11.64138
Most Extreme Differences	Absolute	.325	.346
	Positive	.325	.338
	Negative	-.269	-.346
Kolmogorov-Smirnov Z		1.557	1.660
Asymp. Sig. (2-tailed)		.016	.008

a. Test distribution is Normal.
b. Calculated from data.

Since the P value is less than 0.05, the data is not normally distributed. The purpose of Correlations, Model Summary[b], ANOVA[a] test is to assess how strong and in what direction the connection is between Awareness and Implementation, without presuming normality. And To determine whether individuals with greater Awareness tend to have higher (or lower) Implementation.

Correlations (Findings)

			Awareness	Implementation
Spearman's rho	Awareness	Correlation Coefficient	1.000	.397
		Sig. (2-tailed)	.	.041
		N	23	23
	Implementation	Correlation Coefficient	.397	1.000
		Sig. (2-tailed)	.041	.
		N	23	23

There is 0.397 correlation between awareness and implementation. The correlation is found to be significant. In order to determine whether Awareness is a predictor of Implementation. In order to measure the extent to which Awareness accounts for changes in Implementation. In order to verify the statistical significance of the relationship. In order to comprehend the strength and reliability of Awareness as a predictor of Implementation.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.529[a]	.279	.245	10.11460	1.854

a. Predictors: (Constant), Awareness
b. Dependent Variable: Implementation

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	833.072	1	833.072	8.143	.010[b]
	Residual	2148.406	21	102.305		
	Total	2981.478	22			

a. Dependent Variable: Implementation
b. Predictors: (Constant), Awareness
Model is statistically valid for predicting Implementation based on Awareness.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.027	2.651		.388	.702
	Awareness	.786	.276	.529	2.854	.010

a. Dependent Variable: Implementation

As the Correlation Coefficient is 0.397, Test shows that there is a moderate positive relationship between Awareness and Implementation. Study shows that 93% of population are aware of Solid Waste Management, yet only 6% of population segregate waste. Test confirms that if awareness increases implementation will also increase.

H2 There is a significant difference between the process of Domestic Waste Management practiced in lower- income households in the central suburbs of Mumbai as compared to process prescribed by BMC.

As required by the Indian government, the MCGM is putting the Solid Waste Management Rules, 2016 (SWM Rules) into effect in Mumbai, The responsibilities of waste generators are spelled out in detail in the SWM rules, thus it is compulsory that Each home must deliver waste that has been separated at the source for processing and disposal. Study shows that 52% of the Population collect waste in the waste Basket, whereas 29% of the population collect waste in Plastic bag. Each waste generator must sort their waste, keep it in separate storage, and transfer it to municipal workers or approved waste collectors. Study shows that 83% of the population do not segregate wet & dry waste.

Rules says that, segregate and store the waste they produce into three distinct streams: bio-degradable, non-biodegradable, and domestic hazardous wastes. This should be done using appropriate bins, and the segregated waste should be handed over to authorized waste pickers or collectors according to directions or notifications from local authorities as needed; No waste generator shall dispose of the solid waste they produce by throwing, burning, or burying it on streets, in open public spaces outside their property, or in drains or water bodies (CPCB, 2016).

7. Recommendations:

To increase Awareness following steps can be taken:

a. Educate about importance of proper waste management

b. Create more awareness of Segregation so that there will be translation from Awareness to segregation

c. Distribute Dustbins for Wet & Dry Waste

To step up the relationship of Awareness & Implementation from moderate to high there are few recommendations which are as follows:

a. Strict action to be taken for not following BMC rules regarding waste management verifying adherence to the rules: Vigilance Citizen Squad can be formed who can help BMC for not only creating awareness but also strict implementation. Citizen Squad can include Society members, NSS Volunteers.

b. As per the rules mentioned in SWM 2016, penalty for not segregating the waste can be charged. These penalties can be charged not from individual house but collectively from Society, by this Society members will automatically pressurise the people staying in their society to segregate waste.

c. BMC can make list of the society or Area who follow waste management rules and norms appreciation can be given through media.

d. BMC not to collect waste from household who fail to segregate waste.

8. Conclusion:

Household waste can be classified based on its characteristics, allowing for the development of a suitable and appropriate waste management method in the community. This process can enhance health and environmental quality while facilitating waste repurposing. The well-being of the public. It is important that the model encompasses various stakeholder components and considers the specifics of trash, the features of urban settings. Environmental cleanliness must be prioritized by waste management, which should also avoid littering. A polluted environment can influence the spread of disease to both us and those around us. For this purpose, let us start right away by steering clear of waste and ensuring that our surroundings remain tidy at all times.

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