International Journal of Economic, Finance and Business Statistics (IJEFBS)
Vol. 3, No. 6, 2025: 377-388

An Analysis of Public Perception and Community Engagement in Municipal Solid Waste Management: A Case Study of Hyderabad District, Sindh, Pakistan

Yufan Qi[1], Shahnaz Bhutto[2]*, Siyu Pan[3], Yue Zhong[4], Abdul Rasool Khoso[5]
School of Public Administration, Hohai University, Nanjing
Corresponding Author: Shahnaz Bhutto shahnaz.socio.95@gmail.com

A R T I C L E I N F O

Keywords: Municipal Solid Waste Management, Community Engagement, Public Perception, Hyderabad, Pakistan

Received: 19, October
Revised: 20, November
Accepted: 30, December

A B S T R A C T

This study investigates the interplay between public perception, community engagement, and municipal solid waste management (MSWM) in Hyderabad District, Sindh, Pakistan by exploring the resident satisfaction with municipal waste services, socio-demographic and attitudinal factors influencing public cooperation, and identifying barriers to effective community participation. Employing a mixed-methods approach, the research integrated a quantitative survey of 200 residents with 5 qualitative interviews. Results revealed a significant service gap, with a low overall perception score of municipal efficiency (mean: 1.89/5). Public trust was critically low, strongly correlating with service satisfaction (r=0.58) and willingness to pay user fees (r=0.41). Higher education levels significantly predicted a greater willingness to segregate waste at source (χ^2=24.87, p=0.0004). Qualitative findings underscored deep-seated frustration with irregular collection, poor municipal responsiveness, and a widespread belief that individual efforts are futile within a broken system. The study concludes that the efficacy of MSWM in Hyderabad is severely undermined not merely by technical deficits, but by a profound disconnect between municipal planning and citizen perceptions, leading to a cycle of distrust and non-cooperation. Therefore, recommendations prioritize bridging this gap by rebuilding institutional credibility through transparent and reliable service delivery, launching targeted education and awareness campaigns tailored to different literacy and socio-economic groups, and fostering participatory governance models that involve residents in waste management planning and monitoring. This integrated approach is essential for transforming public perception and enabling a sustainable, community-supported MSWM system in Hyderabad.

DOI: https://doi.org/10.59890/ijefbs.v3i6.269
ISSN-E: 3025-9959
https://dmimultitechpublisher.my.id/index.php/ijefbs

INTRODUCTION

The management of municipal solid waste (MSW) is one of the most pervasive and complex challenges facing urban centers in the 21st century, particularly in the developing world (Khoso et al., 2025). As global populations increasingly concentrate in cities, the generation of waste accelerates, posing significant threats to environmental integrity, public health, socio-economic development, and overall quality of life (Agbola et al., 2025). Effective Municipal Solid Waste Management (MSWM) is therefore not merely a technical or logistical imperative but a fundamental component of sustainable urban governance (Garg & Arora, 2025), directly linked to the United Nations Sustainable Development Goals (SDGs), specifically SDG 11 (Sustainable Cities and Communities) and SDG 12 (Responsible Consumption and Production). However, the efficacy of MSWM systems is seldom determined by engineering prowess or policy frameworks alone; it is deeply mediated by the human dimension specifically, the perceptions, attitudes, and cooperative behaviors of the citizenry, as seen in case studies such as Brazil's participatory waste collection models (Khatib, 2011) and community-driven recycling initiatives in India (Dash, 2025). The interface between municipal service provision and community acceptance, participation, and adaptation forms the critical, and often most fragile, link in the waste management chain, a lesson echoed in Rwanda's Umuganda community cleanup program and South Korea's volume-based waste fee system, both of which highlight the role of public engagement in improving waste outcomes (UN-Habitat, 2010). This dynamic is acutely evident in South Asia, a region experiencing breakneck urbanization amidst institutional and resource constraints (Ellis & Roberts, 2015). Pakistan, as the world's fifth most populous country, epitomizes this challenge. Its urban centers generate an estimated 48.5 million tons of solid waste annually, with a meager 50–60% collection rate in major cities, leaving vast quantities to accumulate in streets, vacant lots, and drainage systems, or to be disposed of through uncontrolled burning or open dumping a pattern also observed in Nigeria and the Philippines, where inadequate systems exacerbate health and environmental risks (Ogwueleka, 2009; Guerrero et al., 2013). Sindh province, housing the megacity of Karachi and significant secondary cities like Hyderabad, faces particularly severe strains on its urban services. Hyderabad, the second-largest city in Sindh and a historic cultural and economic hub, grapples with the dual pressures of population growth and infrastructural limitations, similar to challenges faced by cities such as Dhaka, Bangladesh, and Lima, Peru. The city's waste management system, traditionally operated by municipal authorities, is characterized by inconsistent collection services, inadequate waste processing facilities, and the widespread practice of open dumping at designated landfill sites (Jerin et al., 2022; Harvey, 2017), which are often unengineered and poorly managed a situation mirrored in Accra, Ghana, and Jakarta, Indonesia (Marshall & Farahbakhsh, 2013). This scenario creates a visible and odorous environmental problem, contributes to urban flooding by clogging drains (Bhutto et al., 2025; Khushi et al., 2024), and poses severe risks to public health through the proliferation of disease vectors and contamination

of air, soil, and water resources, underscoring the urgent need for integrated, perception-sensitive waste governance models informed by global examples of successful community-inclusive approaches (Khoso et al., 2025).

LITERATURE REVIEW

Within this context, a persistent gap exists between the formal MSWM infrastructure and services provided by the Hyderabad Municipal Corporation and the daily waste management practices and expectations of its residents. Despite municipal efforts, which are often hampered by budgetary shortfalls, logistical inefficiencies, and operational challenges, a significant proportion of generated waste remains uncollected or improperly managed (Kaur et al., 2025). This failure is frequently attributed in policy circles to technical and financial deficits. However, an emerging body of scholarly work argues that the socio-behavioral dimension is equally, if not more, critical. The attitudes, knowledge, beliefs, and perceived responsibilities of the local population collectively termed "public perception" fundamentally shape their engagement with the waste management system (Wan et al., 2022). Low levels of awareness, dissatisfaction with service quality, distrust in municipal authorities, and entrenched cultural habits can lead to non-compliance with disposal protocols, littering, illegal dumping, and resistance to new initiatives like source segregation or user fees. Consequently, even well-designed technical interventions can falter if they are not socially intelligible, culturally resonant, and perceived as legitimate and beneficial by the community (Liu, 2024). Thus, the core problem this study addresses, is the disconnect between municipal MSWM planning and execution on one hand, and the perceptions and engagement practices of Hyderabad's citizens on the other. This disconnect undermines environmental sustainability, public health, and the potential for a circular economy in the district (Khoso et al., 2024).

Significance of the Study

This research holds significant and multifaceted value for a diverse range of stakeholders: for academic discourse, it enriches the interdisciplinary literature on environmental sociology and urban governance in the Global South by applying theoretical frameworks of public perception and citizen-state relations to the empirical context of waste management in an understudied Pakistani city; for policy makers and municipal authorities, such as the Hyderabad Municipal Corporation, it provides a crucial, ground-level diagnosis of social bottlenecks, shifting the focus from purely technical solutions to the necessary development of tailored communication strategies, participatory planning, and trust-building initiatives that can inform more effective public programs; for civil society and community organizations, the study serves as an empowering tool by documenting public sentiment and identifying actionable leverage points for advocacy, grassroots mobilization, and campaigns promoting improved services and civic responsibility; and for the general public, it amplifies resident voices and concerns, thereby fostering a broader societal dialogue on environmental rights, responsibilities, and the co-production of sustainable urban services.

METHODOLOGY

This study adopted a mixed-methods approach, combining quantitative survey techniques with descriptive and inferential statistical analysis to assess public perception and community engagement regarding municipal solid waste management (MSWM) in Hyderabad District, Sindh. The methodology was designed to capture both the socio-demographic characteristics of respondents and their attitudes, behaviors, and perceptions toward existing waste management services.

Study Area and Population

The research was conducted in Hyderabad District, the second-largest city in Sindh, Pakistan. The study population consisted of residents from diverse socio-economic and residential backgrounds, including planned/formal colonies, unplanned/informal settlements, and mixed-use urban areas.

Sampling and Data Collection

A cross-sectional survey was administered to a sample of 200 respondents, selected through a stratified random sampling technique to ensure representation across key demographic variables such as gender, age, education level, income, and residential type. Besides that, the 5-point Likert scale questionnaire was used for obtaining the perception of residents. Data were collected using a structured questionnaire, which included:

1. Section A: Socio-demographic information (gender, age, education, income, residential area type).
2. Section B: Likert-scale items measuring perceptions of municipal service efficiency (e.g., regularity of waste collection, complaint responsiveness, and environmental safety of disposal).
3. Section C: Questions assessing willingness to engage in waste segregation and pay user fees.
4. Section D: Items measuring environmental awareness, trust in municipal authorities, and self-reported waste management practices.

The questionnaire was pilot-tested with a small group of residents to ensure clarity and reliability. Data collection was carried out through face-to-face interviews to maximize response rates and ensure comprehension. In addition to that, 5 In-depth interviews were also gathered for the qualitative method to gain the ground-rooted information from the participants.

Data Analysis

Data were analyzed using statistical software (SPSS, Excel, and Python). The following analytical techniques were employed:

1. Descriptive Statistics: Frequencies and percentages were calculated for demographic variables and Likert-scale responses. Mean scores and standard deviations were computed for perception items.
2. Cross-tabulation and Chi-Square Test: The relationship between education level and willingness to segregate waste was examined using cross-tabulation and Pearson's Chi-Square test.
3. Correlation Analysis: Pearson's correlation coefficients were calculated to explore relationships between key variables such as service satisfaction, environmental awareness, trust in municipality, willingness to pay, and self-reported segregation practices.

4. Likert Scale Analysis: Mean scores for each perception statement were aggregated to derive an overall perception score of municipal service efficiency.
5. Qualitative Analysis: The in-depth interviews were analyzed manually using the process of recording, transcribing, translating, coding, and decoding. Finally interpreted accordingly in the results section.

Ethical Considerations

Informed consent was obtained from all participants before administering the survey. Anonymity and confidentiality were maintained throughout the data collection and analysis process. The study was conducted in accordance with ethical guidelines for social research.

Limitations

The study is limited by its sample size and geographic focus, which may affect the generalizability of findings to other regions. Additionally, self-reported data may be subject to social desirability bias. Future studies could benefit from longitudinal designs and qualitative interviews to deepen understanding of behavioral determinants.

Table 1. Reliability Analysis of Key Survey Constructs

Construct	Cronbach's Alpha (α)	Interpretation
Service Satisfaction	0.78	Acceptable Reliability
Environmental Awareness	0.72	Acceptable Reliability
Trust in Municipality	0.79	Acceptable Reliability

RESULT AND DISCUSSION

Table-2. Demographic Information of the Respondents

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	112	56.0
	Female	88	44.0
Age Group	18-30 years	78	39.0
	31-45 years	65	32.5
	46-60 years	42	21.0
	Above 60 years	15	7.5
Education Level	Primary or below	35	17.5
	Matric/Secondary	68	34.0
	Intermediate/Diploma	52	26.0
	Bachelor's degree or above	45	22.5
Monthly Household Income (PKR)	< 30,000	48	24.0
	30,000 - 60,000	85	42.5
	60,001 - 100,000	45	22.5

	> 100,000	22	11.0
Residential Area Type	Planned/Formal Colony	70	35.0
	Unplanned/Informal Settlement	80	40.0
	Mixed-Use Urban Area	50	25.0

The table-2 presents the demographic profile of the 200 respondents surveyed in Hyderabad District, Sindh, revealing a sample that is predominantly male (56%) and young to middle-aged, with 71.5% of participants between 18 and 45 years. Educational attainment is varied, with the largest group having a Matric/Secondary level education (34%), while a combined 43% have an intermediate diploma or a bachelor's degree or higher. Economically, the majority (66.5%) report a monthly household income below PKR 60,000, indicating a sample skewed toward lower-middle-income households. Geographically, respondents were drawn from diverse residential contexts, with the highest representation from unplanned/informal settlements (40%), followed by planned/formal colonies (35%) and mixed-use urban areas (25%), ensuring the study captured perspectives across different urban living environments.

Table 3. Public Perception of Municipal Service Efficiency (Likert Scale Analysis)

Statement (Please rate the current services)	1	2	3	4	5	**Mean Score**	**Std. Deviation**
1. Waste collection is regular and reliable.	45%	30%	15%	8%	2%	1.92	1.02
2. Collected waste is transported without spillage/littering.	40%	35%	12%	10%	3%	2.01	1.12
3. The municipality responds to complaints about waste.	55%	25%	13%	5%	2%	1.74	0.98
4. Final disposal (landfill) is environmentally safe.	50%	28%	17%	4%	1%	1.78	0.95
5. Services are equitable across different neighborhoods.	38%	33%	20%	7%	2%	2.02	1.05
Overall Perception Score (Average Mean)						**1.89**	

1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree

The residents' perceptions of municipal solid waste management services, as detailed in Table 3, reveal a pervasive dissatisfaction across all measured dimensions. The overall perception score is low at 1.89 out of 5, indicating a consensus that services are inadequate. Specific areas of failure are pronounced: a majority (55%) strongly disagree that the municipality responds to complaints, and half (50%) strongly disagree that landfill disposal is environmentally safe. The reliability of waste collection is also poorly rated,

with 45% strongly disagreeing that it is regular. These negative assessments, consistent across statements, reflect a profound public discontent with the efficiency, responsiveness, and environmental safety of the current system, as captured in the survey of the 200 residents whose demographic profile includes a majority from lower-income brackets and unplanned settlements.

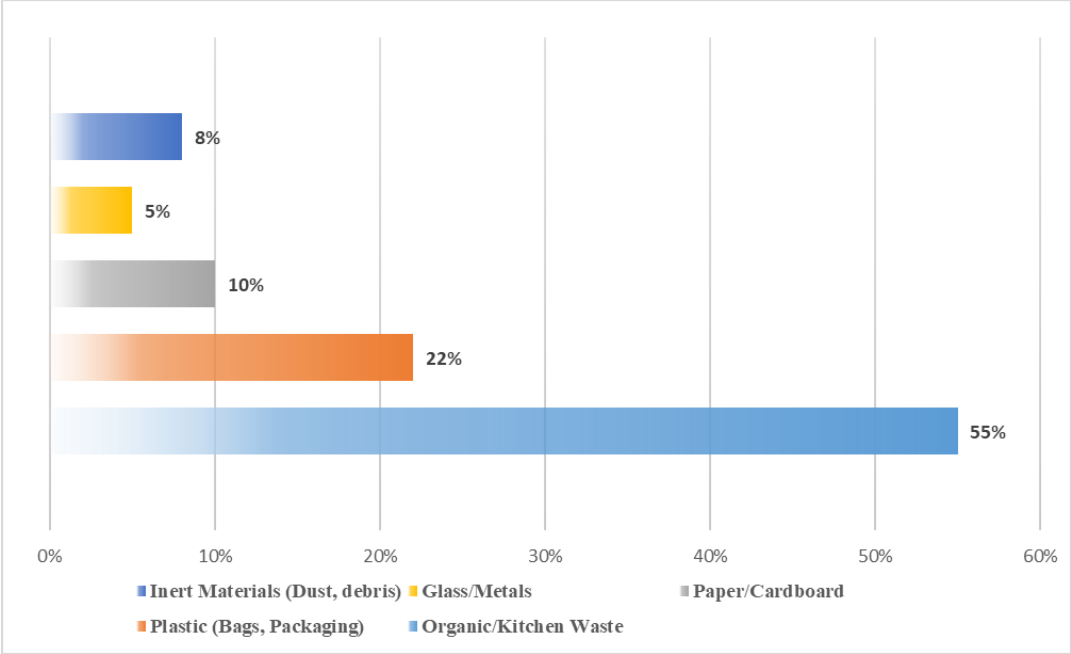

Figure 1. Observed Waste Composition and Disposal Practices in Study Areas

The observed waste composition in the study area, as detailed in Figure 1, is predominantly organic, with kitchen and food waste constituting the majority at 55%. Plastic waste, including bags and packaging, forms the second-largest category at 22%, followed by paper and cardboard at 10%. Inert materials, such as dust and debris, account for 8%, while recyclables, including glass and metals, together comprise only 5%. This composition profile highlights a significant potential for organic waste processing, such as composting, and underscores a critical need for targeted interventions to reduce the high proportion of single-use plastics within the municipal waste stream

Table 4. Cross-Tabulation: Education Level vs. Willingness to Segregate Waste at Source

Education Level	**Willing to Segregate**	**Not Willing**	**Unsure/Neutral**	**Total**
Primary or below	8 (22.9%)	22 (62.9%)	5 (14.3%)	35
Matric/Secondary	22 (32.4%)	35 (51.5%)	11 (16.2%)	68
Intermediate/Diploma	25 (48.1%)	18 (34.6%)	9 (17.3%)	52
Bachelor's degree or above	30 (66.7%)	10 (22.2%)	5 (11.1%)	45
Total	**85 (42.5%)**	**85 (42.5%)**	**30 (15.0%)**	**200**

Chi-Square Test: χ^2 = 24.87 df = 6, p-value = 0.0004				

The analysis reveals a strong and statistically significant relationship between education level and willingness to segregate waste at source (χ^2 = 24.87, p = 0.0004). As detailed in the table-4, willingness increases markedly with higher educational attainment: only 22.9% of those with primary education or below are willing, compared to 66.7% of those with a bachelor's degree or above. Conversely, the proportion of residents who are not willing to segregate decreases from 62.9% in the lowest education group to 22.2% in the highest. This clear gradient underscores that formal education is a key determinant of pro-environmental behavioral intent, suggesting that awareness campaigns and waste management interventions must be tailored to address the specific informational and motivational gaps within less-educated demographic segments to improve overall community participation.

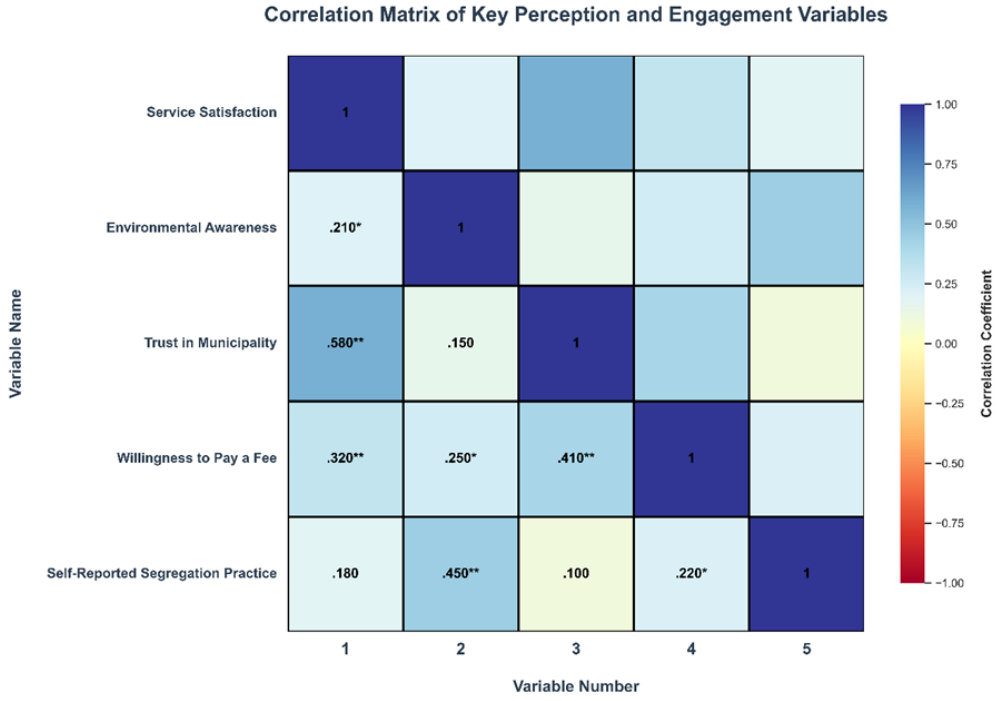

Figure 2. Correlation of the Matrix of Key Variables

Figure 2 highlights the correlation matrix, illustrates the key interrelationships among perception and engagement variables. The analysis reveals that Trust in Municipality has the strongest positive correlation with Service Satisfaction (r = .580**), underscoring the foundational role of institutional credibility in shaping resident evaluations of waste services. Furthermore, Environmental Awareness demonstrates its most substantial association with Self-Reported Segregation Practice (r = .450**), indicating that knowledge is a primary driver of pro-environmental behavior. Willingness to Pay a Fee is positively linked to both Trust in Municipality (r = .410**) and Service Satisfaction (r = .320**), suggesting financial cooperation is transactional and contingent upon perceived service quality and institutional reliability. Notably, Trust in Municipality shows no significant correlation with Environmental Awareness or Self-Reported Segregation Practice, revealing that

confidence in authorities is distinct from personal environmental knowledge or action. All significant correlations are positive, indicating a consistent pattern where improvements in one factor, such as trust, are associated with gains in related areas like satisfaction and willingness to contribute.

Qualitative Results: Resident Perspectives on Service, Segregation, and Civic Responsibility

Based on the findings from in-depth interviews, residents' perceptions reveal a complex interplay of dissatisfaction, mistrust, and conditional willingness to engage, shaped by lived experiences of service delivery and socio-economic context. Regarding service reliability and municipal trust, participants expressed frustration over inconsistent collection and poor responsiveness. One resident from a planned colony noted, "They come only twice a week, and sometimes not at all. When we call, no one answers. We feel ignored," while a respondent from an informal settlement added, "Even if we keep waste properly, it stays for days. Animals scatter it. What can we do? The municipality doesn't care about our area." This sense of neglect fosters widespread distrust and a perception of institutional apathy. Concerning waste segregation and environmental awareness, attitudes varied significantly with education and perceived system efficacy. A more educated participant remarked, "I know segregation is important, but if the whole system is broken, why should I separate at home? They mix everything again in the truck," highlighting a rational disconnect between individual action and systemic failure. Conversely, a resident with lower formal education stated, "We burn what can be burned. Separating? That's for people who have time and education. We don't even have proper bins," pointing to structural and cognitive barriers to pro-environmental behavior.

On the topic of financial contributions and shared responsibility, responses indicated a transactional view of civic engagement. A local shopkeeper explained, "I would pay a small fee if I saw improvement clean streets, regular pick-up. But now, why pay for nothing?" Similarly, a household head expressed, "It's the municipality's job, not ours. We already pay taxes. Why should we do their work?" These statements underscore a demand for tangible service improvements as a precondition for willingness to cooperate or contribute financially. Finally, regarding community mobilization and environmental consequences, participants described a cycle of declining civic morale and environmental degradation. A youth participant observed, "We see waste everywhere, drains clogged. We complain, but when nothing changes, people start throwing anywhere. It's a cycle of neglect," while a community elder lamented, "Before, people took pride in cleanliness. Now, there's no unity. Everyone blames the other authorities blame us, we blame them." Together, these narratives reveal a fragmented social contract, where ineffective service delivery erodes both trust and the collective ethos necessary for participatory solid waste management.

The findings of this study illuminate a core governance dilemma in urban solid waste management within the Global South: the persistent gap between institutional provision and community cooperation. In Hyderabad, low public perception scores regarding service reliability, equity, and environmental safety

(Mean=1.89), coupled with a strong correlation between service dissatisfaction and distrust in municipal authorities (r=0.580), reveal a fractured social contract that severely impedes system efficacy. This dynamic resonates with documented challenges in other developing cities, such as Indonesia, where inadequate collection and unengineered dumping have similarly eroded public trust and encouraged improper disposal practices (Dethier, 2017). The qualitative narratives from residents expressing feelings of neglect and institutional apathy mirror sentiments reported in contexts like Nepal, where municipal limitations have fostered public disengagement (Guragain, 2023). The analysis further demonstrates that awareness does not automatically engender action; while environmental awareness showed a positive correlation with self-reported segregation (r=0.450), the significant relationship between higher education and willingness to segregate (χ^2=24.87, p<0.001) underscores the role of both cognitive and structural barriers. This "rational disconnect," where residents question the utility of segregating waste if the system ultimately remixes it, finds parallels in observations from community-driven recycling initiatives in India, where individual participation hinges on the perceived integrity of the downstream process (Joshi & Ahmed, 2016). Moreover, the public's conditional willingness to engage whether through fee payment or segregation contingent upon observable service improvements, reflects a transactional view of civic responsibility. This underscores a critical lesson from South Korea's successful volume-based waste fee system, which was effective precisely because it was implemented alongside reliable services and extensive public communication, thereby gaining legitimacy (Park, 2018). Therefore, the case of Hyderabad reinforces the imperative, championed by models like Rwanda's Umuganda community cleanup (Uwimbabazi, 2012) and Brazil's participatory waste collection (Gutberlet et al., 2022), that technical solutions must be embedded within strategies that actively rebuild trust, ensure procedural equity, and foster genuine co-production (Medina, 2010; UN-Habitat, 2014). For MSWM in Hyderabad to transition towards sustainability, policy must pivot from a purely technical focus to a perception-sensitive approach that aligns municipal action with community expectations, thereby healing the fractured link in the waste management chain.

CONCLUSIONS AND RECOMMENDATIONS

The findings of this study underscore the profound influence of public perception and civic engagement on the effectiveness of municipal solid waste management in Hyderabad. Despite municipal efforts, the MSWM system remains hampered by inconsistent service delivery, inadequate disposal practices, and a deep-seated mistrust between residents and local authorities. Quantitative data reveal low overall satisfaction with municipal services, while qualitative insights illustrate how experiences of neglect and inefficiency shape residents' attitudes and behaviors lived. The strong correlation between education and willingness to segregate waste, as well as the influence of trust and environmental awareness on civic cooperation, highlights the socio-behavioral dimensions of waste governance. Ultimately, the persistence of open dumping, littering, and public disengagement reflects not only infrastructural

gaps but also a breakdown in the social contract necessary for sustainable urban environmental management. Without addressing these perceptual and relational barriers, even well-intentioned technical interventions are likely to fall short.

To improve MSWM in Hyderabad, municipal authorities should enhance service reliability, transparency, and public communication to rebuild trust, while implementing community-based awareness campaigns on waste segregation and environmental responsibility. Policymakers should integrate resident feedback into planning, introduce incentive-based systems, and foster participatory governance through local committees. Civil society can support through advocacy and community clean-up initiatives, and future research should focus on longitudinal behavioral studies and inclusive policy design to ensure equitable and sustainable waste management outcomes.

REFERENCES

Agboola, S. O., Inetabor, G. M., Bello, O. O., & Bello, O. S. (2025). Waste Pollution and Management: Current Challenges and Future Perspectives. In Smart Waste and Wastewater Management by Biotechnological Approaches (pp. 3-20). Singapore: Springer Nature Singapore.

Bhutto, S., Khoso, A. R., Jintu, G., Suyuhan, W., & Akhtar, F. (2025). QUANTIFYING THE HUMAN HEALTH BURDEN OF FLOOD DISASTERS: AN EMPIRICAL ANALYSIS FROM SHAHDADKOT, SINDH PROVINCE OF PAKISTAN. Journal of Media Horizons, 6(3), 1484-1495.

Dash, A. (2025). Environmental Degradation and Sustainability: Trends, Challenges, and Opportunities. Impact of Environmental Degradation on Ecosystems and Preventive Measures, 1-28.

Dethier, J. J. (2017). Trash, cities, and politics: urban environmental problems in Indonesia. Indonesia, 103(1), 73-90.

Ellis, P., & Roberts, M. (2015). Leveraging urbanization in South Asia: Managing spatial transformation for prosperity and livability. World Bank Publications.

Garg, S., & Arora, P. (2025). Waste management challenges and opportunities: a holistic approach for sustainable development. International Journal of Environmental Science and Technology, 22(14), 14753-14770.

Guerrero, L. A., Maas, G., & Hogland, W. (2013). Solid waste management challenges for cities in developing countries. Waste management, 33(1), 220-232.

Guragain, G. P. (2023). Community Engagement in Local Governance. Kutumbha vani, 4(1), 72-82.

Gutberlet, J., Besen, G. R., & Morais, L. P. (2020). Participatory solid waste governance and the role of social and solidarity economy: Experiences from São Paulo, Brazil. Detritus, 13(13), 167-180.

Harvey, P. (2017). Waste futures: infrastructures and political experimentation in southern Peru. Ethnos, 82(4), 672-689.

Jerin, D. T., Sara, H. H., Radia, M. A., Hema, P. S., Hasan, S., Urme, S. A., ... & Quayyum, Z. (2022). An overview of progress towards implementation of solid waste management policies in Dhaka, Bangladesh. Heliyon, 8(2).

Joshi, R., & Ahmed, S. (2016). Status and challenges of municipal solid waste management in India: A review. Cogent environmental science, 2(1), 1139434.

Kaur, M., Singh, A., & Kaur, A. (2025). Challenges and consequences of improper waste disposal in rural tourism. In Solid waste management and disposal

practices in rural tourism (pp. 317-352). IGI Global.
Khatib, I. A. (2011). Municipal solid waste management in developing countries: Future challenges and possible opportunities. Integrated waste management, 2, 35-48.
Khoso, A. R., Bhutto, S., & Suyuhan, W. (2025). Challenges and Opportunities in Solid Waste Management for Sustainability in District Hyderabad, Pakistan. Sustainable Processes Connect, 1(1), 1-10.
KHOSO, A. R., BHUTTO, S., & AKHTAR, F. (2024). STRATEGIC APPROACHES PROMOTING SUSTAINABLE DEVELOPMENT IN SOLID WASTE MANAGEMENT BASED ON CIRCULAR ECONOMY: A LITERATURE REVIEW.
Khoso, A. R., Jintu, G., Chen, Q., Sheikh, M. J., Suyuhan, W., & Bhutto, S. (2025). Ecological and health impacts of tobacco farming in Pakistan: A mixed-methods approach toward a sustainable pathway for agricultural transition. Tobacco Induced Diseases, 23, 10-18332.
Khushi, S. R., Khoso, A. R., Bhutto, S., & Narejo, A. A. (2024). The long-term health impacts of repeated flood events: A Review. Journal of Environmental and Energy Economics, 3(1), 11-19.
Liu, N. (2024). Influence and mechanisms of perceived information disclosure in shaping public attitudes towards waste disposal facilities: Evidence from China. Ecological Indicators, 166, 112514.
Marshall, R. E., & Farahbakhsh, K. (2013). Systems approaches to integrated solid waste management in developing countries. Waste management, 33(4), 988-1003.
Medina, M. (2010). Solid wastes, poverty and the environment in developing country cities. World Institute for Development Economic Research (UNUWIDER) Working Papers.
Ogwueleka, T. (2009). Municipal solid waste characteristics and management in Nigeria. Journal of Environmental Health Science & Engineering, 6(3), 173-180.
Park, S. (2018). Factors influencing the recycling rate under the volume-based waste fee system in South Korea. Waste management, 74, 43-51.
Un-Habitat. (2010). Solid waste management in the world's cities: Water and sanitation in the world's cities 2010. Routledge.
Uwimbabazi, P. (2012). An analysis of Umuganda: The policy and practice of community work in Rwanda (Doctoral dissertation, University of KwaZulu-Natal, Pietermaritzburg).
Wan, X., Zhang, Y., Mao, P., Li, H., Wang, R., Yi, X., & Zhao, X. (2022). How perceived corporate social responsibility and public knowledge affect public participation intention: evidence from Chinese waste incineration power projects. Engineering, Construction and Architectural Management, 29(10), 4107-4131.