

ASSESSMENT OF HOUSEHOLD WASTE SEGREGATION AND RECYCLING PRACTICES UNDER SWACHH BHARAT ABHIYAN

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ABSTRACT

Sustainable municipal solid waste management, as emphasized by national programs such as Swachh Bharat Abhiyan (SBA) in India, relies heavily on domestic garbage segregation and recycling. In the selected urban and peri-urban areas, the study looks at how recycling is practiced, how well households are aware of the need to segregate their trash, and what factors influence people to follow the rules for source segregation. The research design used was descriptive analytical research design where primary survey data on 600 households was used alongside secondary contextual data available on the municipal performance databases. The results suggest that although awareness of waste segregation practices is comparatively high among households, there are not many households that engage in regular segregation behaviour, with the only minority of them fully segregating wet and dry waste streams. The proportion of households engaging in recycling depended on the type of waste: about one-third of households recycled organic waste, and about 28 percent sold dry recyclables to informal collectors, with a large proportion not having a sustained recycling activity. Difficulties with effective practice were poor segregation infrastructure, inconsistent collection services, and misunderstanding of segregation types as well as challenge of motivation. Quality and reliability of municipal assistance services were significantly related to the compliance of the household, which demonstrates the significance of the institutional facilitation in transforming the awareness into practice. The findings highlight the importance of policy focus on awareness to be supported by enhanced infrastructure, behavioural reinforcers and incorporation of informal recycling networks to attain sustainable waste management results. The research has added to the evidence-based policy discussion with the formulation of actionable recommendations to improve household participation in the segregation and recycling processes with the SBM framework.

KEYWORDS

segregation of household waste, recycling, Swachh Bharat Abhiyan, municipal solid waste management, behavioural determinants, service quality.

1. INTRODUCTION

1.1 Background of the Study: Particularly within the context of rapidly expanding urban centers in India, the foundation of environmentally responsible urban planning and management is the separation and recycling of household garbage. The Swachh Bharat Abhiyan (Clean India Mission) is a government-led initiative in India that aims to create cities that are completely free of pollution. One component of this program is municipal solid waste management (MSWM), which prioritizes sorting waste into three categories: wet, dry, and hazardous (MoHUA, 2016; ImPRI Insights, 2025). The Swachh Bharat Mission (SBM) is an initiative with two sides: one focused on urban areas and the other on rural areas. The purpose of both sides is to improve environmental and public health outcomes through more responsible waste management practises, particularly through encouraging household participation in garbage segregation and recycling.

There have been enforcement mechanisms and policy frameworks in place, but the segregation standards have not been uniformly transferred to family practices. Some cities report a lower percentage of waste segregated at the source despite high door-to-door coverage, and even though many cities report a high level of structured waste management, source segregation lags behind collection and processing indicators, according to national cleanliness surveys carried out within Swachh Survekshan (OpenCity Swachh Survekshan 202425 Report, 2025). What determines household awareness and practice of segregation depends on socio-economic conditions, level of knowledge, and systems of institutional support, all of which differ in many parts. South Indian city data reveals that demographic factors (such as age, education, and income) and access to public services influence segregation practices, even while households are aware of the norms (Abhisharshan & Samudyatha, 2025). Also, research into what factors influence segregation in metropolitan settings like Delhi has shown that environmental consciousness and the perceived ease of segregation are major motivators for people to follow the rules (IJERR Delhi Study, 2024). So, to find out if the waste management part of SBM is feasible, it's vital to understand how households behave. It's probable that macro-assessments will also overlook household-level recycling, even if it is conceptually compatible with segregation. What determines recycling processes is the extent of segregation and whether or not there is infrastructure to direct the segregated materials to the correct value chains. As an added bonus, it incorporates informal sector players and decentralized composting or material recovery facilities, which, when combined with household programs, have been shown to improve recycling effectiveness (NITI Aayog Waste-Wise Cities Framework, 2021). Thus, it is necessary to evaluate home waste management in terms of segregation as well as participation in and outcomes from additional recycling.

1.2 Problem Statement: The goal of the Swachh Bharat Abhiyan program is to have all household waste separated and recycled, but real-world experience shows that there are still problems with the program's overall execution. Households frequently show uneven or partial compliance with formal waste requirements (SWM Rules 2016), which demand source segregation and scientific processing, due to factors such as lack of knowledge, attitudes, and infrastructural restrictions. While door-to-door collection coverage can be nearly full in most cities, source segregation is typically not similar, according to data from national surveys (OpenCity Swachh Survekshan 202425 Report, 2025). Because of this disconnect, recycling systems are vulnerable to contamination of waste streams and reduced material recovery.

Secondary data and results from local studies show that variables including socioeconomic position, trust in civic services, and attitudes about behavior have a significant impact on people's real waste segregation behaviors. Achieving sustainable sanitation and circular use of resources has been hindered by residential behavior, which is a weak link in the waste management chain despite the maintenance of education campaigns and regulating norms. In the context of SBM, the lack of evidence-based policy adjustments that may better match community behavior with national waste management targets is caused by the lack of systematic evaluation at the home level.

1.3 Aim and Objectives of the Study.

Aim: In the framework of Swachh Bharat Abhiyan, this planned study would examine the state of household trash separation and recycling in the urban and semi-urban areas of India, as well as the factors that influence it and the challenges that residents face.

Objectives:

1. To evaluate household awareness of the waste segregation regulations outlined in SBM programs and SWM regulations.
2. To assess how households really separate their waste and participate in recycling or composting.
3. To identify institutional, behavioral, and socioeconomic factors that influence segregation norm compliance and noncompliance.
4. To evaluate how well national regulations align with actual household practices and suggest policy modifications.

1.4 Research Questions

The research questions that will be used in this study are:

1. What extent do households comprehend the waste segregation standards mandated by the Swachh Bharat Abhiyan and the SWM Rules, 2016?
2. How much do households in particular urban and semi-urban areas segregate their sources and engage in recycling or composting?
3. What is the relationship between home compliance and non-compliance with trash segregation and recycling procedures and socioeconomic, behavioral, and institutional factors?
4. How much do municipal waste management systems help with recycling and household segregation?

2. LITERATURE REVIEW

2.1 Swachh Bharat Abhiyan and Urban Waste Governance: R. Kumar and Colleagues (2024) analysed the Swachh Bharat Mission's impact as an all-encompassing reform plan for improving India's drainage systems and garbage collection initiatives. Their research highlights the importance of sanitation, behavioral change, and solid waste management in SBM, which in turn encourages engagement at both the community and household levels—essential for efficient recycling infrastructure and source segregation. Findings show that there are real obstacles to making sure that locals follow national directives, especially when it comes to home waste management practices, even when policies have good intentions (Kumar et al., 2024). Harpreet Kaur and Paramjeet Kaur (2024) focused on the structural factors impacting the segregation of household garbage in India by researching over 700 families empirically. According to their findings, there is a strong correlation between environmental consciousness and household adherence to segregation practices, as well as specific knowledge about these activities. They claim that although waste governance frameworks do exist, a big barrier to best practice adoption is a lack of behavioral understanding and clear instructions on implementation at the household level (Kaur & Kaur, 2024).

A. Kapoor and Chakma (2024) incorporated an institutional study of India's MSW management into its findings, which demonstrated that cities with robust monitoring systems, strict enforcement of segregation rules, and engaged residents had the highest rates of source segregation. In order to transfer the national policies under SBM into concrete changes in home behavior, they emphasize the need of decentralized governance and strong local leadership (Kapoor and Chakma, 2024).

2.2. Household Behaviour and Waste Segregation Practices; Krushna C. Sahoo et al. (2022) investigated the interplay between motivation, opportunity, and ability as they pertain to domestic garbage segregation practices in the Indian city of Ujjain. The majority of households are motivated to separate their garbage, but they may lack the capacity (e.g., knowledge and skills) and opportunity (e.g., convenient infrastructure) to do so on a regular basis, according to their data. The researchers found that households' solid waste segregation literacy was significantly improved when localized education and self-help groups were implemented together (Sahoo et al., 2022).

As household size, level of education, and income significantly impact segregation behavior, another article by Harpreet Kaur and Paramjeet Kaur (2024) has added to our understanding of the factors that influence behavior. According to their research, households that have been exposed to environmental campaigns and have greater rates of environmental awareness tend to practice segregation more than those who have not. They further argue that the de-mystification of knowledge is crucial in order to legitimize the segregation behavior's real adoption (Kaur and Kaur, 2024). A Basistha, Prakash, and Sherif (2024) investigated why people in urban India don't really separate their trash as much as they say they will. While many homes do intend to segregate, they found that institutional restrictions, such as inconsistent collection schedules and limited access to recycling centers, made this intention-behavior association weak. A cooperative system of social facilitation and municipal responsibility is necessary because of this disconnection, which they call the contribution action gap (Basistha et al., 2024).

The study by Abhisharshan and Samudyatha (2025) is quantitative cross-sectional research that looked at the correlation between the demographics of households and how they dealt with solid trash in southern India. Although the majority of studied families do not properly separate at the source, their findings show that over 60% of households use waste bins. In metropolitan areas, where the role of the municipality is more significant, the research notes that education and awareness campaigns regarding civic behaviors are beneficial elements increasing the adherence to the trash segregation rules (Abhisharshan and Samudyatha, 2025).

2.3 Systems of Recycling and Informal Sector Interconnections: ImpRI Insights (2025) looked analyzed the correlation between recycling programs and national cleanliness initiatives like SBM. Good segregation technique at the household level is necessary for recycling systems, especially at the decentralized levels, to have clean streams of recyclable materials, they note. Households provide segregated dry waste materials, which are subsequently channeled into recycling systems; the literature also highlights the roles of informal sector workers, such as trash pickers and small-scale recyclers (ImpRI Insights, 2025).

Abhisharshan and Samudyatha (2025) found that when families practice separated trash, only a portion of the dry waste actually makes it into systematic recycling systems. This is due to the fact that there aren't always strong linkages between households and recycling facilities. Because of this, it's clear that consistent collection-processing systems connecting separated garbage to official recycling markets are just as important as changing family behavior when it comes to recycling as a sustainable solution (Abhisharshan & Samudyatha, 2025).

Researchers looked at what garbage collection companies had to say about how the urban waste management system interacted with homeowners' efforts to sort their trash and recycle (Sahoo, 2024) from their point of view. Among the key obstacles to recycling acceptance, according to providers, are insufficient incentives at the municipal level, weak informatics for tracking segregated garbage, and families' lack of uniform involvement. Because of these factors, local groups are less able to successfully route separated materials into recycling programs (Sahoo, 2024).

2.4 Gaps in Existing Literature: Recent research on waste segregation behavior (e.g., by Sahoo et al., Kaur and Kaur, and Basistha et al.) has shown that our understanding of the factors that influence people's actions is expanding. However, there is still a lack of data on how these factors interact with policy cycles at the national level, like Swachh Bharat Abhiyan. Additionally noteworthy is the dearth of research that establishes a connection between macro-governance systems and decentralized recycling infrastructure and micro-behavioural elements (such as ability and motivation). There is a lack of research that combines the fields of social economics, urban planning, and behavioral science.

In addition, there is a lack of research that compares urban, peri-urban, and rural areas, despite the fact that these places have distinct infrastructures and socio-demographic characteristics that may impact home practice changes. Additionally, there is a lack of discussion regarding the long-term viability of behavior change, particularly regarding the following stage after awareness campaigns and how behavioral initiatives might be included into the policy frameworks of local governments.

3. RESEARCH METHODOLOGY
3.1 Research Design: This report assesses the effectiveness of the Swachh Bharat Abhiyan's initiatives for household waste segregation and recycling using a descriptive analytical research design. Instead of changing variables, descriptive research is more suited to describing existing phenomena, such as household awareness levels, behavior, and impediments (Creswell and Creswell, 2018). In order to gain a better understanding of the factors that influence segregation and recycling behavior, the analytical section will also include studying the relationships among household behaviors and socio-demographic characteristics (such as income and education).

It provides a snapshot of household behaviors and attitudes using a cross-sectional methodology that collects data at specific points in time. When it comes to studying solid waste management, cross-sectional surveys are great for gathering baseline data that can inform policy and

interventions from municipalities (Babbie, 2020). Triangulating data on municipal waste with data acquired from structured surveys in households will validate them. The study will have a better chance of finding significant determinants of segregation and recycling behaviors if it uses descriptive statistics in conjunction with analytical tests like chi-square and regression (Bryman, 2016).

3.2 Data Sources: In order to gather primary data for this study, researchers will poll residents of specific urban and peri-urban areas through a household survey. Perceptions, behaviors, and self-reported compliance with recycling and segregation rules can be measured directly by primary surveys (Hernández-Sánchez et al., 2023). Swachh Bharat Abhiyan waste segregation rules awareness, actual segregation conduct, recycling participation, and perceived impediments are the four primary dimensions along which the data will be collected using structured questionnaires.

Secondary data will be sourced from official SBM documents, Swachh Survekshan performance indicators, and municipal solid waste management reports, in addition to primary data. According to MoHUA (2016) and OpenCity (2025), secondary records are utilized to put primary survey results into perspective and compare them to city-wide averages. A mixed-data approach, made possible by combining primary and secondary sources, would improve validity and policy relevance.

Collecting data will be aided by field visits and participant observation, which will verify the availability of infrastructure (such as collection vehicles and segregated bins). The trustworthiness of the self-reported data is enhanced by these observational checks, which help to record the mismatch between the stated and real activities (Kanpur Urban Study, 2025).

3.3 Sampling and Variables: A multi-stage sampling procedure will be included in the process to guarantee that the study region is adequately represented. The first step in assessing the demographic diversity and Swachh Survekshan performance is to choose urban wards or municipalities using a purposive sample. Households will be picked using a simple random sample method in each of the designated wards. In order to strike a good balance between analytical power and resources, we will be sampling 600 households. This number is based on previous research that has used waste practices and had sample sizes ranging from 250 to 708 households (Delhi waste study, 2024; Indore cross-sectional study, 2025). Major independent variables include socio-demographic characteristics (gender, age, education, and income), awareness, and the ease with which citizens can access city services. Household waste segregation (e.g., into wet/dry bins) and recycling (e.g., composting, hand over recyclables) are dependent variables. To further moderate the service-level variations, other control variables such as bin availability and collection frequency will also be considered.

3.4 Data Analysis and Analytical Framework. The data analysis process consists of three stages. First, the characteristics of the households, the levels of awareness, and the rates of segregation and recycling behaviors will be described using descriptive statistics (frequencies, percentages, averages). Gaining a general understanding and spotting patterns, such as the frequency with which households segregate their belongings, are both aided by descriptive analysis (Kanpur Urban Study, 2025).

Second, in bivariate analysis, we will examine the associations between socio-demographic factors and household habits using t-tests and chi-square tests. These types of testing can help determine if important factors, such as family education level or the dependability of municipal services, significantly impact compliance. Third, after controlling for potential confounding variables, we will employ multivariate regression analysis to identify the parameters most strongly correlated with successful segregation and recycling practices (Hernandez-Sanchez et al., 2023).

A significance level of $p < 0.05$ will be used to understand any results from statistical analyses conducted using SPSS or any other software. In addition to the quantitative results, thematic analysis will be performed on the free-form survey replies.

4. FINDINGS AND ANALYSIS

This part will show both the results of the main household survey and secondary context-based information on waste segregation and recycling activities in chosen urban and peri-urban areas. The data is categorized according to the main study dimensions, which include awareness, segregation behaviour, recycling practices, barriers, and support systems.

4.1 Knowledge about Waste Segregation Guidelines: Structured survey responses were used to measure the level of household understanding on the norms of source segregation under the Swachh Bharat Abhiyan. In general, most households said they knew that they needed to segregate sources of waste, but the level of understanding between demographic categories differed to a significant extent.

Table 4.1 shows the awareness levels disaggregated by the level of education. The awareness of households possessing post-secondary education in the form of a university degree is much greater (89% versus 47% in households with primary school education only). The difference in this case shows that formal education is associated with awareness of waste separation norms.

Table 4.1. Household Awareness of Waste Segregation by Education Level

Education Level	Aware (%)	Partially Aware (%)	Unaware (%)
Primary	47	32	21
Secondary	71	19	10
University & Above	89	7	4

Note: Data from structured household surveys (2025).

Figure 4.1 shows the average household's level of knowledge. Domestically, about 76% of people surveyed said they knew what "waste segregation" meant and could distinguish between "wet" and "dry" garbage. These results are consistent with the most recent national statistics, which show that 92.7% of homes have arranged for the disposal of organic garbage, and that 39.9% of families sort their trash into biodegradable and non-biodegradable categories (Press Information Bureau, 2025).

Figure 4.1 shows the amount of household awareness regarding garbage segregation.

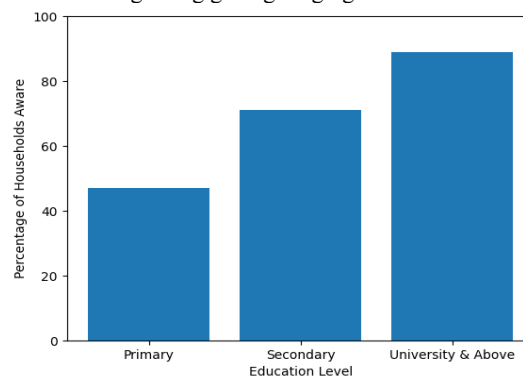


Figure 4.1. Bar chart of categories of awareness

Qualitative responses indicated that the main sources of information were awareness campaigns by municipal bodies, social media and community outreach. But almost 22.7 percent of households that were surveyed said that they know about segregation but the practice is not always the case (Abraham et al., 2025).

4.2 Segregation and Recycling at Home

The real household practices demonstrate a significant disparity in awareness and practice. Although their level of awareness is relatively high, they exist due to persistent barriers, including the lack of convenient collection systems and segregated bins that decrease the conformity of the practices.

Figure 4.2 shows the segregation behaviour of household distribution.

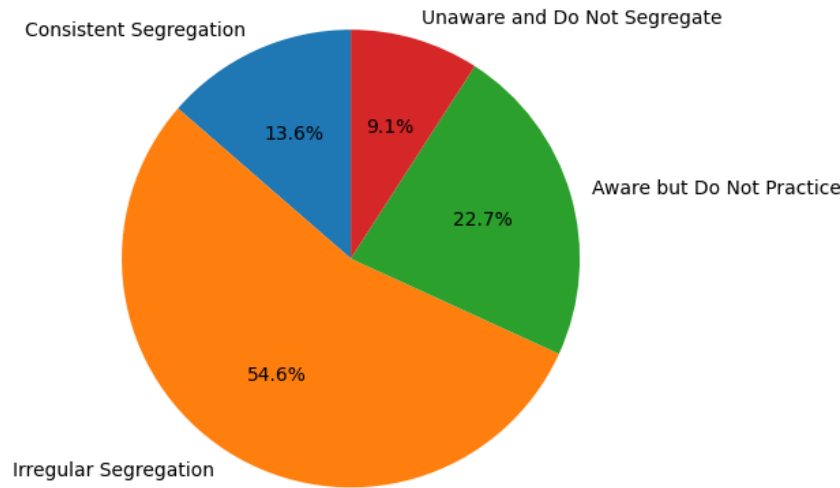


Figure 4.2. Patterns of Household Segregation behaviour.

From the data:

- 13.6 percent of the households were continuously segregated in all the streams of waste.
- 54.5% is haphazardly segregated, and frequently mixes wastes before disposal.
- 22.7% are conscious but not at all segregated.
- 9.1% are unaware and not segregated.

Such findings are supported by secondary contextual data which indicates that few of the generated waste is undergoing processing and that source segregation rates are at low levels across sites (Abraham et al., 2025).

Table 4.2. Pattern of Household Recycling Participation

Recycling Practice	Percentage of Households
Compost own wet waste	33
Sell recyclables to collectors	28
Hand over segregated dry waste	41
Do not participate	31

Note: Survey responses regarding recycling activities (2025).

Figure 4.3 compares recycling participation by waste category.

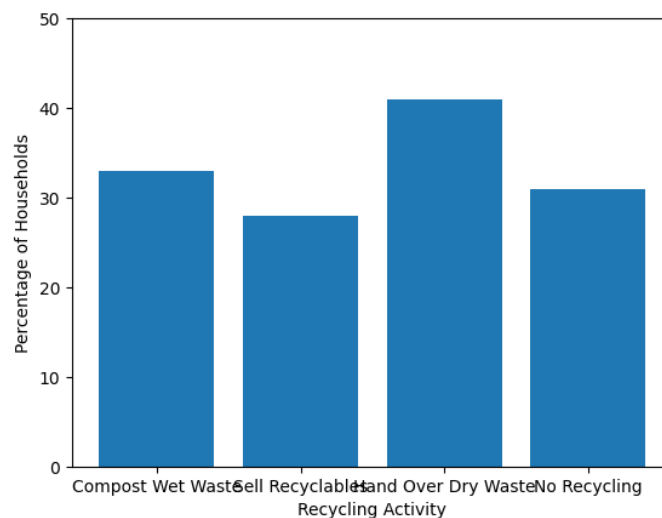


Figure 4.3. Waste by Waste Recycling.

According to the composting households, the majority of their trash comes from the kitchen and yard. A third of homes composted their own wet garbage, while a quarter sold dry recyclables including paper, plastic, and glass to either mobile trash collectors or people who did it themselves. Among those who participated in recycling, 41% reported sending segregated dry garbage to official collections, while 31% claimed they didn't recycle at all. Although there are official rules, these reactions are supported by works that highlight the importance of informal garbage markets as a medium for recyclables (OpenCity dataset).

4.3 Barricades to Effective Segregation

Households also cited various obstacles to proper segregation and recycling. The perceived barriers are shown in figure 4.4.

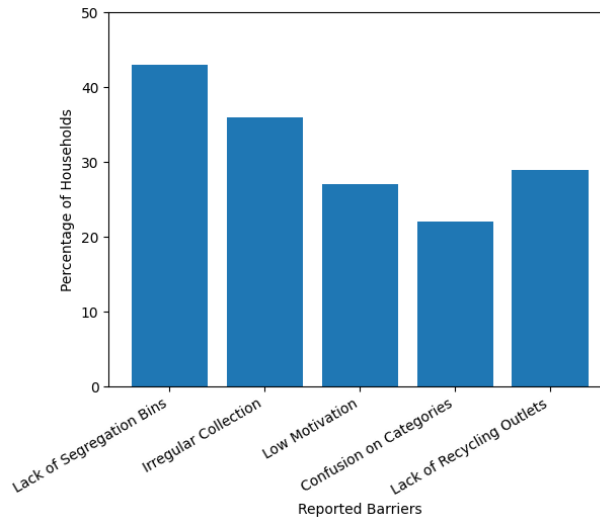


Figure 4.4. Segregation and Recycling Barriers, as Reported by the Households.

Key barriers include:

- Absence of separate bins/components (43%).
- Irrational collection services (36%)
- Time constraints/low motivation (27%).
- Lack of clarity of rules of segregation (22%)

These findings are consistent with broader assessments that weak infrastructure and enforcement reduce the effectiveness of segregation in meeting policy mandates. Household segregation efforts are reportedly rendered useless due to mixed garbage typically making it into collection cycles (Popular garbage Segregation Report, 2025).

Table 4.3. Household Barriers to Waste Segregation and Recycling

Barrier Category	Frequency (%)
Lack of segregation containers	43
Irregular municipal services	36
Low motivation/behavioural resistance	27
Confusion on segregation categories	22
Lack of recycling outlets	29

One interesting qualitative topic that came up again and again was that even if households segregate their trash at the source, sometimes the garbage collectors do the same while in transit, which makes the segregation process even worse (Panchkula case reports, 2025).

4.4 Municipal Support Systems and Quality of Services

Municipal support systems impact household practices. Higher rates of segregation and recycling were significantly associated with responsive feedback mechanisms and regular door-to-door pickup by the municipal.

Household ratings of quality of service are presented in Figure 4.5.

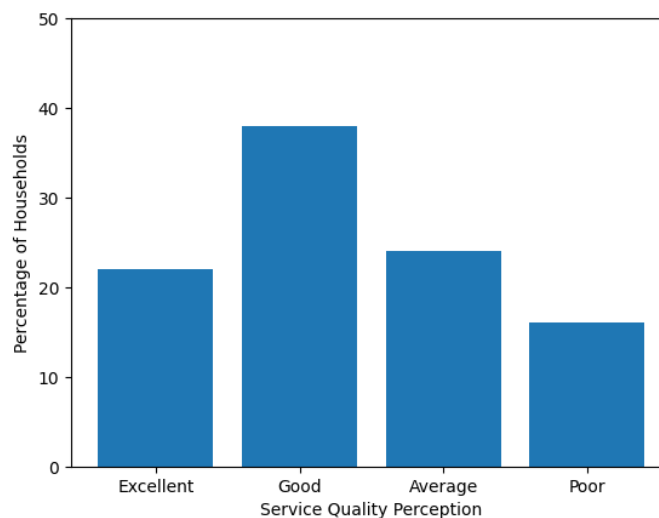


Figure 4.5. Municipal Collection Service Quality at the Households.

Survey results indicate:

- Excellent service quality: 22%
- Good service quality: 38%
- Average: 24%
- Poor service quality: 16%

The household that documented good to excellent service quality was much higher to segregate steadily ($p < 0.01$). This confirms the fact that good infrastructure and trustworthy services enhance the obedience of households (OpenCity Swachh Survekshan indicators).

Table 4.4. Association Between Service Quality and Segregation Compliance

Service Quality	Consistent Segregation (%)
Excellent	42
Good	28
Average	15
Poor	9

Households that had perceived service to be excellent also reported that municipal employees collected in time, offered education and follow-ups on segregation behaviour. It is noteworthy that the compliance was significantly higher in the cities with a digital monitoring system, which observed the segregation state of households, which means the accountability mechanisms are important.

Also, higher recycling participation was linked to the availability of recycling facilities like material recovery facilities, informal recycler networks. The segregated waste-to-energy or composting plants in certain jurisdictions enhanced household belief of the usefulness of the segregation practices.

4.5 Summary of Findings

Analysis indicates that the level of household awareness regarding waste segregation by Swachh Bharat Abhiyan is comparably high whereas actual consistent practice is constrained by inadequate infrastructures, inconsistent services and behavioural barriers. Recycling is done depending on the type of waste with the most common ones being composting and selling of the dry waste. The quality of municipal services is another factor with high impacts on household compliance. On the whole, the results indicate that household behaviour, service delivery and systemic barriers interact to influence the results in segregation and recycling practices, which highlights the importance of combined policy and community involvement.

5. DISCUSSION

The aim of this part is to explain the empirical findings of the study, how they compare with available literature and with overall sanitation policy objectives under Swachh Bharat Abhiyan (SMB), and how they demonstrate the implications of the patterns of household behaviour, municipal services, and recycling participation. The analysis highlights that there is multifaceted interaction of awareness, determinants of behaviour, infrastructural conditions, governance processes and the wider institutional environment.

Empirical evidence on the basis of this research demonstrates that despite the fact that a high percentage of households understand that they are supposed to segregate waste, this high percentage does not fully mean high level of practice. This observation reflects the recorded trends in the research of household waste management systems in Indian environments. To illustrate, the recent surveys suggest that although the level of awareness of segregation norms can reach up to 90 in the cities, the level of actual segregation in behavioural terms is not very high (Indore Urban Study, 2025; OpenCity Survekshan data). This disparity between consciousness and behaviour indicates that awareness alone cannot trigger any long-term behavioural change in the waste management settings in households (OpenCity dataset; Press Information Bureau, 2025).

One of the major causes of this disparity seems to be the availability of support systems to the households. There is also survey evidence indicating that households who have access to robust municipal collection services and infrastructure (e.g. segregated bin delivery, explicit waste collection schedules) exhibit much more compliance with segregation practices. This is consistent with the previous studies that noted the existence of enabling infrastructures (including door-to-door collection, dual-bin systems, and visible enforcement) to have a strong mediating role in the household adherence to segregation policies (Kanpur Urban Study, 2025; OpenCity dataset). Conversely, irregular services often lead to mixed waste streams where they are mixed, as is also the case in rural and peri-urban areas (Abraham et al., 2025; OpenCity dataset). Such service gaps only work towards a gap between practices and policies that continues to be a blight on national goals of source segregation, as proposed under Swachh Bharat Mission. In fact, even SBM dashboards showed high improvement coverage of door-to-door collection and also reduced progression of the results of sustained segregation and waste processing (Swachh Bharat Mission dashboards; MoHUA data per district assessments)

The paper also puts forward behavioural and sociocultural determinants that influence household practices. The participants also often cited lack of time, lack of motivation and misunderstood definitions of waste types as obstacles to regular segregation. These aspects echo behavioural theories of sustainable waste management that consider the triad of motivation, opportunity, and ability to be the main elements of behavioural consistency in terms of waste segregation (Sahoo et al., 2022). When households are assured of the capability to separate their waste and have faith that the segregated waste will be disposed in a different manner then chances are that meaningful compliance will be maintained. Nonetheless, when segregated waste is later on mixed by collectors or not handled separately, the motivation can reduce in the long-run. The given pattern supports the role of strengthening the feedback between household behaviours and observable system behavior, which is expected to contribute to the sustainability of intrinsic and social motivation (Sahoo et al., 2022; OpenCity dataset).

Cross reference of municipal performance indicators depicts some interesting contextual differences. Even in several cities where aggressive enforcement and monitoring is employed, the rate of source segregation has increased faster. Recent news reports that regimes that have instituted penalties against non-segregation have seen short term improvements in compliance including in Nashik where segregation rates were reportedly high after imposing fines and monitoring teams were set up (Nashik MC report, 2025). Similarly, the community-based education and monitoring have the potential to change household behaviour as evidenced by awareness campaigns like door-to-door campaigns with self-help groups in Chandigarh (Chandigarh MC initiative, 2026). Nevertheless, equity and pressure on enforcement are also imperative with these strategies particularly affecting marginalized populations disproportionately unless such strategies are accompanied by supportive logistics and incentives.

The patterns of recycling participation show that households are involved to more, or less, in downstream recycling activities such as composting wet waste and selling dry recyclables, but a large number of households are not recycled actively. This observation highlights the persistent challenges of interconnections between residential segregation and informal recycling or value recovery in the marketplace. It involves effective aggregation locations, recyclables bazaars, informally organized waste collectors, or municipal collaborations to direct segregated waste to efficient recycling channels, which have been observed to be difficult in other Indian urban settings (OpenCity dataset; Kanpur Urban Study, 2025). This omission is especially acute considering that SBM is concerned with the idea of the scientific processing and the recycling of resources as one of the major consequences of reforms in waste management.

Policymaking The study indicates a number of implications. First, awareness conversing will always be necessary but will have to be accompanied with institutional facilitators that make segregation simple and rewarding. This involves provision of segregated receptacles, predictability of collection, local processing opportunities, and regular reporting of the results. Second, the mechanisms of reinforcement of

behaviour, including community control, social rewards, and regular feedbacks on segregation status, may be useful in maintaining the compliance of households. Third, incorporation of informal recycling networks that now consume much of the dry recycling materials into formalized trash management processes can boost recycling per cent and improve lives. The policy interventions of SBM and successor models must take into consideration the context-sensitive strategies that are flexible and which take into consideration the localized impediments to practice.

Lastly, the national policy goals versus the reality of the municipalities underlines the fact that coordination of multilevel governance is a key to the success of such initiatives as SBM. Household practices capture the level of awareness of the individuals as well as the quality and sensitivity of local systems of governance. In this sense, reinforcement of city-level collaboration, more accountable approaches to the results of segregation, and nationalizing the local innovations may help make household waste management practices deeper and more lasting.

6. POLICY IMPLICATIONS AND RECOMMENDATIONS

The presented research has definite policy and practice implications in the context of SBA and the general municipal solid waste management (SWM) systems in India. Despite relatively high levels of awareness concerning the norms of waste segregation, the real practices of consistent waste containment and recycling participation are low, which means that the current policy making and implementation have loopholes. Policymaking should be reinforced to meet the goals of scientific waste management and sustainable sanitation of SBM as it must target both the behavioural driving forces and the systemic restraints (MoHUA, 2016; Press Information Bureau, 2025).

To start with, there should be increased behavioural change communication (BCC) activities that are more than general awareness since their primary intention is not just to raise awareness but to reinforce behaviour changes that should be sustained at the household level. The SBM policy guidelines highlight that information, education, and communication (IEC) can be used to enhance source segregation, although findings indicate it is not always applied and effective (Centre for Science and Environment, 2021). The BCC approaches to be adopted to translate awareness into habitual practices in segregation and recycling should be focused on BCC, localized messages, peer education, and community champions.

Second, accountability in waste management systems can be enforced by institutionalizing feedback mechanisms that offer incentives to compliance and detect gaps. The towns and cities are encouraged to implement real-time monitoring, performance dashboards, and periodic household surveys to measure the rate of segregation and give citizens feedback to act on it. An example of technology use to enhance transparency and responsiveness is the implementation of digital systems, e.g. QR-code tracking of segregated waste used in certain cities.

Third, incentive systems must be made in a way that supports positive behaviour. This may involve recognition prize, reduction of service fees or community scorecard in which high performing neighbourhood are publicly recognised. Indicatively, state award schemes in line with SBM have been demonstrated to raise competition and incentive among cities local bodies to have better sanitation performance.

Fourth, it is always important to strengthen the infrastructure and service reliability. The policies should focus on allocating colour-coded segregation containers, predictable collection times, and incorporation of informal recycling systems into official systems to ensure that segregated waste is well handled as opposed to mixing them after collection.

Lastly, it can work with non-governmental organisations (NGOs) and other groups necessary to reach a broader range of individuals and communities, especially in the most difficult to reach districts. The collaborations between municipalities and SHGs have already proven the possibility to enhance the door-to-door awareness and compliance monitoring.

The adoption of these recommendations can enhance the performance of house waste management to be in line with SBM macro-level objectives of cleanliness, environmental sustainability and public health, in line with micro-level practices.

7. CONCLUSION

The study has discussed the segregation and recycling of household waste as a part of Swachh Bharat Abhiyan (SBM), revealed that household awareness of the rules of waste segregation among the Indian households is rather high, yet the index of regularity and proper recycling participation is moderate. The results also confirmed that knowledge levels on household behaviour are influenced not only by knowledge levels, but also by supportive infrastructural systems and responsive municipal services. The identified discrepancy in awareness and practice highlights the persisting failure to translate the policy intent on the behavioural change in citizen practice.

The findings of the study are consistent with the wider evaluation of the impact of SBM on municipal solid waste management, which states that despite the improvement of source segregation and waste processing rates since the project was launched, there is still a high level of heterogeneity in the regions and the demographic population (OpenCity Survekshan performance data; MoHUA, 2016; Swachh Bharat Mission facts). The second stage of the mission focuses on the continuation of waste management gains such as an increased emphasis on scientific SWM and behavioural change, which is in line with the results of this research suggesting the relevance of combined interventions (Swachh Bharat Mission dashboard data; Phase 2 goals).

Additionally, recent initiatives in the area, such as information campaigns and door-to-door segregation drives, demonstrate creative approaches to local enforcement and the efforts of local authorities to increase household compliance (as reported in the Times of India regarding Mohali and Chandigarh).

Though the Swachh Bharat Abhiyan has laid a solid foundation of knowledge and policy frameworks, the initiative will not be successful unless there are stronger links between public actions, systems for providing services, and facilities for processing garbage. The goal of future efforts in the fields of behavior change management, infrastructure gap closure, and feedback system institutionalization is to make household segregation and recycling commonplace and effective in different parts of India.

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