Beyond the Bin: Rethinking Municipal Solid Waste Management through Environmental Governance and Social Perspective

Kulsum Begum

Research Scholar Public Administration, MANUU

Email: kulsumbegum3700@gmail.com and

K. Vinitha

Intern, Dr. MCR HRD Institute of Telangana

Email: vinitha200302@gmail.com

Municipal solid waste management (MSWM) is often understood primarily in terms of what happens after waste enters the municipal system, with comparatively less attention being given to the social and institutional processes that determine what becomes waste in the first place. This paper adopts a "Beyond the Bin" perspective to examine MSWM as a broader environmental governance challenge shaped by household consumption, social behavior, institutional arrangements and citizen participation. It argues that addressing waste only through collection and disposal overlooks the conditions that contribute to its generation and the social and institutional relationships through which waste is managed. The paper looks at the different dimensions of MSWM, including household consumption practices, awareness related to MSW governance, household solid waste-management practices, and the social aspects of MSWM. A descriptive, cross-sectional research design with a mixed-method approach was adopted, drawing on a primary survey of 100 respondents from Telangana selected through convenience sampling. The primary survey brings out the motives and drivers underlying certain behavioral practices among citizens and provides insights into emerging patterns and challenges of MSWM at the grassroots level. The responses indicate that waste-related practices are influenced not only by individual choices but also by the social and institutional context in which those choices are made. The findings therefore highlight the relevance of environmental governance, participation, accountability, coordination, and shared responsibility in understanding MSWM. The "Beyond the Bin" perspective connects the processes through which waste is generated with the social and institutional processes

through which it is governed, drawing attention to waste prevention, sustainable consumption and citizen participation alongside conventional waste-management practices. The paper thus seeks to place MSWM within a broader environmental governance and social framework, emphasizing that addressing waste requires attention not only to its management after generation but also to the conditions that shape its generation.

Keywords: Municipal Solid Waste Management; Environmental Governance; Sustainable Consumption; Social Perspective; Citizen Participation; Waste Governance.

1.Introduction

"Environmental problems are everyone's fault but nobody's problem."

In today's world, environmental problems are becoming an everyday event. But these problems have not received attention to what it requires, and this becomes an issue when a problem does not get an acknowledgement then there will least effort toward it. And this is the case with most environmental problems. According to the United Nations Environment Programme (UNEP), the world is facing Triple planetary crises comprising climate change, nature and biodiversity loss, pollution and waste. Solid Waste Management (SWM) has traditionally been approached as a municipal service concerned primarily with the collection, transportation, processing, and disposal of waste. However, the scale and complexity of contemporary waste generation challenge this conventional understanding. Urbanization, alteration of consumption patterns, and an increase in the use of packaged and disposable products have stressed waste management from being a simple sanitation problem to a major environmental and institutional problem with socio-economic repercussions. Globally, municipal solid waste generation is projected to increase substantially in the coming decades, placing greater pressure on land, resources, and urban infrastructure. This situation is more challenging in India, especially because of rapid urbanization and varied capacity of municipalities to process waste and engage citizens. Though the Solid Waste Management Rules (SWM) 2016 placed responsibilities of source segregation, collection, processing and scientific disposal of solid waste, challenges like mixed waste, inadequate source segregation, dependency on landfills, and limited resource recovery show that significant gap exists between policy and its implementation. Current practices on SWM are largely downstream-focused. They deal with what happens after waste is generated at the household or community level. However, this approach fails to investigate what precedes waste disposal. Waste is not created at the bin; it is generated through a wider system of resource extraction, production, packaging, distribution, consumption, and disposal. Consequently, addressing waste only after it has been generated limits the capacity of

public institutions to address its structural causes. This entails moving from "waste management" to "waste governance." Environmental governance provides a more comprehensive framework and acknowledges that responsibility for waste management involves several factors such as governments, municipalities, producers, consumers, service providers, civil society and informal waste workers. Thus, effective waste governance requires adequate administrative structures and capacity as well as coordination of institutional accountability and participation across waste lifestyles.

At the same time, the concept of sustainable consumption challenges the assumption that increasing waste is an unavoidable consequence of economic development. It shifts attention towards reducing unnecessary consumption, encouraging reuse and repair, improving product durability, and questioning patterns of excessive material use. This complements the circular economy, which seeks to move away from the linear “take-make-use-dispose” model towards systems in which products and materials remain in use for as long as possible through prevention, reuse, repair, refurbishment and recycling. However, existing approaches reveal an important limitation. The circular economy is often reduced to recycling, while environmental governance is usually examined in isolation from consumption and resource recovery. Similarly, waste policies may place considerable emphasis on citizen segregation while giving comparatively less attention to the upstream role of producers, product design and consumption systems. The contribution of informal waste workers to material recovery also remains insufficiently integrated into formal governance structures.

2. Conceptual framework

The environmental issues are certain challenges that cause disorder in the natural environment, and it needs to be governed to maintain the order. The historical aspect of environmental governance is related to various developments in policy instruments and paradigm shifts. The need to govern environment felt necessary with arising disorders in society such as rising level of carbon CO2 in atmosphere, global warming, climate change, natural imbalance and all these are consequence of human activities as quoted by Lipschutz - “Environmental problems has become more social than a biological one." Under traditional public administration environmental problems govern with command-and-control principles which are status quo in nature and poorly suited for modern complex environmental problems. During the 1980s the doctrine of the New Public Administration brought market principle to the governance of environment like carbon trading and clean development mechanisms and various policy commitments for instance, Stockholm conference

1972, Earth summits, Kyoto protocol, Paris agreement, sustainable development etc. In present era the governing environmental issues are challenged by. Firstly, low politic where environmental issues are given least priority by people who are in power. Secondly, Devolved fragmentation, environmental issues are left with local governments without strong financial backbone. Thirdly, Disjointed incrementalism where environmental policies Adjusted step by step rather than making it rational and comprehensive. (Evans and Thomas,2024) Municipal solid waste is becoming a major environmental issue in the modern world. The need for and importance of solid waste management can be understood from the fact that historically, poor waste management has led to various governance, health, and environmental consequences. For instance, 1994's Surat, India plague outbreak, Ghana, Acra's Seasonal flooding in 2011 and love canal industrial hazard affecting large number of people in USA. (Wilson et al., 2015)This highlights that a sound waste management system can prevent the consequences of the environment, human health, and society. (Chandrappa & Das 2012)

Waste management demands a new way of thinking. There is a need for shifting paradigms in terms of managing waste. Because in present context waste generation is largely dictated by consumption patterns and household income. There is an increasing trend of non-food items. (Widyaningsih et al. 2015) Rather than relying on conventional methods such as landfill and incineration, which is going out of fashion. There is a need for focusing on emerging ideas such as zero waste, sustainable consumption, Sustainable production and recycling, life cycle assessment, organic composting etc. this emphasis that there is urgent need to act upon these ideas. For instance, recycling above 80 percent only can slow down the depletion of natural resources. (Steffan lehmann 2010). Rising income, changing lifestyle pattern, and increased consumption has led to a huge generation of waste which is around 2.56 billion metric tons in 2022 and expected to increase 3.86 billion metric tons by 2050 in a business-as-usual scenario. This shows the urgency of the issue. The environmental impact of municipal solid waste is that in global methane assessment, solid waste is the third largest global source of methane which is around 20 percent. If we look at waste from a resource perspective, then it will have large benefits, for instance upstream employment such as Research, Redesign, Remanufacturing, and Recyclability. etc. With this municipal solid waste has become a very part of environmental governance and society. (what a waste 3.0, 2026) The impact of waste on health is huge; diarrheal diseases caused an estimated 1.2 million deaths globally in 2021,Open burning and unsafe waste treatment can release pollutants such as PM2.5, PM10, arsenic, benzene, cadmium, lead, mercury and dioxin-like substances, which may affect respiratory, cardiovascular, reproductive, neurological and immune systems.(WHO, 2025)

Environmentally, solidwaste disposal contributes approximately 3-4% of annual global anthropogenic greenhouse gas emissions.(Monni et al. 2006) and this is also causing air pollution, water contamination etc. This shows that municipal solid waste management is a cross-cutting issue which is affecting health, climate change, sustainable production and consumption etc. it needs holistic approach to address. Economically, in terms of management of waste, cost of inaction is becoming more than the cost of action. For instance, in proper waste management cost of action is US$ 5-7 per capita per year, but cost of inaction is US$ 20-50. This reflects the urgent need to act upon proper waste management across the globe. Proper waste management can benefit society in many ways, for instance McKinsey in report Row 3 above quotes that the waste sector will create around 9-25 million green jobs in future. Food waste management costs around 750 billion USD. Proper management can save the economy. (Wilson et al., 2015) There is a need to have innovation in three categories. Firstly, technological innovation with less ecological footprint. Second, at institutional level, i.e. using market and non-market-based techniques. Third, nurturing less materialistic values in society and promoting sustainable lifestyles. (Steffan lehmann 2010)

3. Objectives

1. To examine household solid waste management practices, with a focus on segregation, disposal, recycling, and interaction with waste-collection services.
2. To assess sustainable consumption practices among households, particularly in relation to waste reduction, reuse, repair, and avoidance of single-use products.
3. To examine citizens' perceptions of environmental governance in SWM, focusing on service delivery, accountability, enforcement, and citizen participation.
4. To identify key behavioral, social, and institutional factors influencing sustainable SWM and examine their implications for effective waste governance.

4. Methodology

4.1 Research Design

The present study adopts a descriptive, cross-sectional research design to examine household solid waste management (SWM) practices and explore how environmental governance and social factors shape sustainable waste-management behavior. The descriptive component helps the study understand existing household-level practices and perceptions, while the cross-sectional design allows data to be collected from respondents at a particular point in time. A mixed-method approach is used, incorporating both quantitative and qualitative elements. Primary data is collected through a structured online questionnaire administered using Google Forms. The questionnaire consists mainly of close-ended questions, including multiple-choice items and statements measured on a five-point Likert scale. A small number of open-ended questions are also included, allowing respondents to describe their views, experiences, and perceptions in greater detail.

4.2 Study Area

The study is conducted in Telangana, with respondents drawn from different locations across the state. Telangana offers a relevant context for examining household solid waste management in view of its rapid urbanization, changing consumption patterns, and the increasing demands placed on municipal waste-management systems. The study does not seek to evaluate the administrative or operational performance of any particular municipality. Instead, it focuses on household-level waste-management practices and public perceptions related to SWM, environmental governance, and associated social dimensions.

4.3 Participants and Sample Size

The study comprises a total sample of 100 respondents residing in Telangana. An effort is made to include respondents from different demographic and socio-economic backgrounds. The questionnaire collects information on characteristics such as age, gender, educational qualification, occupation, household income, household size, and type of residence. These variables are considered to examine whether waste-management practices and perceptions differ across demographic and socioeconomic groups. The individual respondent constitutes the unit of analysis, although several questions specifically address practices and decision-making at the household level. The study therefore examines individual responses in relation to household waste-management behavior, perceptions, and participation.

4.4 Sampling Technique

The study employs convenience sampling which is considered appropriate for the present exploratory study given the available time and resources, as well as the objective of obtaining preliminary empirical insights into household waste-management practices and perceptions. At the same time, the limitations of this sampling approach are recognized. Since the study is based on a non-probability sample of 100 respondents, the findings cannot be treated as statistically representative of the entire population of Telangana. The results are therefore interpreted primarily in relation to the respondents included in the study. Rather than making population-wide generalizations, the analysis focuses on identifying patterns, perceptions, and associations within the surveyed sample.

4.5 Data Sources

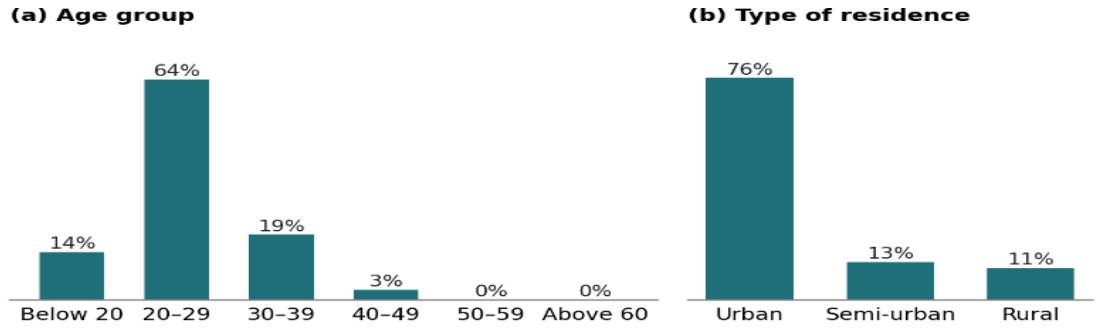
The study draws on both primary and secondary sources of data to develop a broader understanding of the research problem. Primary data is collected through a structured questionnaire administered using Google Forms. The questionnaire is organized around five broad dimensions: (i)

demographic characteristics, (ii) household solid waste management practices, (iii) sustainable consumption, (iv) environmental governance, and (v) the social dimensions of waste management. The use of close-ended, Likert-scale, and limited openended questions allows the study to capture measurable patterns while also giving respondents some scope to express their individual perspectives. Secondary data is obtained from relevant scholarly literature, government reports, policy documents, legislative and regulatory frameworks, institutional publications and credible national and international sources dealing with municipal solid waste management, environmental governance, sustainable consumption and the social dimensions of waste management. The literature review and conceptual framework provide the basis for understanding the relationship between solid waste management, environmental governance, sustainable consumption, and social participation. These conceptual linkages guide the empirical investigation and inform both the design of the questionnaire and the subsequent analysis of the primary data.

5. Data Analysis

5.1 Demographic profile

The demographic profile of the respondent shows that most of the respondent falls between the age category of 20-29 years. And majority of them are urban residents that is 76%. And rest of them from semi urban (13%), rural (11%) areas. so, this broadly reflects an urban picture. Figure 1. Age distribution and type of residence of respondents.

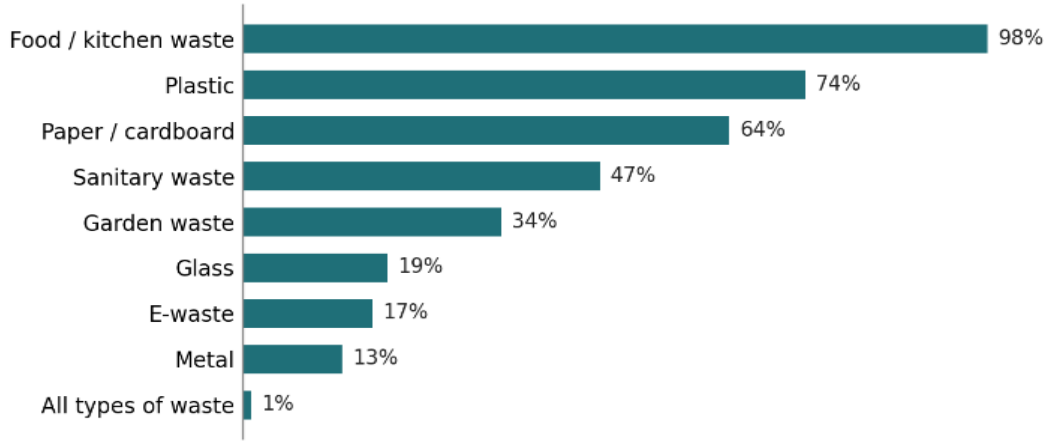


Source: Primary survey data.

5.2 Household Waste Generation and Segregation Practices

Figure.2 shows different category of waste generated on households. The food and kitchen (98%) waste is dominant followed by plastic (74%), paper or cardboard (64%), sanitary waste (47%), garden waste (34%), glass (19%), E waste (17%), and metal (13%).

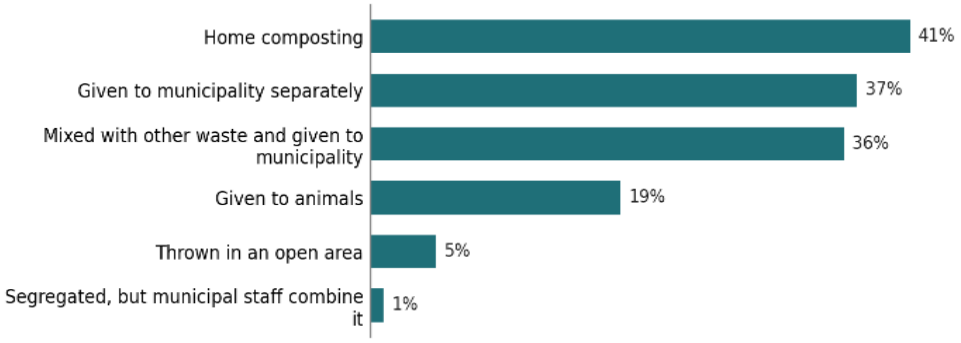
Figure 2. Types of waste generated by households.



Source: Primary survey data. Multiple responses allowed; percentages may exceed 100%.

Figure 3. Management of kitchen waste

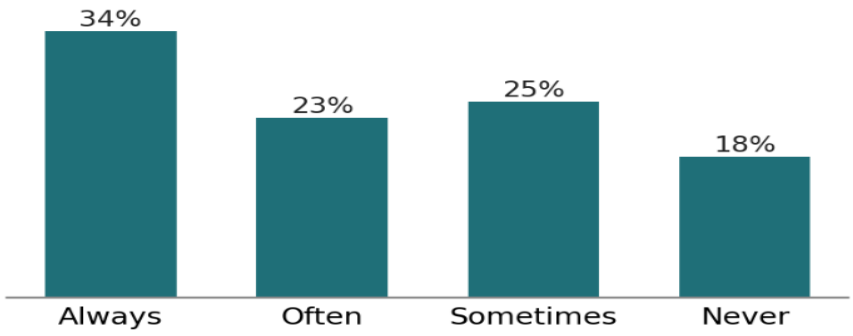
Figure 3 shows that major part of kitchen waste treated by home composting (41%) followed by 37% is given to municipality separately. 36% of kitchen waste is mixed with other waste and given to municipality, followed by 19% is given to animal. 5% throw it at open area. And 1% believe that they segregate it but municipal staff combine it anyhow.



Source: primary data.

Figure 4. Frequency of household waste segregation

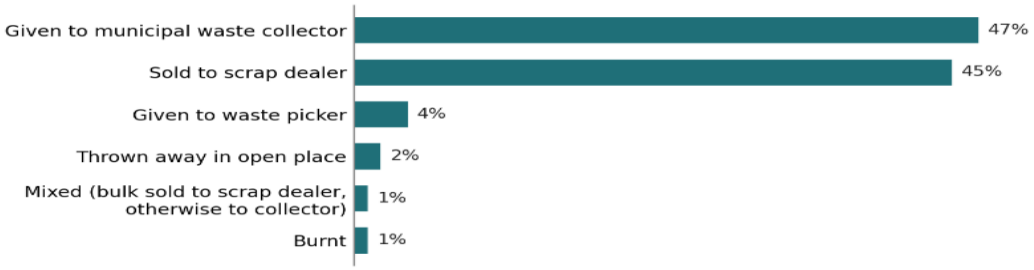
Figure 4 shows that 34% respondents always practice waste segregate at source, while 34% practices it often followed by 25% sometimes. And 18% of the respondent never practiced waste segregation at source



Source: Primary survey data.

Figure 5. Destination of recyclable waste.

Figure 5 shows that 47% of respondents hand over recyclable waste to municipal waste collectors, while 45% sell it to scrap dealers. Only 4% give it to waste pickers, whereas 2% dispose of it in open spaces and 1% each follow mixed disposal practices or burn the waste. These findings indicate that recyclable waste is largely channelled through municipal collection systems and informal scrap markets, highlighting the role of both formal and informal actors in household waste recycling.

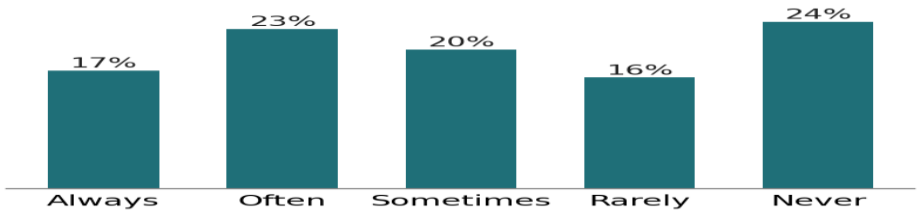


Source: Primary survey data.

5.3 Municipal Service and Barriers to Segregation

Figure 6. Whether the waste collector collects segregated waste separately.

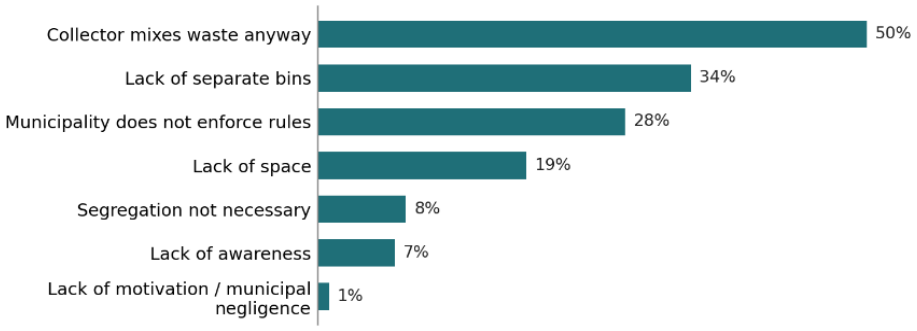
The findings indicate that separate collection of segregated household waste is inconsistent. While 23% of respondents reported that waste collectors often collect segregated waste separately and 17% stated that this always happens, 20% reported that it happens only sometimes. Furthermore, 16% indicated that separate collection rarely occurs, while 24% stated that it never occurs. These findings suggest a gap between household-level waste segregation and municipal collection practices. The lack of consistent separate collection may discourage households from maintaining segregation at source.



Source: Primary survey data.

Figure 7. Major reasons for not segregating household waste.

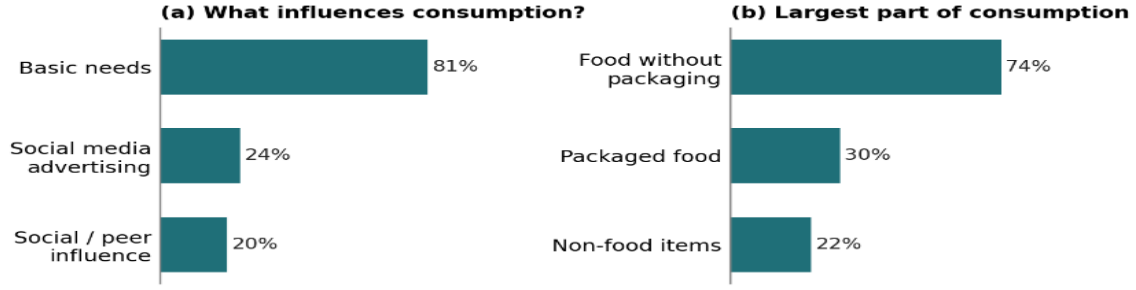
The most frequently reported reason for not segregating household waste was the perception that waste collectors mix waste anyway, cited by 50% of respondents. This was followed by the lack of separate bins (34%) and inadequate municipal enforcement of rules (28%). Additionally, 19% identified a lack of space as a barrier. Relatively fewer respondents cited the belief that segregation was unnecessary (8%), lack of awareness (7%), and lack of motivation or municipal negligence (1%). Overall, the findings indicate that barriers to segregation are primarily associated with collection practices, infrastructure, and administrative enforcement rather than a lack of public awareness alone.



Source: Primary survey data. Multiple responses allowed; percentages may exceed 100%.

5.4 Consumption Patterns and Everyday Practices

Figure 8. Influences on consumption and the largest category of consumption.

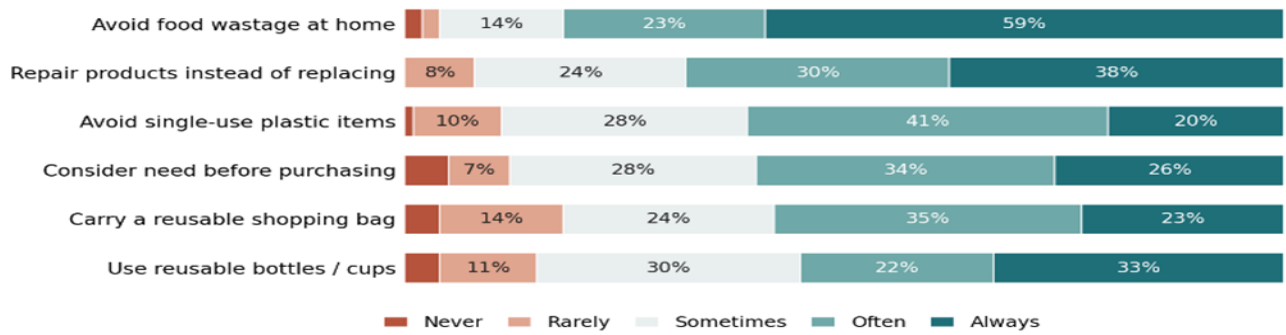


The findings show that basic needs were the primary influence on consumption, reported by 81% of respondents. Social media advertising (24%) and social or peer influence (20%) were also identified as factors affecting consumption decisions. Regarding the largest category of consumption, food without packaging was reported by 74% of respondents, followed by packaged food (30%) and non-food items (22%). These results suggest that consumption is largely need-oriented, although social influences also play a role. The relatively high share of food consumed without packaging may provide an opportunity to promote sustainable consumption practices, while packaged food consumption highlights the need to consider packaging waste. Multiple responses were permitted for this figure.

Source: Primary survey data. Multiple responses allowed; percentages may exceed 100%.

Figure 9. Frequency of waste-reducing consumption behaviours (sorted by share responding "Often" or "Always").

The findings reveal variations in the adoption of waste-reducing practices among respondents. Avoiding food waste at home was the most frequently reported behaviour, with 82% indicating that they practised it often or always. Repairing products instead of replacing them followed at 68%. In comparison, 61% reported often or always avoiding single-use plastic items, while 60% considered the need for a product before purchasing it. Carrying reusable shopping bags was reported often or always by 58% of respondents, while 55% frequently used reusable bottles or cups. These results indicate stronger adoption of food-waste prevention and product repair than of some reusable alternatives. The findings suggest scope for encouraging consistent waste-reduction practices in everyday consumption.

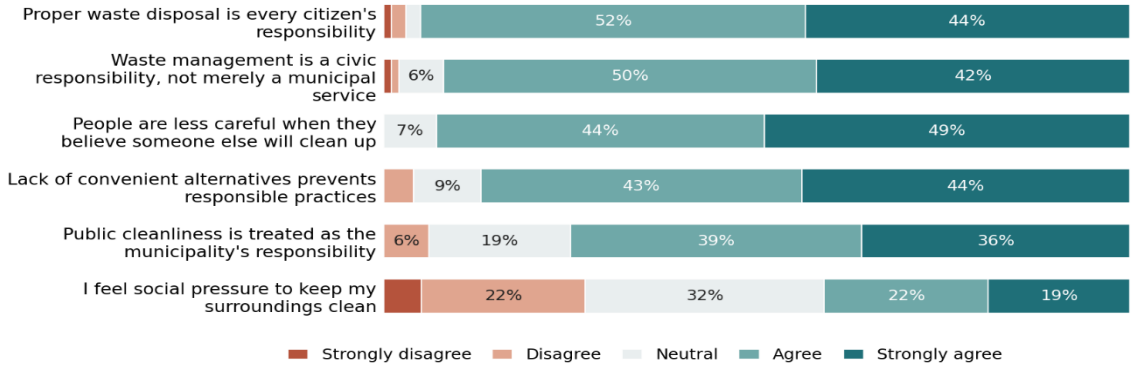


Source: Primary survey data. Rows are normalised to 100%; labels below 6% are not shown.

5.4 Civic Responsibility and Social Attitudes

Figure 10. Level of agreement with statements on civic responsibility and social influence. The findings demonstrate a strong sense of civic responsibility towards waste management. A combined

96% of respondents agreed or strongly agreed that proper waste disposal is every citizen's responsibility, while 92% supported the view that waste management is a civic responsibility rather than merely a municipal service. Similarly, 93% agreed or strongly agreed that people tend to be



less careful when they expect someone else to clean up. In addition, 87% believed that a lack of convenient alternatives prevents responsible practices. However, responses concerning social pressure to keep surroundings clean were more varied, with 41% agreeing or strongly agreeing, 32% remaining neutral, and 27% disagreeing or strongly disagreeing. Overall, the findings suggest that respondents recognise their civic responsibilities, but translating these attitudes into consistent practices may depend on municipal facilities, convenient alternatives, and social influences.

Source: Primary survey data. Rows are normalised to 100%; labels below 6% are not shown.

6. Findings

6.1 Household Waste Management Practices

The findings show that household waste management varies with awareness, collection arrangements, and individual participation. Most respondents (76%) belonged to urban areas, while 13% were from semi-urban and 11% from rural areas. Although 49% were very or somewhat familiar with municipal solid waste management, 35% had only heard of it, suggesting differences in the depth of awareness. In terms of municipal collection, 53% reported alternate-day collection and 23% received daily services. Segregation practices varied considerably. While 34% consistently segregated waste and 23% did so often, 18% never practised segregation. Food and kitchen waste emerged as the most common household waste (98%), followed by paper and cardboard (74%) and metal (64%).

6.2 Waste Disposal and Recycling Practices

The responses reflect a combination of municipal collection and household-level waste recovery. Around 41% practised home composting, while 37% handed kitchen waste separately to municipal

collectors. However, 36% reported that kitchen waste was mixed with other waste before collection.For recyclable materials, 47% depended on municipal collectors, while 45% sold them to scrap dealers. This highlights the role of both municipal services and informal recycling channels in household waste recovery.

6.3 Sustainable Consumption Practices

Respondents showed a propensity towards sustainable consumption regarding food waste, product repair and replacement, and reduction of disposable products. Around 82% of respondents reported that they consistently tried to avoid food waste, while 61% reported that they consistently tried to avoid single-use plastics. About 68% of respondents said that they would consider the necessity of a product before purchasing and would prefer repairing a product rather than replacing it.Although a few select reported that they use reusable shopping bags and bottles, these responses indicate that sustainable choices are not integrated into the daily lives of all the respondents.

6.4 Environmental Governance and Citizen Responsibility

The responses reflect a sense of civic responsibility toward waste management. About 96% of respondents believed that the proper disposal of waste is the responsibility of every citizen, and 92% of respondents believed that waste management is a civic responsibility rather than a municipal service.However, 87% of respondents also believed that the absence of easier alternatives made it hard to practice environmental responsibility. Also, 75% of respondents believed that it is the primary responsibility of the municipality to keep public areas clean. These respondents believed that it is the responsibility of the individual to practice environmental governance within the limits of the framework and capacity of municipal environmental governance.

7. Discussion

The results demonstrate that municipal solid waste management is more than the usual concerns with collection and disposal. It includes household consumption and behavioral choices, institutional arrangements, and the nature of citizen–municipality interactions. Household-level composting and recycling illustrates the importance of decentralized waste recovery. However, the absence of uniformity in segregating waste, coupled with the irregular collection by municipal workers underscores a vital citizen-participation and institutional-responsiveness nexus. While a large portion (57%) of the respondents indicated that they segregate waste either always or often, only a little over 40% indicated that municipal workers consistently respected waste segregation. This shows that household participation is highly reliant on the dependability of municipal service

delivery. The adoption of sustainable consumption practices, particularly food-waste avoidance, product repair, and reduced reliance on single-use plastics indicate that behavioral changes are critical in influencing households to modify their practices in addressing waste at source. At the same time, the influence of basic needs, advertising, and social factors indicates that consumption decisions are shaped by considerations extending beyond individual environmental awareness. One major aspect of the study is the recognition of waste management as a shared civic responsibility. However, dependence on municipal authorities and the constraints arising from lack of alternatives point toward the need to move beyond an exclusively service-oriented approach. Citizen participation must be complemented by accessible infrastructure, consistent collection mechanisms, and institutional accountability.The study takes a 'Beyond the Bin' approach to waste management, particularly regarding the role of local municipalities, the integration of best practices on sustainable consumption and household waste management, as well as the emphasis on social responsibility and responsive institutions. Effective waste governance consequently requires a shift from a predominantly collection-centered framework towards a more integrated and participatory approach to environmental management.

8. Conclusion

Municipal solid waste management cannot be understood merely as a question of collecting, transporting, and disposing of waste. The findings of this study demonstrate that waste management is closely connected with household consumption patterns, everyday behavioural choices, social practices, municipal service delivery, and citizen-institution relationships. The “Beyond the Bin” perspective therefore shifts attention from what happens after waste is generated to the social and institutional conditions that shape its generation, management, and recovery.

The findings indicate that respondents demonstrate a considerable degree of awareness and willingness to adopt sustainable practices, particularly in relation to avoiding food waste, reducing single-use plastics, repairing products, and participating in waste segregation and recycling. At the same time, inconsistencies in segregation and the dependence on municipal collection systems reveal that individual responsibility alone cannot ensure effective waste management. The gap between citizens’ willingness to participate and the availability and reliability of supporting services highlights the importance of institutional responsiveness. The study also reinforces the idea that effective waste governance requires shared responsibility. Citizens have an important role in responsible consumption, segregation, reduction, reuse, and recycling, while municipalities must provide accessible infrastructure, reliable collection, effective enforcement, and accountable

service delivery. Informal recovery mechanisms and community participation also need greater recognition within waste-management systems.

Overall, the study argues for a shift from a predominantly collection-centred approach towards an integrated model of environmental governance that addresses waste prevention, sustainable consumption, resource recovery, citizen participation, and institutional accountability together. Moving "beyond the bin" therefore requires not only better waste-management systems but also changes in consumption practices, institutional arrangements, and relationships between citizens and public institutions. Such an approach can contribute to more sustainable, participatory, and responsive municipal solid waste governance.

References

Wilson, D. C., Rodic, L., Modak, P., Soos, R., Carpintero, A., Velis, C. A., Iyer, M., & Simonett, O. (2015). *Global waste management outlook*. United Nations Environment Programme & International Solid Waste Association.

Widyaningsih, N. L., Tjiptoherijanto, P., Widanarko, S., & Seda, F. S. S. E. (2015). Linkage model between sustainable consumption and household waste management. *Procedia Environmental Sciences, 28*, 195–203. https://doi.org/10.1016/j.proenv.2015.07.026

Chandrappa, R., & Das, D. B. (2012). *Solid waste management: Principles and practice.* Springer.

Monni, S., Pipatti, R., Lehtilä, A., Savolainen, I., & Syri, S. (2006). *Global climate change mitigation scenarios for solid waste management* (VTT Publications No. 603). VTT Technical Research Centre of Finland.

Cook, E., Ionkova, K., Bhada-Tata, P., Yadav, S., & van Woerden, F. (2026). *What a waste 3.0: Global snapshot of solid waste management toward circularity until 2050*. World Bank.

Steffen Lehmann (2011) "Resource Recovery and Materials Flow in the City: Zero Waste and Sustainable Consumption as Paradigms in Urban Development, "Sustainable Development Law & Policy: Vol. 11: Iss. . 1, Article 13.

Evans, J., & Thomas, C. (2024). *Environmental governance* (2nd ed.). Routledge. https://doi.org/10.4324/9781003334699

Ministry of Environment, Forest and Climate Change. (2026). *Solid Waste Management Rules, 2026* (S.O. 388(E)). Government of India.

Central Pollution Control Board. (2024). *Annual report 2023–24 on implementation of Solid Waste Management Rules, 2016*. Ministry of Environment, Forest and Climate Change, Government of India.

Khan, A., Mishra, S., & Singh, P. (2025). *Tailoring solid waste management in India: Learnings from cities with a million-plus population*. Council on Energy, Environment and Water.

Maity, S. K. (2018). Importance of municipal solid waste management. *International Journal of Advanced Engineering Research and Science, 5*(5), 361–363.

Mandpe, A., Paliya, S., Gedam, V. V., Patel, S., Tyagi, L., & Kumar, S. (2023). Circular economy approach for sustainable solid waste management: A developing economy perspective. *Waste Management & Research, 41*(3), 499–511.

Godfrey, L. (Ed.). (2021). *Waste management practices in developing countries.* MDPI.

Palm, J., & Bocken, N. (Eds.). (2021). *Achieving the circular economy: Exploring the role of local governments, business and civic society in an urban context.* MDPI.

Fidelis, R., Guerreiro, E. D. R., Horst, D. J., Ramos, G. M., de Oliveira, B. R., & Junior, P. P. de A. (2023). Municipal solid waste management with recyclable potential in developing countries: Current scenario and future perspectives. *Waste Management & Research*, 1–21.

Pernebayev, Z., & Aitimbetova, A. (2026). Environmental impacts of municipal solid waste disposal in urban areas: A systematic review of contamination pathways, assessment methods, and mitigation strategies. *Sustainability, 18*(8), 3900.

Srivastava, V., Ismail, S. A., Singh, P., & Singh, R. P. (2015). Urban solid waste management in the developing world with emphasis on India: Challenges and opportunities. *Reviews in Environmental Science and Biotechnology, 14*(2), 317–337.