

Municipal waste management scenario in Bangladesh: 3Rs perspective

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ABSTRACT

Keywords:

3Rs (Reuse, Reduce and Recycle)

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management

municipality

waste

This study aims to analyze the current state of solid waste management in municipalities in Bangladesh, while also identifying the challenges they face and the opportunities that arise from their situations. This research employs a quantitative research approach, prioritizing primary data while integrating qualitative methods. Data collection involved objective-based questionnaires, content analysis of relevant documents, key information interviews, and a semi-structured survey method. The data have been organized, categorized, coded, computed, analyzed, summarized, presented, and tabulated (Statistical Packages for the Social Sciences). The primary objective is to evaluate the quantity and composition of Municipal Solid Waste in the study areas, and compare it to other municipalities in relation to the principles of the 3Rs (Reduce, Reuse, Recycle). The main objective of this study is to identify the challenges and opportunities related to waste generation, composition, and management practices. Furthermore, the study seeks to determine the limitations of the existing systems and explore potential improvements based on the three-resources framework. The study could explore the integration of technology in monitoring and managing waste services, assessing how these innovations can enhance transparency and accountability within local governments. This study could also explore the feasibility of establishing Ward Development Committees and their role in mobilizing community participation, along with assessing the financial implications of introducing extra charges for excessive waste production.

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INTRODUCTION

Bangladesh is one of the least urbanized countries in the world right now. However, it is one of the top ten countries that is urbanizing the fastest, with a rate of 18.2% in urban areas and a rate of 3% overall. As cities grow quickly, there is also a quick rise in solid waste (Haider, 2021; Nanda & Berruti, 2021; Soni et al., 2023; Voukkali et al., 2024; Wowrzeczka, 2021). Still, a lot of people in Bangladesh live in semi-urban or rural areas. They want to improve their lives and move to cities, but the people who are moving from rural areas have the same mindset as they did before; Where they dump trash in open spaces, water sources, or places where no one lives (Reza, 2013). This makes it hard to get rid of the trash the right way. Waste management has been left out of the picture because of how quickly cities are growing, which is bad for people's health and the environment. But more trash brings problems as well as opportunities that could help the country work on waste management and development.

Waste has been seen as a problem in Bangladesh since the late 1980s. Waste management has always been seen as the job of "low caste" or "Dalit" people in Bangladesh, from the beginning until now. People from these castes used to be in charge of cleaning the cities without much help from the government or other groups. In the past, people from these castes were hired by town governments to pick up trash. Most of the time, they used simple tools like a buffalo rib to lift trash and dump it in an open field or along a river bank (Anua et al., 2022). Bangladesh was formerly a Muslim nation with well ingrained religious and cultural traditions. In addition, the notion of being or feeling accountable for one's waste management contrasts with traditional beliefs and customs. Historically, it was believed that low-caste individuals were responsible for garbage management and cleaning, and after the task was completed, the waste was disposed of in adjacent rivers or an open field (Anom et al., 2015).

Municipal or city offices, who are tasked with garbage collection and disposal, have historically lacked the necessary waste management expertise. However, in recent years, cities have realized that garbage collection and disposal are the shared duty of everyone in society, not just the lower classes. These shifts could not have happened without the education offered by a variety of groups, including government and the Non-Profit Organization (NGOs), which may have been created by the international institution or the government (Rahman, 2016). The improper management of waste poses significant threats to the living environment, leading to various detrimental effects. Firstly, the combustion of garbage is a major contributor to air pollution, negatively impacting air quality. Secondly, the dumping of solid waste can contaminate the soil, affecting its health and usability. Additionally, inadequate waste management by municipalities can result in human health issues, including headaches, vomiting, and neurological disorders, highlighting the urgent need for better waste handling practices (Majumder, 2012). If adequate planning and its execution are not done, the urban environment will be severely damaged, and people's lives would suffer as a result.

The primary aim of this research is to analyze the current state of solid waste management in municipalities, while also identifying the challenges they face and the opportunities that arise from their situations. Specific objectives include investigating the methods currently employed by municipalities for solid waste management, assessing the quantity and composition of Municipal Solid Waste in the study areas, and comparing it to other municipalities in relation to the principles of the 3Rs (Reduce, Reuse, Recycle). Additionally, the research seeks to determine the limitations of the existing solid waste management systems and explore potential improvements based on the 3Rs framework.

The purpose of this research is to quantify the amount of solid waste generated in the studied areas as well as the prevalent waste management techniques (*Pourashavas*). It analyzes shortcomings in present procedures and impediments to setting up an effective waste management system in the areas under study. Based on the study's results, the author suggests reforms to the *Pourashavas*' SWM. These suggestions will be helpful to decision makers at both the micro and macro levels in formulating the right management system of reusing, reducing, and recycling of waste materials. Additionally, these suggestions will assist waste management professionals in designing and implementing efficient methods for managing waste (Achankeng, 2004). The effectiveness of community-based waste management is wholly dependent on the level of motivation and willingness of residents to pay taxes and attend to other responsibilities. It has been discovered that the community-based waste management method has served relatively better than the City Corporation in terms of reducing the volume, making the community aware of waste management, and providing them with alternatives to manage the waste. These achievements can be attributed to the fact that the method is community-based.

The provided document focuses on the current state of solid waste management in municipalities in Bangladesh, highlighting the challenges and opportunities related to waste generation, composition, and management practices. It identifies gaps in comparative analysis across municipalities and lacks a theoretical framework for zero waste management, as seen in the studies by Amin & Selim (2024) and Ahmed et al. (2023). The novelty of the research lies in its localized approach, providing detailed insights into solid waste management practices through household surveys that incorporate socio-economic factors, thereby emphasizing community involvement in the application of the 3Rs (Reduce, Reuse, Recycle). This study aims to propose actionable recommendations for better integrating the 3Rs into current practices, addressing a practical need within the context of Bangladesh.

METHOD

This study employs a quantitative research approach, prioritizing primary data while integrating qualitative methods. It utilizes an analytical research design to assess quantitative data alongside descriptive qualitative data. Six municipalities across three districts were purposefully selected, focusing on population size and socio-economic status. Data collection involved objective-based questionnaires, content analysis of relevant documents, key information interviews, and a semi-structured survey method. A convenience sampling technique was used, resulting in a total sample size of 300, including 250 service users and 50 service providers and officials. Both primary and secondary sources were consulted, with primary data gathered through interviews and surveys, while secondary data came from various educational and research materials. The following is the breakdown of the respondents.

Table 1. Composition of Respondents

Sl No.	Name of the District	Name of the Municipalities	Name of Respondents	Total Respondents
1.	Kushtia	Kushtia and Kumarkhali	Mass people, Peoples representatives, Govt officials, NGOs staffs and Others	100
3.	Norail	Norail and Kalia	Mass people, Peoples representatives,	100

		Govt officials, NGOs staffs and Others		
4.	Satkhira	Satkhira and Kolaroa	Mass people, Peoples representatives, Govt officials, NGOs staffs and Others	100
Total Respondents (Three hundred)				300

The gathered information has been organized, categorized, coded, computed, analyzed, summarized, presented, and tabulated. After being processed, the data were next examined and interpreted with the use of statistical tools and methods. In addition, using the SPSS method, the data has been classified, tabulated, and analyzed (Statistical Packages for the Social Sciences). Microsoft Word and Excel have also used to analyze data.

Bangladesh is one of the countries with the most people per square mile (1,125 per sq km). Along with having a lot of people, the country is also notable for how quickly cities are growing. The country's total population has been growing by about 1.4% per year, but the number of people living in cities has been growing by about 3.2% per year. The above comparison shows very clearly how quickly cities are growing. This process has led to most of the urban local centers that are required to offer services related to urban health and the environment (Islam, 2021). The management of solid waste, which is one of the most vital services, is now under a significant amount of pressure as a result of the increasing demand placed on the city's infrastructure facilities and urban services. When conducting an analysis of the country's SWM system, it is necessary to take into account the amount of waste generated, the kind or characteristics of the waste, the method by which it is stored and collected, as well as the treatment and disposal procedures (Kabir, 2020).

RESULTS AND DISCUSSION

Demographic Characteristics of Respondent

Researchers made an effort to include a wide range of socioeconomically and demographically diverse sample houses in our analysis. Responses are broken down according to age, gender, marital status, education, employment, income, and number of people living in the home. This is because the quantity and content of solid waste generated in a given metropolitan area are directly influenced by the demographics of that city's population.

The characteristics of the households that were sampled are presented in a straightforward and concise manner in the table that can be seen underneath. According to the data presented in the table that follows, there are 76 percent of male household heads/respondents and 24 percent of female household heads/respondents. This was owing to the fact that the majority of the time, women choose to stay inside their homes and labor rather than going outside to get employment. This domination of women is acknowledged and crucial for this research since women have superior information than males regarding the managing of their residence's solid waste property. Besides this, about 80% of the sample respondents are adults (30-60 ages). Based on the table below, 16%, 24%, 13%, 10%, 25%, and 11% of people had no formal education, finished primary school, finished secondary school, finished higher secondary school, finished college, and finished graduate school, respectively. In terms of education level, the majority of respondents (46%) have completed high school and/or college. These educational characteristics of sample households also made it easier to get quick and different ideas. This also makes it more likely that the information gathered from such respondents is correct.

Table 2. Socio-economic and demographic characteristics of respondents

Characteristics of respondents	Description of characteristics	Frequency	Percent
Sex	Male	190	76%
	Female	60	24%
	Total	250	100%
Age	20-30	28	11%
	30-40	90	36%
	40-50	60	24%
	50-60	50	20%
	60+	22	9%
	Total	250	100%
Status of Education	No formal education	40	16%
	Primary Education	60	24%
	Secondary Education	33	13%
	Higher Secondary Education	26	10%
	Graduation	63	25%

	Post-Graduation	28	11%
	Total	250	100%
Family size	1-3 persons	102	41%
	4-6 persons	133	53%
	7-9 persons	9	4%
	10 persons and above	6	2%
	Total	250	100%
Employment status	Trading	52	21%
	Private sector	93	37%
	Government sector	60	24%
	Daily labour	33	13%
	Other	12	5%
	Total	250	100%
Marital status	Single	90	36%
	Married	148	59%
	Divorced	8	3%
	Widowed	4	2%
	Total	250	100%
Average monthly income	Below 500	13	5%
	501-1500	75	30%
	1501-2500	43	17%
	2501-5000	45	18%
	5001 and above	67	27%
	No response	7	3%
	Total=	250	100%

Source: Compiled from questionnaires survey, 2022

In addition, the household size of the entire samples of the respondents showed that 41% of them had between 1 and 3 family members, 4% have between 7 and 9 family members, and the bulk of them, 53%, had between 4 and 6 family members. Only two percent of the homes who participated in the survey reported having more than ten people living in their household at any given time. It is used as a measurement of how crude the population is, and it has significant implications for health as well as the collection of solid wastes. This result demonstrates that the majority of respondents from the study region came very close to meeting the average for the whole country.

When we consider the job situations of the respondents, as presented in the table that is located above. 21 percent of the overall samples of 250 households are merchants, 37 percent are employees in the private sector and make up the biggest percentage of sample respondents, and 24 percent are workers in the government sector. On the other hand, everyday laborers make up 13% of the total respondents in the sample. The remaining five percent of respondents are involved in a wide variety of alternative economic pursuits. In terms of the respondents' marital status, around 36 percent were unmarried, 59 percent were married, 3 percent were divorced, and close to 2 percent had lost a spouse. As a result, a person's marital status has its own set of implications for the economic and social value associated with the composition of solid waste and its creation.

Lastly, income is another social and economic factor that contributes to the increasing amount of solid waste and the growing problem of managing municipal solid waste. The amount of a household's annual income has an effect on how municipal solid waste is handled. The table also shows how much money each household made each month. Based on this information, households were put into five groups. So, most (30%) of the sample households with average monthly incomes between 501 and 1500 taka are in the second group. But only 17 percent of households fall into category three, which has incomes between 1,500 and 2,500 taka per month.

Waste Production Scenario of Municipalities in Daily Basis

Every municipality now faces a critical dilemma with regard to managing its municipal solid waste. Along with rubbish from businesses, industries, and other sources, solid waste also originates from residential areas such as houses and street cleaning. The following Table-05 shows the daily waste production rate in the study locations:

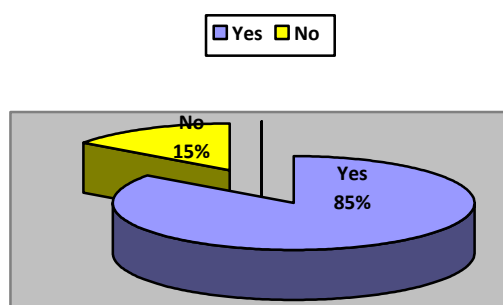
Table 3. Scenario of Waste Production of Different Municipalities/Day

Scenario of Waste production of different municipalities	Scenario of Municipalities					
	Narail Sadar	Kalia	Kushtia Sadar	Kumarkhali	Satkhira Sadar	Kolaroya
1-5 kg	2%	5%	3%	5%	4%	3%
5-10 kg	10%	15%	10%	10%	12%	18%
10-20 kg	35%	35%	27%	26%	27%	30%
>20 kg	53%	45%	60%	59%	57%	49%
Total=	100%	100%	100%	100%	100%	100%

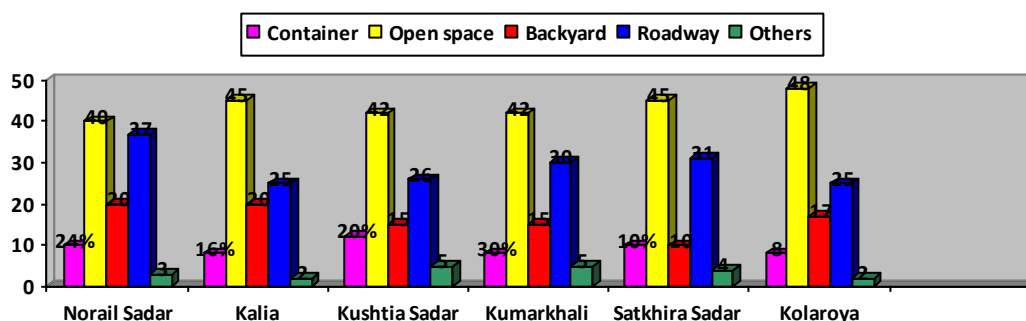
The above Table-05 shows the income level based per capita generation by the municipalities of Bangladesh. Maximum respondent (Narail sadar in 53%, Kalia in 45%, Kushtia sadar in 60%, Kumarkhali in 59%, Satkhira sadar in 57% and Kolaroa in 49%) were said that the average highest waste generation rate was more than 20 kg/capita/day. Second largest respondent (Narail sadar in 35%, Kalia in 35%, Kushtia sadar in 27%, Kumarkhali in 26%, Satkhira sadar in 27% and Kolaroa in 30%) were argued that the average waste generation rate within 10-20 kg/capita/day. Besides, rest of the respondent (Narail sadar in 12%, Kalia in 20%, Kushtia sadar in 13%, Kumarkhali in 15%, Satkhira sadar in 16% and Kolaroa in 21%) were claimed that the average waste generation rate within 1-10 kg/capita/day.

Place of Dumping Household Waste by the Participants

This study's population was selected at random in order to gain a comprehensive grasp of trash management. As a result, the following table displays the attitudes and behaviors of individuals with relation to the neglect of rubbish in their everyday lives.

**Figure 1.** Dumping facilities of wastages

From the above figure, total 85% people responses that they have dumping station near to their areas and 15% peoples oppose that statement. The following figure reveal that the area of dumping wastages in respective municipalities. The respondents said about why and how they were dumping their wastes in their local areas.

**Figure 2.** Place of Dumping Household Waste by the Participants

In our study, we have found that maximum respondent didn't dump the wastes in any specific areas or places. They just throw wastes in open places beside the roads and highway or near the households and the scenario was 40% in Norail sadar municipality, 45% in Kalia municipality, 42% in Kushtia sadar

municipality, 42% in Kumarkhali municipality, 45% in Satkhira sadar municipality and 48% in Kolaroa municipality. Another, the second largest respondents said that they were dumped their wastes beside the roadway and the scenario was 37% in Norail sadar municipality, 25% in Kalia municipality, 26% in Kushtia sadar municipality, 30% in Kumarkhali municipality, 31% in Satkhira sadar municipality and 25% in Kolaroa municipality. Besides, very few respondents argued that they usage container to storage and dumped wastes and the scenario was 24% in Norail sadar municipality, 16% in Kalia municipality, 20% in Kushtia sadar municipality, 30% in Kumarkhali municipality, 10% in Satkhira sadar municipality and 8% in Kolaroa municipality. Very few respondents responded that they were usage different policies to dumped their wastes during produces the wastes.

Opinions of Participants about Increasing of Solid Wastes in the Municipalities

In this part of the questionnaire, respondents were questioned on the manner in which the quantity of garbage that is accumulating in their respective municipalities is growing. The majority of participants mentioned a quickening of population increase.

Table 4. Opinions of the Participants about the Increasing of Wastes in Municipalities

How do you think the solid waste is increasing day by day?	Scenario of Municipalities					
	Norail sadar	Kalia	Kushtia Sadar	Kumarkhali	Satkhira Sadar	Kolaroya
Increase of population	53%	42%	60%	58%	55%	50%
Change of food habit	20%	18%	12%	10%	15%	20%
Not taking care of it	25%	35%	27%	29%	29%	27%
Others	2%	5%	1%	3%	1%	3%
Total	100%	100%	100%	100%	100%	100%

The above table revealed that the causes of increasing wastes in respective municipalities. Maximum respondents argued that the increase of population was the main causes of increasing wastes and the scenario was 53% in Norail sadar municipality, 42% in Kalia municipality, 60% in Kushtia sadar municipality, 58% in Kumarkhali municipality, 55% in Satkhira sadar municipality and 50% in Kolaroa municipality. Besides, 20% in Norail sadar municipality, 18% in Kalia municipality, 12% in Kushtia sadar municipality, 10% in Kumarkhali municipality, 15% in Satkhira sadar municipality and 20% in Kolaroa municipality were thought that the change of food habit of mass people also causes produces huge wastes in municipalities. Urbanization and employment opportunities is the major causes to change traditional food habit of general people. Another, 25% in Norail sadar municipality, 35% in Kalia municipality, 27% in Kushtia sadar municipality, 29% in Kumarkhali municipality, 29% in Satkhira sadar municipality and 27% in Kolaroa municipality were argued that authority of concern municipalities is not aware of their responsibilities properly which creates waste management problem.

Scenario of Wastes Collection

Following the successful installation of an appropriate waste management system with the assistance of the World Bank, there are specific methods of collection that have shown to be the most effective in the market region.

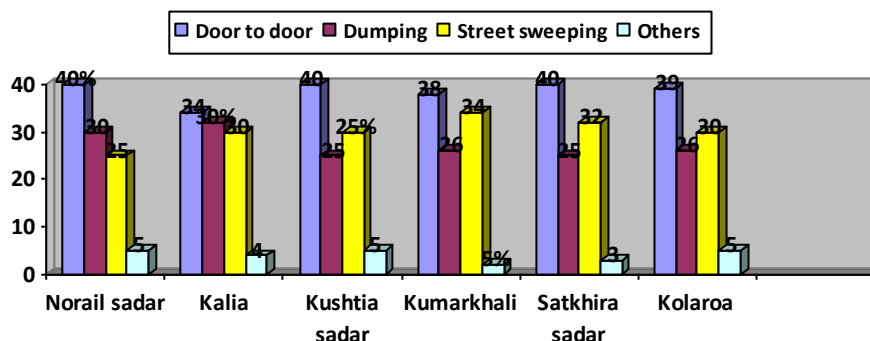


Figure 3. Types of Waste Collection System in the Society/Locality

The above figure shown that the collection system of wastes from all municipalities. From the above figure, 40% of Norail sadar municipality, 34% of Kalia municipality, 40% of Kushtia sadar municipality, 38% of Kumarkhali municipality, 40% of Satkhira sadar municipality and 39% of Kolaroa municipality's

total respondents said that municipalities concern department collected wastes from door to door every day. Besides, 30% of Norail sadar municipality, 34% of Kalia municipality, 25% of Kushtia sadar municipality, 26% of Kumarkhali municipality, 25% of Satkhira sadar municipality and 26% of Kolaroa municipality's total respondents argued that the municipalities concern department collected wastes from dumping areas. On the other hand, 25% of Norail sadar municipality, 30% of Kalia municipality, 25% of Kushtia sadar municipality, 34% of Kumarkhali municipality, 22% of Satkhira sadar municipality and 30% of Kolaroa municipality's total respondents said that the municipalities concern department collected wastes from street sweeping. Rest of the respondents claims that all the municipalities collected wastes in their own way. During our study we can't find any environmentally friendly and suitable process/ procedure to collect wastes from household, commercial or institutional areas in respective municipalities.

Nature of Monitoring in Waste Management

It is imperative that the concern department of the municipality do routine surveillance on the municipality. The following information on the monitoring scenario of the concerned department is presented:

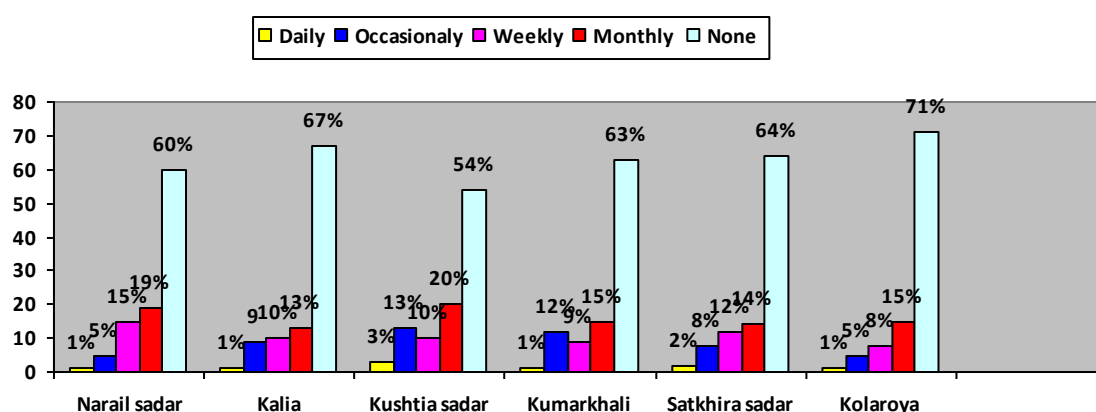


Figure 4. Nature of monitoring in waste management

From above diagram, 60% of Norail sadar municipality, 67% of Kalia municipality, 54% of Kushtia sadar municipality, 63% of Kumarkhali municipality, 64% of Satkhira sadar municipality and 71% of Kolaroa municipality's total respondents said that the municipal authority never monitors the wards regarding wastes management. We have found also 1% of Norail sadar municipality, 1% of Kalia municipality, 3% of Kushtia sadar municipality, 1% of Kumarkhali municipality, 2% of Satkhira sadar municipality and 1% of Kolaroa municipality's total respondents argued that the municipal authority regular monitor the wards regarding wastes management. Another, 5% of Norail sadar municipality, 8% of Kalia municipality, 13% of Kushtia sadar municipality, 12% of Kumarkhali municipality, 8% of Satkhira sadar municipality and 5% of Kolaroa municipality's total respondents said that the municipal authority occasionally visited the municipal wards. We have also found that 15% of Norail sadar municipality, 10% of Kalia municipality, 10% of Kushtia sadar municipality, 9% of Kumarkhali municipality, 12% of Satkhira sadar municipality and 8% of Kolaroa municipality's total respondents mentioned that the municipal authority weekly monitors the municipal wards regarding wastes management. On the other hand, 18% of Norail sadar municipality, 12% of Kalia municipality, 20% of Kushtia sadar municipality, 9% of Kumarkhali municipality, 15% of Satkhira sadar municipality and 14% of Kolaroa municipality's total respondents said that the municipal authority monitors the municipal wards on monthly basis regarding wastes management.

Major Problems of Waste Management System

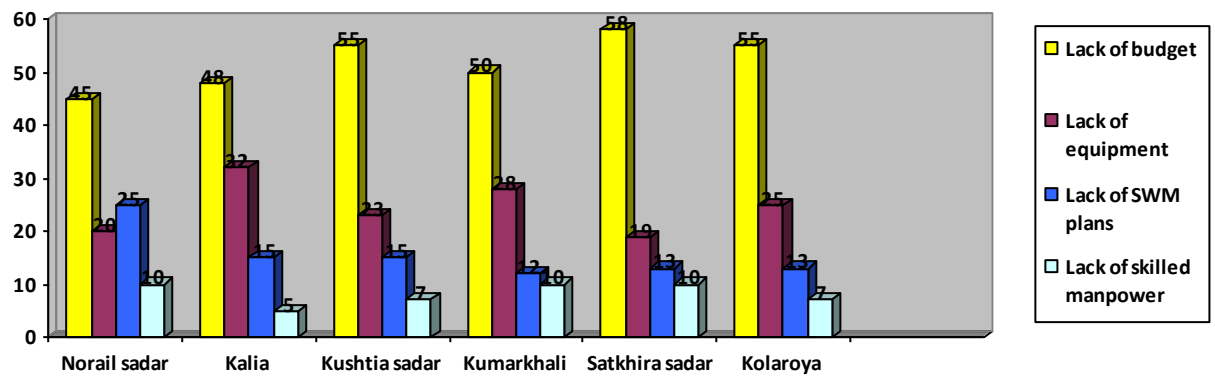


Figure 5. Major problems of municipal waste management system

The above diagram shows that the 45% of Norail sadar municipality, 48% of Kalia municipality, 55% of Kushtia sadar municipality, 50% of Kumarkhali municipality, 58% of Satkhira sadar municipality and 55% of Kolaroya municipality's total respondents thought that lack of adequate budget was the major cause to provide citizens' expected services. Another, 20% of Norail sadar municipality, 32% of Kalia municipality, 23% of Kushtia sadar municipality, 28% of Kumarkhali municipality, 19% of Satkhira sadar municipality and 25% of Kolaroya municipality's total respondents mentioned that lack of proper equipment in municipalities was one of the major causes to provide expected services. Besides, 25% of Norail sadar municipality, 15% of Kalia municipality, 15% of Kushtia sadar municipality, 12% of Kumarkhali municipality, 13% of Satkhira sadar municipality and 13% of Kolaroya municipality's total respondents argued that lack of municipalities waste management policies was another major cause to provide citizens' expected services. On the other hand, 10% of Norail sadar municipality, 5% of Kalia municipality, 7% of Kushtia sadar municipality, 10% of Kumarkhali municipality, 10% of Satkhira sadar municipality and 7% of Kolaroya municipality's total respondents claimed that lack of skilled manpower in the municipalities hampered waste management related activities which causes to provide expected services.

Suggestions Regarding Reuse, Reduce and Recycle (3Rs) in Domestic Waste Management

The majority of responders mentioned initiatives were meant to cut back on waste, utilize existing materials, and recycle old ones.

Table 5. Respondents Suggestions Regarding Reuse, Reduce and Recycle (3Rs)

Respondents' suggestions on 3Rs	Municipality					
	Narail sadar	Kalia	Kushtia Sadar	Kumarkhali	Satkhira Sadar	Kolaroya
How to reduce waste generation (%)						
Only buy necessary goods	35%	23%	20%	15%	20%	15%
Buy durable products	15%	17%	15%	10%	15%	10%
Use environmental friendly products	20%	30%	33%	35%	30%	35%
Bring reusable bags when shopping	35%	30%	32%	40%	35%	40%
Total	100%	100%	100%	100%	100%	100%
How to reuse waste (%)						
Reuse used plastic bags	35%	40%	45%	35%	31%	40%
Donate used clothes, shoes or notebooks	20%	17%	15%	20%	19%	18%
Reuse carton box to keep things	45%	43%	40%	45%	50%	42%
Total	100%	100%	100%	100%	100%	100%

How to recycle waste (%)						
Selling recycle trash	20%	24%	25%	20%	27%	20%
Recycle is to recreate useful things from trash	25%	26%	20%	23%	15%	18%
Residents cannot do recycling by themselves	55%	50%	55%	57%	58%	62%
Total	100%	100%	100%	100%	100%	100%

According to the above table, when individuals go shopping or purchase food and beverages, they do not carry containers or reusable bags. Small containers are more convenient, but they also produce more garbage. According to the findings of our survey, giving plastic bags to customers is seen as courteous and caring by vendors. According to the findings, respondents often reuse items including rubber bands, clothing, notebooks, shoes, and plastic bags. Compared to metropolitan regions, more individuals in suburbs reuse such items. Not only does the reuse technique save money, but it is also ingrained in care recipients. People are constrained from reusing items by convenience and family money. This is a crucial aspect, and inhabitants' reuse of objects has to be improved if trash output is to be decreased and the environment is to be protected. Similar to the previous two Rs, which are to reduce and reuse, recycling is more common among the underprivileged. Respondents often recycle rubbish, sell it, and make useful items out of it. Compared to metropolitan regions, more people live in suburban areas that sell and recycle waste. The cost of recycling garbage and family income can limit recycling activity. Due to the cheap cost of the items, which often do not include the expense of garbage removal, individuals become lazier and sell recyclable rubbish. Residents recycle rubbish more for the financial gain than for environmental or waste reduction purposes.

Authorities Perception on reasons behind the increase of wastes

They were questioned about how the amount of rubbish in their municipality is growing in this portion of the questionnaire.

Table 6. Opinions of Increasing of Wastes in Municipalities

Causes of increasing wastages	Scenario of Municipalities					
	<i>Narail sadar</i>	<i>Kalia</i>	<i>Kushtia Sadar</i>	<i>Kumarkhali</i>	<i>Satkhira Sadar</i>	<i>Kolaroa</i>
Increase of population	35%	30%	40%	33%	40%	33%
Lack of logistic support	20%	25%	19%	22%	15%	20%
Lack of Budget	40%	42%	40%	41%	43%	45%
Others	5%	3%	1%	4%	2%	2%
Total	100%	100%	100%	100%	100%	100%

The above diagram shows, 35% of Norail sadar municipality, 30% of Kalia municipality, 40% of Kushtia sadar municipality, 33% of Kumarkhali municipality, 40% of Satkhira sadar municipality and 33% of Kolaroa municipality's total respondents mentioned that due to increase of population in municipalities hampered waste management related activities which caused to provide expected services. Another, 20% of Norail sadar municipality, 25% of Kalia municipality, 19% of Kushtia sadar municipality, 22% of Kumarkhali municipality, 15% of Satkhira sadar municipality and 20% of Kolaroa municipality's respondents said that lack of logistic support of municipalities was one of the major causes to provide expected services. Besides, 40% of Norail sadar municipality, 42% of Kalia municipality, 40% of Kushtia sadar municipality, 41% of Kumarkhali municipality, 43% of Satkhira sadar municipality and 45% of Kolaroa municipality's total respondents said that lack of adequate budget was one of the major causes to provide citizens' expected services. Rest of the respondents' responses that different types of causes produces wastes like: lack of coordination of govt. offices, absent of proper waste related policies, lack of transparency and accountability etc.

Authorities suggestions about Reuse, Reduce and Recycle (3Rs) in Waste Management

The majority of responders indicated trash reduction, reuse, and recycling actions (Table 11). Even if their comprehension is basic, it would help the public's acceptance of this 3Rs program. The biggest contributors to the rising garbage creation are the availability of plastic bags and containers.

Table 7. Respondents' suggestions about Reuse, Reduce and Recycle (3Rs)

Respondents' suggestions on 3Rs	Municipality					
	<i>Narail sadar</i>	<i>Kalia</i>	<i>Kushtia Sadar</i>	<i>Kumarkhali</i>	<i>Satkhira Sadar</i>	<i>Kolaroya</i>
How to reduce waste generation (%)						
Buy necessary & endurable goods	40%	43%	45%	40%	41%	42%
Use environmental friendly products	25%	27%	33%	35%	39%	38%
Bring reusable bags when shopping	35%	30%	22%	25%	20%	20%
Total=	100%	100%	100%	100%	100%	100%
How to reuse waste (%)						
Reuse used plastic bags	35%	38%	39%	40%	41%	38%
Donate used clothes, shoes or notebooks	30%	26%	25%	27%	29%	28%
Reuse carton box to keep things	35%	36%	36%	33%	30%	34%
Total=	100%	100%	100%	100%	100%	100%
How to recycle waste (%)						
Selling recycle trash	25%	35%	40%	30%	25%	30%
Produce useful things from wastages	75%	65%	60%	70%	75%	70%
Total	100%	100%	100%	100%	100%	100%

When people go shopping or out to eat, they do not carry containers or reusable bags. Smaller containers are more convenient, but they also generate more garbage. Our research revealed that vendors who offered plastic bags to their customers were seen as more courteous and concerned. The data show that the majority of respondents recycle various items, including plastic bags, bottles, rubber bands, clothing, notebooks, and shoes. Suburbanites tend to repurpose such items more often than city dwellers do. Users who have developed the habit of reuse are not simply thrifty. People's willingness to reuse items is limited by factors including family income and ease of usage. There has to be a significant shift in how people in a community approach recycling and reusing materials in order to cut down on trash and improve the state of the environment. Similar to the previous two "Rs," reduction and reuse, recycling is more common among lower-income groups.

Many respondents reported selling recycled goods and making new items out of rubbish. There is a greater concentration of recyclers in suburban regions than in metropolitan ones. Recyclers are less likely to do so when the cost of doing so exceeds the disposable income of the family. The cheap price of the items, which often does not include the expense of trash disposal, encourages individuals to be too sluggish to sell recyclable garbage. Rather than doing it to safeguard the environment or cut down on garbage, most local recycle because of the money they may get from it.

CONCLUSION

Solid waste management is increasingly recognized as a critical global issue, particularly in Bangladesh, where urban and municipal governments are responsible for public services, including waste disposal. This research highlights the significant impact that organizational structures and management methodologies have on waste handling, revealing that insufficient human, financial, and technical resources hinder effective service delivery. The study emphasizes the importance of community involvement in waste management, suggesting that both intra- and inter-organizational factors must be integrated for sustainable practices. Recommendations include establishing Ward Development Committees, recruiting adequate cleaning staff, organizing awareness campaigns focused on the 3Rs, implementing financial incentives for waste reduction, and improving regulations in accordance with the Local Government Act. Future research should develop a framework for enhancing community engagement in solid waste management, assess the effectiveness of training programs, and investigate the role of technology in improving waste service transparency and accountability.

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