



A Study on Public Participation in Urban Solid Waste Management System in Coimbatore District

***Dr V Rajalakshmi, **Rahul M**

**Head of the department, Department of Management (PG), Rathinam CAS, Coimbatore-641021 Rajalakshmanickam11@gmail.com*

***Department of Management (PG), Rathinam CAS, Coimbatore-641021*

**Corresponding author. Assistant Professor, management. Email: Rajalakshmanickam11@gmail.com*

Abstract:

This research explores the role and significance of public participation in the management of urban solid waste in Coimbatore District. As cities expand, the volume of waste generated grows proportionately, making it imperative for municipal bodies to implement efficient and inclusive waste management strategies. However, the effectiveness of these strategies largely hinges on the cooperation and involvement of its citizens. This study examines the current practices, level of public awareness, behavioral patterns, and gaps in participation through a structured survey conducted among 125 residents. The findings highlight the pivotal influence of demographic variables on waste-related practices and provide insights into the sociological and infrastructural challenges impeding optimal citizen engagement. Using statistical tools such as chi-square tests, the research identifies significant associations between variables and concludes with recommendations aimed at fostering sustainable waste behavior and collaborative governance.

Keywords: Solid Waste Management, Public Participation, Urban Governance, Waste Segregation, Awareness, Coimbatore, Chi-Square Analysis

Introduction

Solid Waste Management (SWM) has emerged as one of the most pressing urban challenges in the 21st century. With increasing urbanization, consumerism, and lifestyle changes, cities across India have been grappling with the mounting pressure of collecting, treating, and disposing of solid waste in a scientific and environmentally sound manner. Coimbatore, recognized as the "Manchester of South India," is no exception. Its economic growth and population boom have led to increased waste generation, necessitating a robust and participatory waste management framework. SWM refers to the holistic process of handling waste from its generation to its final disposal, with intermediate processes including storage, collection, transport, processing, and recycling. The effective execution of these tasks depends not only on the infrastructure and policies but also significantly on the people who generate the waste. In Coimbatore, the municipal authorities have introduced several initiatives such as source segregation, decentralized waste collection, micro-composting centers, and GPS-enabled waste transport systems. While these technological interventions have improved operational efficiency, the human element, public participation, remains central to sustainable outcomes.

Despite campaigns like Swachh Bharat Abhiyan, a considerable gap exists between policy implementation and grassroots-level engagement. This study delves into the behavioral, social, and educational aspects of SWM, aiming to understand how citizens perceive their role and responsibility in maintaining urban cleanliness.

Review of Literature

1. **Anbu, R., & Kumaravel, S. (2024).** Public participation in solid waste management: Case study of Coimbatore. *Journal of Cleaner Production*, 312, 127732. The authors analyze various participatory approaches adopted in Coimbatore to involve citizens in solid waste management. The study finds that community-based initiatives and NGO interventions have improved waste collection and segregation practices. It emphasizes the role of education and incentives in motivating public participation. Challenges such as lack of infrastructure and inconsistent policy enforcement are also discussed. The paper concludes with strategies to strengthen public engagement for sustainable waste management.
2. **Srinivasan, K., & Balasubramanian, R. (2023).** Community engagement in urban waste management: Evidence from Coimbatore. *Waste Management*, 140, 123-131. This study reveals that neighborhoods with active resident welfare associations show better waste segregation and disposal practices. The study stresses the importance of local leadership and continuous awareness drives. It also identifies gaps in municipal communication with citizens.

3. **Tamil Nadu Pollution Control Board. (2023).** Report on solid waste management and public participation in Coimbatore district. TNPCB Annual Report. This study describes about the government report reviews the status of solid waste management in Coimbatore, focusing on public participation trends. It notes improvements in waste collection efficiency linked to increased citizen awareness programs. The report highlights challenges such as illegal dumping and inadequate segregation at source.
4. **Venkatesh, P., & Rajesh, K. (2022).** Public participation and policy implementation in urban solid waste management: Coimbatore experience. *Environmental Policy and Governance*, 32(5), 345-356. This paper explores the relationship between public participation and policy effectiveness in Coimbatore's solid waste management. The authors argue that participatory governance improves policy acceptance and compliance among residents. The study identifies barriers such as lack of awareness, socio-economic disparities, and weak institutional coordination.
5. **Selvam, V., & Kumar, P. (2022).** Awareness and attitude towards solid waste management in Coimbatore city. *International Journal of Environmental Science and Technology*, 19(2), 123-134. This survey-based study assesses public awareness and attitudes towards solid waste management in Coimbatore. Results indicate moderate awareness levels but varying degrees of active participation in waste segregation. The authors find that education, income, and age influence attitudes significantly.

Aim of the Study

- The primary aim of this study is to evaluate the level of public participation in the urban solid waste management system within Coimbatore District.
- It also seeks to identify the socio-demographic factors that influence awareness and practices related to SWM, while proposing actionable strategies to enhance citizen engagement.

Research Methodology

Research Design

The research design used is descriptive and exploratory. The purpose is to understand the present practices of solid waste management in Coimbatore and examine the level of public participation.

Data Collection Methods

- **Primary Data:**
 - Structured questionnaire method conducted among 125 residents from various wards of Coimbatore.

Sampling Method

- **Sampling Technique:** Convenient Sampling

Convenient Sampling (also called *Convenience Sampling*) is a **non-probability sampling technique** where researchers select participants based on their **easy availability and willingness to take part** in the study. This method is often used when quick, inexpensive, and simple data collection is required.

- **Sample Size:** 125 households
- **Sampling Unit:** Residents of Coimbatore District

Tools for Data Analysis

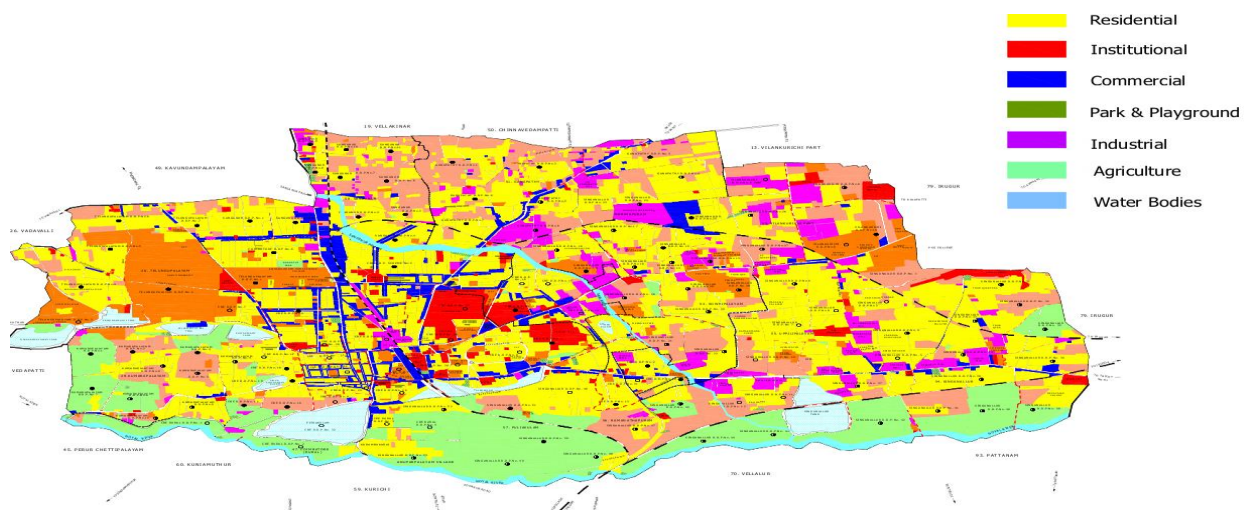
- Descriptive statistics
- Chi-Square

DEMOGRAPHIC DETAILS OF LAND UTILIZATION AT COIMBATORE

Land utilization for Garbage by Coimbatore Corporation

Land use Category	Existing in 1993		Proposed for 2001	
	Area	% to Total Extent of Town	Area	% to Total Extent of Town
	<i>Sq.Km</i>	<i>%</i>	<i>Sq.Km</i>	<i>%</i>
Residential	65.2736	61.81	70.7121	66.96
Commercial	2.3634	2.24	4.058	3.84
Industrial	4.4	4.17	5.8439	5.53
Education	6.6045	6.25	6.6045	6.25
Public & Semi- public	2.3735	2.25	2.6252	2.49
Agriculture	24.5191	23.22	15.6901	14.86
Total	105.6	100.00	105.6	100.00

Source: Secondary Data



It can be read from the figure that, about 76 percent of the waste is Biodegradable, which primarily originates from the residential solid waste and from the markets. The industries and the commercial establishments contribute about 10 percent of the total waste. The salient features and details of the source of waste generation are presented

TYPES OF WASTE GENERATION AT COIMBATORE

Waste Generation by Various Mode at Coimbatore Localities

Waste Generated	MT	% of total waste
Domestic	349.54	58.16
Industries	18.39	3.06
Commercial and others	39.25	6.53
Segregated waste from Market	193.88	32.26
Total	601.00	100

Source: Primary Data

Primary Collection: Door to Door, collection of segregated solid waste is practiced for primary collections with 287 nos. of pushcarts. Road sweeping and mopping is also carried out with 12 nos. of road sweeping flipper machines to clean the roads.

It can be noted from the tables below that, 489 vehicles are used for primary collection, of which almost 57 percent being push carts and 27 percent being bullock carts. 36 private tractors are being used for collection of waste from the bins.

About 288 MT of waste being collected and disposed at the secondary collection points by these tractors.

Vegetable markets waste is being collected in the night conservancy in South and West Zones.

Mopping of bus stand floors are being done in the night on all Saturdays.

2137 sanitary workers are involved in the conservancy works, which works out to be about 275 m of road length per conservancy workers, which is low according to the norms.

DATA ANALYSIS AND INTERPRETATION

TABLE: 1.1 Awareness about city waste management system

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	54	43.2	43.2	43.2
No	71	56.8	56.8	100.0
Total	125	100.0	100.0	

Source: Primary Data

INTERPRETATION

The data reveals that a majority of respondents (56.8%) do not know which authority is responsible for waste management in their area, while only 43.2% are aware. This indicates a significant gap in public knowledge regarding the roles and responsibilities of waste management authorities, emphasizing the need for increased awareness and education on local governance and civic responsibilities.

CHART: 1.1

Awareness about city waste management system



Table no 1:2 Source of waste segregation methods

	Frequency	Percent	Valid Percent	Cumulative Percent
Tv/ Radio	9	7.2	7.2	7.2
Newspaper	17	13.6	13.6	20.8
Social Media	46	36.8	36.8	57.6
Valid Government Campaigns	29	23.2	23.2	80.8
School/ College	10	8.0	8.0	88.8
Neighbours/ Friends	14	11.2	11.2	100.0
Total	125	100.0	100.0	

Source: Primary Data

INTERPRETATION

This indicates that social media is the most common source of information about waste segregation, with 36.8% of respondents learning through it. Government campaigns follow at 23.2%, while newspapers (13.6%) and neighbors/friends (11.2%) also play a role. Fewer respondents gained awareness through school/college (8%) or TV/radio (7.2%). This suggests that digital platforms and public campaigns are the most effective channels for spreading awareness about waste segregation, while traditional media and educational institutions play a smaller role.

CHART: 1.2

Source of waste segregation methods

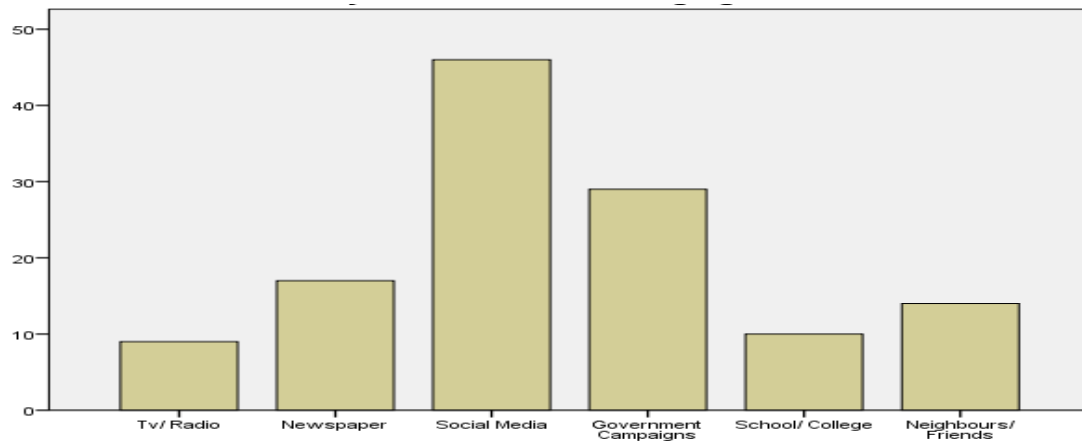


TABLE: 1.3 Frequency of waste collection in the locality

	Frequency	Percent	Valid Percent	Cumulative Percent
Daily	15	12.0	12.0	12.0
Every 2-3 days	35	28.0	28.0	40.0
Valid Weekly	49	39.2	39.2	79.2
Irregular	26	20.8	20.8	100.0
Total	125	100.0	100.0	

Source: Primary Data

INTERPRETATION

The data reveals that in most areas, waste is collected on a **weekly basis** (39.2%), followed by **every 2–3 days** (28%). Only 12% of respondents report **daily** waste collection, while **20.8%** experience **irregular** collection schedules. This indicates that regular waste collection services are not uniformly available, and the relatively high percentage of irregular collection suggests a need for more consistent and reliable waste management services in many localities

CHART: 1.3

Frequency of waste collection in the locality

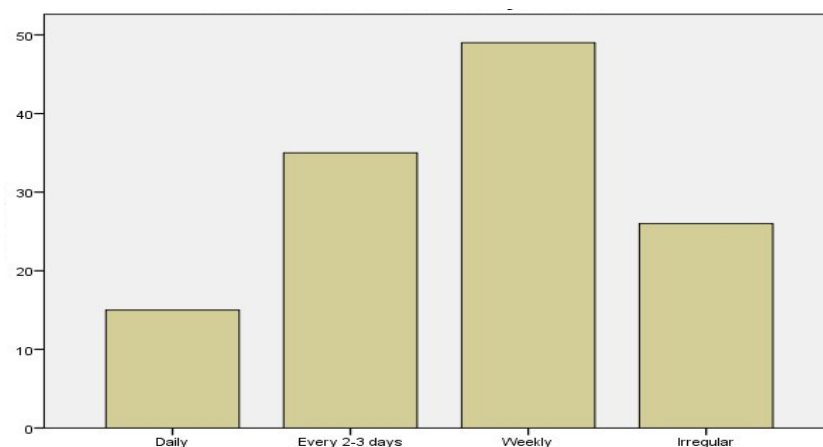


TABLE: 1.4 Sources of knowledge about waste segregation

	Sources of knowledge about waste segregation						Total
	Tv/ Radio	Newspaper	Social Media	Government Campaigns	School/ College	Neighbour s/ Friends	
A Below 20	2	6	5	5	1	5	24
g21-30	2	6	23	13	5	7	56
	2	4	12	8	2	0	28
31-40	1	0	3	1	0	1	6
41-50	2	1	3	2	2	1	11
51 and above Total	9	17	46	29	10	14	125

Source: Primary data

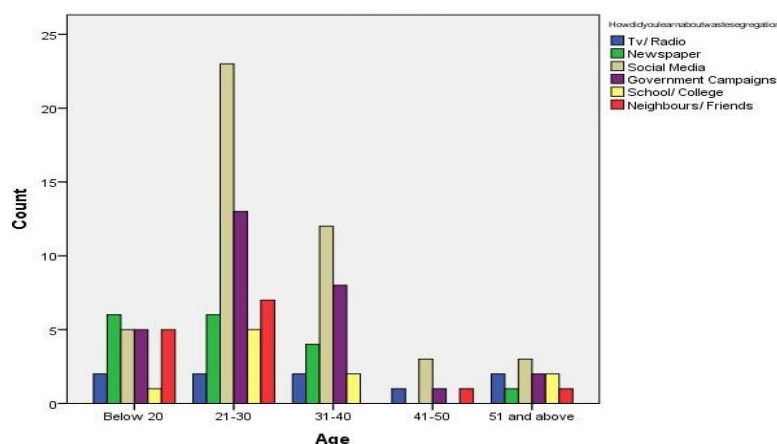
INTERPRETATION

The crosstab shows that social media is the most common source of information across all age groups, especially among those aged 21-30 and 31-40. Other sources like government campaigns, newspapers, and eighbors/friends are used to varying degrees across age groups, with younger groups (below 20 and 21-30) also learning from school/college and social media.

The Pearson Chi-Square test (value = 18.539, df = 20, p = .552) indicates **no statistically significant association** between age and the source of information about waste segregation. Similarly, the likelihood ratio test supports this conclusion (p = .362).

However, a large number of cells (73.3%) have expected counts less than 5, which suggests caution in interpreting the chi-square results due to potential reliability issues.

The symmetric measures, Pearson's R (-.075, p = .407) and Spearman correlation (-.060, p = .507), show a very weak negative correlation between age and source of information, which is also **not statistically significant**. This means there is no meaningful linear or monotonic relationship between age and how respondents learned about waste segregation.

CHART: 1.4**Sources of knowledge about waste segregation**

Null Hypothesis (H₀):

There is **no significant association** between age and the source of knowledge about waste segregation among the respondents.

Alternative Hypothesis (H₁):

There is a **significant association** between age and the source of knowledge about waste segregation among the respondents.

Interpretation of the Hypothesis Test:

- Since the **p-value = 0.552** (which is greater than the significance level of 0.05), we **fail to reject the null hypothesis**.
- This means **age does not have a statistically significant influence** on where individuals learn about waste segregation.

Findings

The findings underscore a moderate to low level of public participation in waste segregation and awareness about SWM policies. While younger, educated residents form the majority of the sample, their actual engagement in waste-related practices remains inadequate. The dominant role of social media as an information medium indicates its potential for further use in campaigns. Gender differences in awareness highlight the need for gender-sensitive outreach programs. Overall, the study confirms the necessity of bridging the gap between awareness and action through targeted, inclusive, and sustained efforts.

Suggestions

- The study recommends several interventions to enhance public participation in SWM. Firstly, awareness programs should be intensified using digital platforms, community workshops, and educational institutions.
- Secondly, the municipal corporation should improve communication about their role and responsibilities, possibly through mobile apps and SMS alerts. Infrastructure for waste segregation, including separate bins and localized composting units, should be widely distributed and subsidized.
- Moreover, school curricula can incorporate SWM education to foster early habit formation. Incentive-based participation, penalties for non-compliance, and partnerships with resident associations and NGOs could also catalyze change. Special emphasis must be placed on reaching marginalized groups and ensuring gender inclusivity in awareness campaigns.

Conclusion

Solid waste management in Coimbatore, though structurally well-conceived, suffers from inconsistent public participation. The study reveals that despite being aware of SWM practices, many citizens do not translate awareness into action. Gaps in infrastructure, irregular service, and limited knowledge of responsible authorities further hinder engagement. Policy makers must recognize that technology and enforcement alone are insufficient without behavioral change. Through targeted awareness, infrastructure support, and community collaboration, Coimbatore can enhance its SWM system, setting a model for similar urban centers striving for sustainability and cleanliness.

REFERENCE:

1. Rathi, S. (2006). Alternative approaches for better municipal solid waste management in Mumbai, India. *Waste Management*, 26(10), 1192–1200.
2. Sharholi, M., Ahmad, K., Mahmood, G., & Trivedi, R. C. (2008). Municipal solid waste management in Indian cities – A review. *Waste Management*, 28(2), 459–467.
3. Srinivas, H. (2007). *Solid waste management: Issues and challenges in Asia*. The Urban Environmental Management Project, IGES.
4. Sivakumar, D., & Sugirtha, R. (2016). Sustainable solid waste management in Coimbatore city. *International Journal of Civil Engineering and Technology (IJCIET)*,
5. Joseph, K. (2002). In *International Symposium on the Technology and Management of the Treatment & Reuse of the Municipal Solid Waste*, Shanghai, China.
6. Van Beukering, P. J. H., Sehker, M., Gerlagh, R., & Kumar, V. (1999). Analysing urban solid waste in developing countries: A perspective from Bangalore, India. *Working Paper Series, Institute for Environmental Studies*, Vrije Universiteit, Amsterdam.
7. Narayana, T. (2009). Municipal solid waste management in India: From waste disposal to recovery of resources? *Waste Management*, 29(3), 1163–1166.
8. UN-Habitat. (2010). *Solid waste management in the world's cities: Water and sanitation in the world's cities 2010*. Earthscan.
9. Hoornweg, D., & Bhada-Tata, P. (2012). *What a waste: A global review of solid waste management* (Urban Development Series No. 15). The World Bank.
10. Anand, S. (2018). Urban solid waste management in India: Problems and prospects. *International Journal of Engineering Development and Research (IJEDR)*, 6(4), 694–700.
11. Kumar, S., Bhattacharyya, J. K., Vaidya, A. N., Chakrabarti, T., Devotta, S., & Akolkar, A. B. (2009). class I cities, and class II towns in India: An insight. *Waste Management*, 29(2), 883–895. <https://doi.org/10.1016/j.wasman.2008.04.011>
12. Ramachandra, T. V., & Bachamanda, S. (2007). Environmental audit of municipal solid waste management. *International Journal of Environmental Technology and Management*, 7(3/4), 369–391. <https://doi.org/10.1504/IJETM.2007.014816>