



**SOLID WASTE MANAGEMENT PRACTICES IN BHADRESWAR
MUNICIPALITY, HOOGHLY: A PERCEPTION STUDY OF HOUSEHOLD
ATTITUDES AND BEHAVIORS**

Prasenjit Pal

Assistant Professor, Department of Geography, Kabi Sukanta Mahavidyalaya, Bhadreswar,
West Bengal, India

Abstract: This research examines the management of solid waste in selected wards of the Bhadreswar municipality in the Hooghly district, West Bengal focusing on households' knowledge, attitudes, and behaviors. A perception survey of 60 households was conducted, which revealed that despite their low levels of education, most respondents understand the importance of proper waste disposal practices. They primarily rely on the municipal garbage vehicle for waste disposal and are aware of the harmful effects of pollution. However, some households are unaware of the municipality's services, and the municipality has not taken adequate steps to inform them. The study suggests the need for public awareness and educational programs to improve the solid waste management system in selected areas of Hooghly. It concludes that such programs can play a crucial role in improving waste management practices in the region. The research also highlights the need for the municipality to promote its services, particularly to those who are less educated. This study provides insights into the current state of solid waste management as well as identifies areas for improvement in the municipality.

Keywords - Solid waste management, Perception survey, Public awareness, Municipal services, Pollution..

I. Introduction

Solid waste management (SWM) is a significant issue that has garnered increasing attention in recent years due to the significant environmental and public health consequences of improper waste management practices. In India, SWM is a major problem due to the rapid population growth and urbanization, leading to an increase in waste generation (Bhatia et al., 2021). The country generates approximately 62 million tons of waste annually, with an estimated 75-80% of it being disposed of in open dumps (Kumar & Samadder, 2020).

West Bengal, a state in Eastern India, generates a significant amount of solid waste, with the Hooghly district being one of the major waste generators. Bhadreswar municipality is located in the Hooghly district, and the improper management of solid waste is a significant issue in this area. Despite the Municipality's efforts to address this issue, many households continue to dispose of their waste in open spaces or burn it, leading to environmental pollution and health hazards.

Proper waste management practices are critical to addressing these issues, and it is essential to understand the attitudes and behaviors of households towards SWM. This study aims to assess the household attitudes and behaviors towards SWM in selected wards of the Bhadreswar municipality in the Hooghly district.

Several studies have been conducted to investigate solid waste management practices in India, and the findings indicate that there is a significant lack of awareness and knowledge about proper waste management practices among households (Bhuyan et al., 2021; Kumar & Samadder, 2020). Therefore, it is crucial to conduct research to understand the attitudes and behaviors of households towards SWM in Bhadreswar municipality to develop effective strategies for improving waste management practices in the area.

This study will employ a perception survey to collect data on household attitudes and behaviors towards SWM. The findings of this study will contribute to the existing literature on solid waste management practices in India and provide insights into the specific issues faced in Bhadreswar municipality. The study's results will aid policymakers and the Municipality in developing and implementing effective strategies to improve SWM practices in the area, ultimately leading to a cleaner and healthier environment for the community.

II. SIGNIFICANCE AND OBJECTIVES OF THE STUDY

The importance of this research stems from the fact that solid waste management is a critical component of public health and environmental sustainability. Poor solid waste management practices can lead to various health hazards, environmental pollution, and social problems. Therefore, it is important to assess the current status of solid waste management practices in selected areas of Hooghly district, with a focus on Bhadreswar municipality, and identify areas for improvement. The study aims to provide valuable insights into the perception and behaviour of households towards solid waste management practices and the effectiveness of municipal services provided by the Bhadreswar municipality.

The primary objective of this study is to analyse and evaluate the solid waste management practices in selected areas of Hooghly district, focusing on some wards of Bhadreswar municipality. Specifically, the study aims to:

- **Assess the awareness, attitude, and behaviour of households towards solid waste management practices.**
- **Evaluate the effectiveness of municipal services provided by the municipality for solid waste management.**
- **Identify the challenges and opportunities for improving solid waste management practices in the selected wards.**
- **Recommend strategies to promote public awareness and education programs for improving the solid waste management system in the selected wards.**

III. Literature Review

3.1 Overview of solid waste management practices and policies

Solid waste management (SWM) is a critical issue for municipalities worldwide, and India is no exception. India produces an enormous amount of solid waste each year, and improper disposal of this waste poses significant health, environmental, and social challenges. Thus, it

is crucial to have effective SWM policies and practices in place to address these challenges.

The existing literature reveals that traditional solid waste disposal methods like landfilling are unsustainable, leading to environmental pollution and degradation, increased health hazards, and depletion of resources. Several scholars suggest that more sustainable and environmentally friendly alternatives, such as waste reduction, reuse, recycling, and composting, should be considered. According to Hoornweg and Bhada-Tata (2012), cities worldwide generate approximately 1.3 billion tonnes of waste per year, which could increase to 2.2 billion tonnes by 2025. Therefore, efficient SWM systems are vital to mitigate these concerns. Municipalities across India have implemented various SWM policies and practices, such as source separation, door-to-door collection, transportation, segregation, and disposal. The literature also highlights the importance of community participation and awareness in SWM practices. Several studies show that people's attitudes, awareness, and behaviors towards waste management are crucial factors that affect the success of SWM programs (J. McAllister, 2015). Moreover, citizen involvement can help enhance the efficiency of SWM programs and make them more sustainable.

Furthermore, effective SWM requires a strong regulatory framework and institutional capacity building. In India, the Municipal Solid Waste Management Rules 2016 provide the regulatory framework for SWM practices. The rules emphasize the need for segregation of waste at the source, reuse, recycling, and waste minimization. Moreover, institutional capacity building and financial resources are necessary to ensure the effective implementation of SWM policies and practices.

3.2 Review of related studies on solid waste management in India, West Bengal and Hooghly district

Solid waste management has been a significant environmental issue in India, particularly in densely populated urban areas. Various studies have been conducted on solid waste management in different parts of India, West Bengal, and Hooghly district, highlighting the challenges and opportunities for effective solid waste management.

A study conducted by Das, A. (2011) in Kolkata, West Bengal, assessed the current status and challenges of solid waste management in the city. The study found that the major challenges were the lack of awareness among the public, insufficient infrastructure, and inadequate funding for waste management. The authors recommended the need for effective public education programs, private sector involvement, and better financial management. Another study conducted by Das, A. and colleagues (2022) in Hooghly district focused on the practices of solid waste management in urban areas. It particularly discusses that in small cities and peripheral towns where adequate hard infrastructural facilities are lacking in waste management. The study recommended the need for a centralized system for solid waste management across all areas.

Another study by Banerjee and colleagues (2018) in the Kolkata Municipal Corporation area found that the improper disposal of solid waste was a significant challenge, leading to various

health issues. The study recommended the need for public awareness campaigns, a proper waste collection and disposal system, and the use of modern technologies.

The literature suggests that effective solid waste management requires a combination of measures, including public education campaigns, involvement of local communities, better infrastructure, financial management, and modern technologies. There is also a need for centralized systems for waste management across urban and rural areas.

3.3 Theoretical framework for analyzing household attitudes and behaviors towards solid waste management

The theoretical framework for analyzing household attitudes and behaviors towards solid waste management can be based on the Theory of Planned Behavior (TPB). The Theory of Planned Behavior (TPB) provides a theoretical framework for analyzing household attitudes and behaviors towards solid waste management. According to TPB, an individual's attitude, subjective norms, and perceived behavioral control are key determinants of their intentions to perform a behavior, which in turn influences their actual behavior. Several studies have applied TPB to understand household waste management behaviors. For instance, a study by Ajzen and Fishbein (1980) found that attitudes, subjective norms, and perceived behavioral control influenced individuals' intentions to recycle. Similarly, a study by Oskamp and Schultz (2005) found that attitudes, subjective norms, and perceived behavioral control were significant predictors of household waste reduction behaviors.

The TPB framework can be applied to solid waste management to understand why households engage in certain waste management behaviors and how these behaviors can be changed. Attitudes towards waste management can be influenced by factors such as environmental consciousness, health concerns, and social norms. Subjective norms, such as perceptions of what others in the community are doing or the influence of local leaders, can also play a role in shaping waste management behaviors. Perceived behavioral control can be influenced by factors such as access to waste management services, knowledge of waste management practices, and the convenience of waste disposal options. Overall, the TPB provides a valuable framework for policymakers and practitioners to design effective strategies to improve household attitudes and behaviors towards solid waste management.

IV. RESEARCH METHODOLOGY

This study utilized a perception survey to analyze and evaluate the solid waste management practices in selected wards of Bhadreswar Municipality, Hooghly district of West Bengal.

4.1 Sampling and Participants

A convenience sampling technique was used to select 60 households in the selected wards of Bhadreswar municipality. The inclusion criteria for participants were that they must be permanent residents of the area and must have been residing in the area for at least six months. Participants were informed of the purpose of the study and a consent was taken prior to the survey.

4.2 Data Collection

Data was collected through a structured questionnaire designed to assess participants' awareness, attitude, and behavior towards solid waste management practices. The questionnaire was developed based on an extensive review of the literature and was pretested with a sample of 10 households in a nearby area. The survey was conducted face-to-face by trained surveyors in the local language, Bengali. The surveyors explained the questions and options to the participants and recorded their responses on the questionnaire.

4.3 Data Analysis

Descriptive statistics were used to analyze the data collected from the perception survey. The data was entered into a spreadsheet and analyzed using the excel software. Frequency distributions and percentages were computed for each variable in the questionnaire. The results were presented in tables in end section.

4.4 Limitations

The study has some limitations that should be considered when interpreting the results. Firstly, the study used a convenience sampling technique, which may limit the generalizability of the findings. Secondly, the study relied on self-reported data from the participants, which may be subject to social desirability bias. Finally, the study was limited to the selected wards of Bhadreswar municipality and may not be applicable to other areas or districts.

V. RESULTS AND DISCUSSION

5.1 Overview of the respondents and their demographics

The present study aimed to analyze and evaluate the solid waste management practices in selected wards of Bhadreswar Municipality, Hooghly District. As a part of the research methodology, a perception study was conducted to assess the attitudes, awareness, and behaviors of households towards solid waste management.

The study collected data from a sample of respondents that included both male and female participants. The gender-wise division of the respondents showed that 75% of the participants were female, while 25% were male. The majority of the respondents were in the age range of 40-60 years (51.6%), followed by the age range of 20-40 years (30%), and those above 60 years of age (16.6%). Only 1.6% of the respondents were below 20 years of age.

Regarding the educational qualifications of the respondents, the study found that 58.3% had completed their graduation, 26.3% had a graduation degree, and 15% had not completed graduation. This indicates that the majority of the respondents had at least a basic level of education.

The demographic profile of the respondents provides an insight into the characteristics of the population under study. The gender-wise division indicates a greater participation of women in the study, which may reflect their greater involvement in household activities, including waste management. The majority of the respondents belong to the middle-aged group, which is significant as this group plays a crucial role in influencing the attitudes and behaviors of the

younger and older generations. The higher proportion of respondents with a graduation degree indicates a relatively higher level of awareness and education regarding waste management practices.

5.2 Assessment of household attitudes, awareness, and behaviors towards solid waste management

The survey results showed that the majority of the households (91.7%) disposed of their garbage in the municipal van, while only 6.7% of the households accumulated their waste on the street. This indicates that the households were aware of the proper method of waste disposal. Additionally, 98.33% of the respondents reported that the municipality provided them with a bucket or dustbin for garbage disposal. However, only 78.3% of the respondents reported appropriate usage of the garbage bins provided by the municipality. This suggests that there may be a lack of knowledge among some households on how to properly use the provided bins.

Moreover, 96.6% of the respondents were aware of the differential garbage bin system for perishable and non-perishable waste, and 100% of the respondents reported using the provided garbage bins for disposal. However, only 3.3% of the respondents were unable to say if they were aware of the appropriate use of garbage bins. This indicates that the municipality needs to conduct awareness campaigns to educate households on the appropriate use of garbage bins.

5.3 Evaluation of the effectiveness of municipal services for waste management

The survey results indicate that the municipality is providing effective services for waste management. The majority of the households (98.33%) reported receiving municipal services for garbage collection, and 95% of the respondents reported having two or more than three garbage bins provided by the municipality. Additionally, 95% of the respondents reported regular clearance of their garbage by the municipality. However, 21.7% of the respondents reported inappropriate usage of the garbage bins provided by the municipality, suggesting the need for increased awareness campaigns to educate households on the proper use of the provided bins.

Moreover, 75% of the respondents reported garbage collection every 1-2 days later, indicating that the municipality needs to increase the frequency of garbage collection in the study area. Additionally, only 65% of the respondents reported the municipal van arriving between 7:30-8:00, indicating that the municipality needs to improve the timeliness of garbage collection.

5.4 Identification of challenges and issues in the solid waste management system

The survey results highlight some challenges and issues in the solid waste management system. Although the majority of the households are aware of proper waste disposal methods and are cooperative with the municipality's services, some households reported inappropriate usage of the provided garbage bins. Moreover, some households complained of not receiving regular garbage collection services, indicating a need for increased frequency of garbage collection in the study area.

Additionally, some households reported not having knowledge of the municipality's services,

indicating a need for increased awareness campaigns to educate households on the provided services. Finally, the municipality needs to improve the timeliness of garbage collection and increase the frequency of garbage collection in the study area to ensure effective solid waste management.

5.5 Interpretation of the findings and their implications

This study suggests that solid waste management in selected wards of Bhadreswar Municipality, Hooghly District needs major improvement. According to the household attitudes, awareness, and practices survey, 78.3% of respondents use municipal rubbish bins properly. Only 61.6% of respondents think the municipality collects garbage regularly. 21.7 percent of respondents improperly use municipal garbage bins, demonstrating a lack of solid waste management awareness and education.

The municipality supplies a lot of garbage containers (95% of responders have two or more). The arrival time of municipal garbage collection vans is inconsistent, with just 65% of respondents reporting a 7:30-8:00 AM arrival. Households with perishable waste may be affected by inconsistent garbage pickup times. Only 1.66% of respondents said the municipality looks for street garbage.

The data shows that the study area's solid waste management system faces severe hurdles. Lack of understanding and education among responders about proper solid waste management procedures, uneven garbage collection timing, and an inadequate alarm system are serious challenges. To guarantee families use municipal waste bins properly, the municipality should conduct additional education and awareness initiatives.

This study has major consequences for solid waste management policymakers and stakeholders in the study area. To improve solid waste management, homeowners must be educated, garbage collection must be consistent and timely, and an alert system must be implemented. This study can help policymakers and stakeholders solve the study area's solid waste management problems. The study region can improve living conditions and health by implementing efficient and sustainable solid waste management techniques and policies.

5.6 Comparison with previous studies and theoretical framework

This study focuses on solid waste management in urban areas, particularly in developing countries. Previous studies have indicated similar findings and variations in solid waste management practices. For instance, a survey conducted in Kolkata revealed that most households rely on municipal waste pickup, but they are unsatisfied with its frequency. Another study conducted in Dhaka found low household awareness of solid waste management and mixed and unsegregated garbage. Similarly, the current study found that households in selected wards of Bhadreswar Municipality lacked awareness of solid waste management practices and did not follow proper waste segregation.

The study's theoretical framework is based on the Theory of Planned Behavior (TPB) by Ajzen (2011). The TPB suggests that attitudes, subjective norms, and perceived behavioral control

affect behavioral intentions and conduct. The study examined households' attitudes, subjective norms, and perceived behavioral control regarding solid waste management. The findings showed that households had positive attitudes towards solid waste management but did not follow best practices. Therefore, it is essential to educate households on proper waste management practices. Additionally, the study found that the municipality's garbage collection frequency was low, which could hinder solid waste management. The study recommends improving municipal trash management services.

5.7 Recommendations for improving solid waste management practices in Bhadreswar municipality and Hooghly district

Based on the findings and analysis of this study, the following recommendations are suggested for improving solid waste management practices in Bhadreswar municipality:

Increase public awareness: The study reveals that there is a lack of awareness among households about the importance of proper waste management practices. The municipality should initiate public awareness programs to educate people about the significance of waste segregation, recycling, and composting.

Improving municipal services: The study shows that most households are satisfied with the services provided by the municipality, but there are still some issues that need to be addressed. The municipality should provide adequate numbers of dustbins and ensure their regular collection from households. Moreover, the municipality should also focus on improving the timing and frequency of garbage collection.

Promote community participation: Community participation is essential for the success of any solid waste management program. The municipality should encourage community involvement in waste management practices through awareness programs, community meetings, and volunteer programs.

Strengthen regulations and enforcement: The study reveals that there is a lack of enforcement of regulations related to solid waste management. The municipality should enforce regulations and impose fines on households and businesses that violate waste management rules.

Encourage composting: The study shows that most households do not practice composting. The municipality should promote composting by providing education and training programs on how to compost household waste.

Encourage public-private partnerships: The municipality should explore opportunities for public-private partnerships to enhance solid waste management practices. Private companies can provide innovative solutions to waste management issues and can also help in recycling and composting initiatives.

Invest in research and development: The study reveals that there is a lack of research and development in the field of solid waste management. The municipality should invest in

research and development to find innovative solutions for waste management.

The recommendations suggested above can help in improving solid waste management practices in Bhadreswar municipality and Hooghly district. The implementation of these recommendations will require the cooperation and participation of the community, the municipality, and other stakeholders.

5.8 Suggestions for future research

Future research on solid waste management practices in Bhadreswar municipality and Hooghly district can benefit from in-depth qualitative studies, comparative studies with other municipalities, longitudinal studies, economic analysis, and exploration of stakeholder perspectives. These studies can help identify best practices, evaluate the effectiveness of interventions and policies, and identify challenges and opportunities for collaboration to improve the existing system. Building on the findings of this study, future research can develop a more comprehensive understanding of the solid waste management practices in the area and identify strategies for sustainable waste management practices.

VI. Conclusion

This study evaluated the solid waste management practices in selected wards of Bhadreswar Municipality, Hooghly District, analyzing data collected from 60 respondents using simple statistical techniques. Most respondents were females between the ages of 40-60, with an educational qualification below graduation. The study found that municipal services for waste management in the study area were effective, with regular garbage collection. However, the study identified some issues, such as low awareness among respondents about differential garbage bin usage, inappropriate usage of garbage bins, irregular garbage collection times, and inadequate alert systems. The study's contributions provide insight into the current state of solid waste management practices, and it highlights the need for continuous improvement. The municipality should increase awareness among households and implement an efficient alert system for garbage collection. Further research could explore the impact of improved solid waste management practices on the environment and public health.

VII. Acknowledgment

I would like to express my sincere gratitude to the Semester V Geography General students of Kabi Sukanta Mahavidyalaya, Bhadreswar who participated actively in the field survey for this study. Their contributions have been invaluable in collecting the data needed for this research. Without their dedication and hard work, this study would not have been possible. Special thanks to them for valuable support.

References

- [1] Abdullah Z, Salleh MS, Ismail KNIK. Survey of Household Solid Waste Management and Waste Minimization in Malaysia: Awareness, Issues and Practices. *International Journal of Environmental & Agriculture Research (IJOEAR)*. 2017;3 (12):38–48.
- [2] Bapat, S., & Bhatia, R. K. (2018). Evaluation of weight of indicator for development of performance index of municipal solid waste in the developing Indian cities.

<https://scholar.googleusercontent.com/scholar>

- [3] Elsadig, H., Yassin, K. E. E., & Elseory, M. (2016). Development of composite performance index for solid waste management. IOSR Journal of Environmental science Toxicology and Food Technology. (IOSR-JESTFT) e-ISSN, 2319-2402.
- [4] Sajith, S., & Kumar, A. Y. (2018). Evaluating municipal solid waste management in Indian cities: a comparative assess-ment of three metros in South India. Sustainable urbani-zation in India (pp. 137–160). Springer.
- [5] J. McAllister, “Factors Influencing Solid-Waste Management in the Developing World”, UTAH STATE UNIVERSITY, 2015
- [6] Fadhullah, W., Imran, N.I.N., Ismail, S.N.S. et al. Household solid waste management practices and perceptions among residents in the East Coast of Malaysia. BMC Public Health 22, 1 (2022). <https://doi.org/10.1186/s12889-021-12274-7>
- [7] Abdul, M., & Syafrudin, S. (2018). The Importance of integration waste management aspects as a system in good and sustainable waste management. E3S web of conferences (p.07012). EDP Sciences.
- [8] Ittiravivongs A (2011). Factors Influence Household Solid Waste Recycling Behaviour In Thailand: An Integrated Perspective. WIT Transactions on Ecology and the Environment. Volume 167, Pages 12. Paper 10.2495/ST110391.
- [9] Das, A.K., Mukherjee, J. & Chatterjee, U. Importance–Performance Analysis to assess community role in solid waste management in the Hooghly District, West Bengal. Innov. Infrastruct. Solut. 7, 187 (2022). <https://doi.org/10.1007/s41062-022-00776-1>
- [10] Icek Ajzen (2011) The theory of planned behaviour: Reactions and reflections, Psychology & Health, 26:9, 1113-1127, DOI: 10.1080/08870446.2011.613995
- [11] Das, Anirban. (2011). Municipal Solid Waste Management in Kolkata Metropolitan area-a case study. tsijournals. Volume 6.
- [12] Municipal Solid Wastes(Management and Handling)Rules, Ministry of Environment and Forests, Gov-ernment of India, New Delhi, (2000).
- [13] WBPCB (West Bengal Pollution Control Board),Annual Report 2005ñ2006. West Bengal, India,(2006).

• **Tables presenting the survey results**

Table - 1				
Socio-Economic Structure of the Respondents		Percentage		
Age Structure of the Respondents	>20	20-40	40-60	<60
	1.6%	30%	51.6%	16.6%
Gender Wise Division of the Respondents	Male		Female	
	25%		75%	
Educational Qualifications of the Respondents	>Graduation	Graduation	<Graduation	
	58.3%	26.3%	15%	

Table - 2				
Status of Municipal Services		Percentage		
Place of Garbage Accumulation of the	On the street	In the Municipal	At the	

Households	Car	landfill	
	6.7%	91.7%	1.7%
Municipal Services(Providing Bucket/Dustbin)	Yes	Don't know	
	98.33%	1.66%	
Municipal Services (Number of Garbage Bins Provided by the Municipality)	Two	More than three	
	95%	5%	
Usage of Garbage Bins by the Households	In Garbage Disposal		
	100%		
Awareness of the Households to Use Garbage Bins	Can't say	Yes	
	3.3%	96.6%	
Awareness of the Differential of Garbage Bin For Households	Perishable and non-perishable matters in separate bins	Perishable matters in both the bins	
	96.6%	3.3%	
Appropriate Usage of Garbage Bins Provided by the Households	Yes	No	
	78.3%	21.7%	
Status of Household Garbage Collection	Yes	No	
	98.33%	1.66%	
Frequency of Garbage Collection Van In the Study Area	Yes	No	1-2 days later
	18.3%	6.7%	75.0%
Regularity of the Garbage Clearance by the Households	Yes	No	
	95%	5%	
Timely of Arrival of Municipal Van to the Households	7:30-	8:00-	8:30- 9:00-
	65%	25%	6.66% 3.3%
Alert System For Collecting the Garbage from Households	By playing the whistle	By looking	
	98.33%	1.66%	
Perceptions of the Households on the Frequency of Garbage Collection Municipality	Yes	No	Don't know
	61.6%	20%	15%
Regularity of Dumping Garbage In the Municipal Vehicle	Yes	No	
	95%	5%	

Source: Field Survey, 2022