To Study the Effectiveness Of Waste Management Practices

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Abstract - Urban India is generating more waste because of a growing population, changing lifestyles, and increased consumption. Waste management is one of the country's biggest environmental challenges. This is mainly due to lack of public involvement, poor segregation habits, and limited infrastructure. National campaigns like Swachh Bharat Abhiyan have raised awareness, but effective practices at the household level still fall short. This research paper analyzes public attitudes, awareness, and participation in responsible waste management. We gathered primary data from 100 residents in Sonipat, Haryana, using structured questionnaires and also interviewed waste collectors and municipal workers. The findings show that while 88% of respondents know about waste segregation, only 43% practice it consistently. Younger and more educated individuals were more willing to adopt eco-friendly waste solutions than older age groups. The study concludes that effective waste management needs motivation, infrastructure improvements, incentives, and community collaboration. Policy makers, NGOs, and local authorities should promote technology use, decentralized composting, and structured awareness programs to turn knowledge into long-term action.

Keywords - Waste Management, Public Attitude, Urban Sustainability, Waste Segregation, Behavior Change, India, Composting.

I. INTRODUCTION

India produces over 160,000 metric tons of solid waste every day, making it one of the highest in the world. Rapid migration to cities, industrial growth, and changing consumption habits have increased the amount of municipal solid waste. Government initiatives like the Swachh Bharat Mission (2014), Solid Waste Management Rules (2016), and Smart Cities Mission aim to improve city cleanliness. However, waste processing struggles in India because of poor segregation, lack of accountability, and public negligence.

Effective waste management relies on not only government systems but also responsible behavior from citizens. There is a gap between awareness and action; households recognize environmental issues but are slow to adopt daily practices like segregation, composting, and reducing plastic use.

This study focuses on behavior regarding waste management and looks at public attitudes in urban and semi-urban areas of Sonipat, Haryana.

II. LITERATURE REVIEW

1. Chennai gated communities (2020)

Residents' attitudes toward SWM were positively associated with behavioral intentions; informal waste pickers play a vital role in recycling infrastructure
2. Bhopal urban households (May 2024)
Only ~52% aware of SWM basics;   ~78% understood segregation vs.   ~28% aware of reuse. Half segregate regularly; ~65% willing to pay extra for better services
3. Delhi municipal consultation (June 2025)

Over 2,700 citizens voiced concerns over infrastructure gaps in segregation, bins, collection. Only   39% find daily segregation practical;   ~49% support user fees
4. Ranchi inner lanes (June 2025)
Residents stressed lack of dustbins in high-density neighborhoods, leading to dumping and health risks
5. National trend via Gallup NSSO (2018)
Nearly 48% disposed of waste openly; 58% lacked garbage collection services—revealed   stagnant or worsening SWM since 2012
6. Delhi UGC study (2023) – Chandigarh conference
Examined public willingness to pay (WTP) for treatment plants;   explored compensation for polluted environments, linking attitude to   livelihood quality

7. Bhopal survey (May 2024)	
65% of households willing to pay extra; higher awareness correlated with higher WTP	
8. Electronic waste recycling intention (2023)	
Using TPB framework, found that attitudes, social norms, and perceived control predicted e-waste recycling intentions in India	
9. West Bengal HCWs during COVID-19 (2021–22)	
43% of healthcare workers showed excellent knowledge; ~98% held favorable attitudes, but knowledge- practice gaps remained	
10. AIIMS Mangalagiri (Dec 2020– Jan 2021)	
Half had favorable knowledge; ~67% agreed BMW is needed for infection control, yet actual practices lagged—training needed	
11. Swachh Bharat awareness (urban Jodhpur, PMC)	
Among 400 residents, ~95–97% had heard of SBM; however, many couldn't identify the responsible ministry or understand deeper goals	
12. Norm-based open defecation intervention (Tamil Nadu, 2023)	
A social-norms campaign increased willingness to pay for ODF neighborhoods and led to higher toilet usage—emphasizing community expectations.	
13. Let's Do It! India & The Ugly Indian (2020–2023)	
Volunteer-driven street cleanups and TereBins improved public attitudes through grassroots engagement	

14.IoT smart bins acceptance study (late 2024)
Survey showed community receptivity to smart bins and apps— suggesting positive attitudes toward tech-enabled SWM
15.Plastic upcycling in Dharavi (2023)
Local women repurpose plastic waste into crafts—attitudes framed by a sense of empowerment and environmental stewardship
16.Lucknow PG Residents (2020)
Among postgraduate residents in a tertiary hospital, 72% had average BMW knowledge, positive attitudes, but only average in practice— emphasizing the need for targeted training programs
17.Nursing Staff at AIIMS Jodhpur (2019)
Healthcare Workers in Northeast (2021): Only 23% performed good BMW practices despite variations across roles—highlighting gaps even when attitudes are positive .
18.Coimbatore Women (2022)
A KAP study among 400 women showed age, income, and occupation significantly influence waste attitudes and behaviors— echoing socio-demographic patterns .

19.Kolhapur Rural Households (2022)	
	Surveying a rural area, the study underscored the need for public education, as inadequate awareness contributes to improper disposal .
20.Northern Kerala Households (2018)	
	Among 400 rural households, attitudes toward waste management were positive, but actual engagement was weak—suggesting interventions focused on motivation .
21.IIT Roorkee Campus (2019)	A case study revealed disorganized waste protocols on campus; authors called for awareness programs and infrastructure to achieve zero-waste goals .
22.School Students (2021)	Survey across urban/rural schools showed that while 80% recognize collective responsibility, lack of systems (e.g., segregation facilities) dampens sustained practice .
23.National Overview (2024)	India became the world's third-largest e-waste producer (~2 million tonnes annually), with rapid growth in IT device disposal—suggesting increasing need for behavioral and policy research .

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where public attitude can be influenced for better waste handling practices.	

Objectives of The Study

Assess awareness of waste management in urban & semi-urban areas

Understand public attitudes on segregation, recycling & disposal

III. RESEARCH METHODOLOGY

This study uses a descriptive research design focused on behavioral analysis. We distributed a structured questionnaire to 100 respondents in Sonipat using stratified sampling across different residential areas. The survey covered demographics, waste habits, and composting attitudes.

We also conducted semi-structured interviews with 15 individuals, including waste collectors, members of Resident Welfare Associations (RWAs), and municipal workers. We analyzed the data using descriptive statistics and qualitative thematic interpretation. The target group included students, homemakers, employees, and business owners. We ensured ethical considerations, such as confidentiality and informed consent.

Data Analysis

Demographics: 55% male, 45% female; 93% under 30 years old. Awareness of waste management concepts: 88%. Despite high awareness, only 43% practice segregation consistently, while 48% do not segregate at all. 72% expressed a willingness to adopt composting or use modern waste solutions. School and college students showed the most interest in eco-friendly behavior. Older respondents cited time limits and lack of space as barriers.

Key Observation: A

significant gap between knowledge and action is shaped by convenience, infrastructure, and ingrained habits.

Key Findings

Awareness does not yet translate into sustainable actions.
While a large number of respondents show good awareness about environmental issues and the importance of waste segregation, their knowledge often does not get translated into steady day-to-day practice. The gap between understanding and action has emerged as a significant barrier to effective waste management. Infrastructure gaps, in terms of lack of separate bins and irregular waste pickups, discourage adoption.

The inadequate availability of colour-coded bins, community collection points, and timely door-to-door services is reported by many households. This makes it inconvenient on the part of the people to segregate waste properly and often pushes them back toward mixed waste disposal.

Younger people are more

motivated to adopt environmentally friendly behaviors. The survey shows that youth are more willing to adopt sustainable behavior, try out green alternatives, and engage in environmental activities. Their increasing interest can serve as a critical catalyst towards community-wide behavioral change.

Respondents have faith in government programs but would expect better on-ground implementation. While people appreciate government-led campaigns, policies, and awareness drives, they believe that implementation is inconsistent. They also desire clearer guidelines, stronger enforcement, and greater coordination at the level of municipal bodies with the citizens. Interest in composting is high among gardening households and students. The families involved in gardening, as well as students in groups, have a special interest in composting organic waste.

Composting to them is not only good for the environment but also gives nutrient-rich material to make available to home gardens and school projects. • Incentive-based waste programs are very publicly supported. The respondents show interest in various incentive-based systems, whether discount oriented, tax benefits, recognition programs, or even digital reward points. It increases the willingness to segregate and recycle waste and follow long-term sustainable habits.

Suggestions

Intensify public education campaigns using practical demonstrations.
Hands-on workshops, street plays, school activities, and live demonstrations involving large-scale awareness drives can be carried out to show people how to segregate the waste, compost at home, and reduce single-use plastics. Practical, visual learning helps communities better understand the impact of their actions and encourages long- term behavioral change.

Using color-coded bins and doorstep collection.

This can be further simplified by easy access to clearly labeled, color- coded bins for wet, dry, and hazardous waste. When combined with doorstep collection services, this reduces the burden on households and ensures consistent participation in proper waste disposal practices.

Create local composting hubs and install smart compost machines.

Community composting facilities, fitted with smart compost machines or decentralized mini-processing units, can process organic waste into nutrient-rich compost. This will reduce landfill pressure, foster urban farming, and ultimately result in a circular economy that can
convert organic waste into a valuable resource.

Initiate youth-led volunteer

programs at the community level. Engaging young volunteers in cleanliness drives, rallies for awareness, and waste segregation not only energizes local action but also builds leadership and responsibility among youth. Their enthusiasm can serve as a driving force to mobilize wider community participation.
• Offer incentives, discounts, tax credits, and digital recognition. Therefore, reward- based systems can encourage citizens to pursue sustainable practices. The rewards can be in the form of rebates on utility bills, tax benefits for compliant households, mobile app reward points, or even public recognition through digital badges and certificates. Such initiatives reinforce good behavior and make sustainability more attractive. • Empower women and SHGs to manage composting units. Supporting women-led SHGs through training, resources, and financial assistance would provide livelihood opportunities while strengthening the waste management ecosystem. Their involvement in managing the composting units, recycling hubs, or awareness programs fosters community ownership and ensures long-term sustainability.

IV. CONCLUSION

Waste management is not only a municipal duty but a shared responsibility of all citizens. While the study indicates encouraging trends in mindset, more so among younger people, it also points to clear gaps in behavior and several systemic issues that continue to get in the way of meaningful progress.
For a truly sustainable waste ecosystem, what is needed is strong public motivation, the pervasiveness of efficient technologies, and consistent support from the government. These aspects need to come together in seamless coordination to ensure effective waste reduction, segregation, recycling, and disposal.

Further, with a growing awareness about environmental impacts, the biggest challenge remains in terms of how to translate that awareness into action at the personal level.

People need to be motivated toward reviewing their consumption patterns, adopting more sustainable habits, and engaging in active participation in community-level waste programs. Simultaneously, authorities should work on improving infrastructure, enforcement mechanisms, and promoting innovations that make responsible waste management easy and accessible for all.

Ultimately, awareness needs to be translated into action if we are to build a cleaner, greener, and more resilient future. We can achieve long-lasting change and protection of the environment for future generations through cooperation between citizens, institutions, and technology.

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