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Comprehensive Analysis of Municipal Waste Management in Bangladesh: Embracing the 3rs (Reduce, Reuse, Recycle)

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Abstract

Massive solid waste generation and mismanagement are important social and environmental challenges in urban and rural regions. Municipalities are worried about solid waste collection, disposal, and recycling, but population growth makes it harder to manage. Thus, millions of urban residents' face health risks and environmental damage from solid trash deposited on highways and into open sewers. Municipal solid waste needs special attention as time passes. The biggest problem with solid waste in cities is illness. Malaria, respiratory, ocular, and skin illnesses are worse in Bangladesh. Ground water and air pollutants also harm health. However, solid garbage stops the drainage system, flooding streets and causing mosquitoes, odour, and annoyance. This study aimed to determine waste generation rate (per capita per day), waste composition in houses, secondary dumping site, and final dumping site, waste reduction, and economic benefits of 3R policy. A questionnaire was given during residential garbage pickup. People were surveyed on socioeconomic status, garbage collection system, and generation rate. Our analysis suggests that mass and volume of recyclables are crucial to a healthy and cost-effective waste management system. Separate recyclable garbage and bring only organic and non-recyclable inorganic rubbish to the disposal.

Keywords: Waste, Management, Municipality, 3Rs (Reuse, Reduce and Recycle), Bangladesh.

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. 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 mind-set as they did before. Where they dump trash in open spaces, water sources, or places where no one lives [1]. 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 [2]. 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 [3].

Municipal or city offices, which 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 [4]. The following is a consequence of the fact that wastes have the ability to damage the essential elements that make up the living environment:

A major contributor to air pollution is the combustion of garbage.

Contamination of the soil might result from the dumping of solid waste.

The improper management of trash and rubbish by the municipality is the cause of human problems such as headaches, vomiting, neurological disorders, and so on [5].

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.

Methodology

The primary purpose of this research is to conduct an analysis of the current state of solid waste management in the municipalities, with the secondary objectives of identifying the obstacles faced by municipalities and the possibilities presented by their situations. The specific objectives are following:

To investigate the present methods used by the municipalities for the management of solid waste.

To find out how much Municipal Solid Waste is made in the study

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areas, what it is made of, and how it compares to municipalities in light of the 3Rs.

To determine the limitations of the existing Municipal Solid Waste system as well as the possible improvements that might be made to it in terms of the 3Rs.

Rationale of the Study

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 [6]. 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.

This is quantitative research. As a quantitative study, primary data is the most important thing for this research. This study combined the qualitative and quantitative approaches. Analytical research design has been used to look at quantitative data, which shows how respondents feel in a quantitative way, while qualitative data has been looked at in a descriptive way.

Selection of the Study Area: Six municipalities within three different districts were selected purposively for conducting this study. Number of population and their socio-economic status were given important emphasis to select the study area.

Data collection Methods: In order to gather information on the intended respondents, a series of objective-based questionnaires has been designed. The data for this research was gathered using the following methods:

Content Analysis: Content analysis entails gathering information from all important documents, books, journals, articles, online articles and research works. It has both quantitative and qualitative capabilities.

Key Information Interview (KII): A face-to-face interviews have been conducted. According to the researcher, face-to-face interviews with semi-structured oral interviews are appropriate for gathering information from them.

Survey method: In this study, a semi-structured questionnaire survey has been used to collect primary data. It's one of the most efficient ways to gather primary data.

Official Records: The information relating to this proposed issue have been obtained by reviewing and examining the official records, documents for better understanding of the proposed study.

Target population and sampling

One of the most popular non-probability sampling techniques was used by the researchers: the convenience sampling approach. The total sample size is 300 (three hundred), which includes both service providers (Pourashavas) and service users (Pourashavas people). Out of 300 respondents, 250 were selected (including both male and female) from the demand side (service recipients). The rest, 50 respondents are executives, elected officials and NGOs staffs of Pourashavas.

Sources of data and sampling procedure

In order to acquire this material, both primary and secondary sources were consulted. Secondary data is data that has been obtained from a variety of secondary sources, such as educational statistics, books, seminar papers, stories, past research and reports. Primary data are collected using methods such as interviews and questionnaire surveys [7]. Purposive sampling was employed to survey the complete sample using a semi-structured questionnaire. The research regions were chosen through selective selection. The following is the breakdown of the respondents:

(Table 1)

Data processing and data analysis

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.

Scenario of solid waste management in Bangladesh

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 [8]. 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.

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

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 [9, 10].

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)

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.

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%**

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)

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 (KNarail 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)

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

(Figure 2)

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

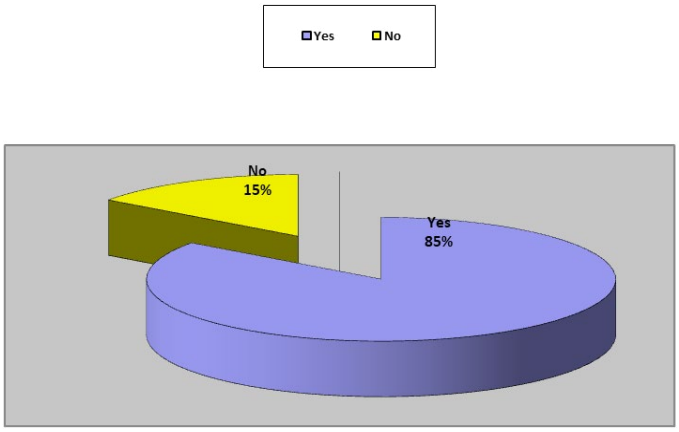

Figure 1: Dumping facilities of wastages.

mentioned a quickening of population increase.

(Table 4)

The above table revealed that the causes of increasing waste 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 are 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)

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

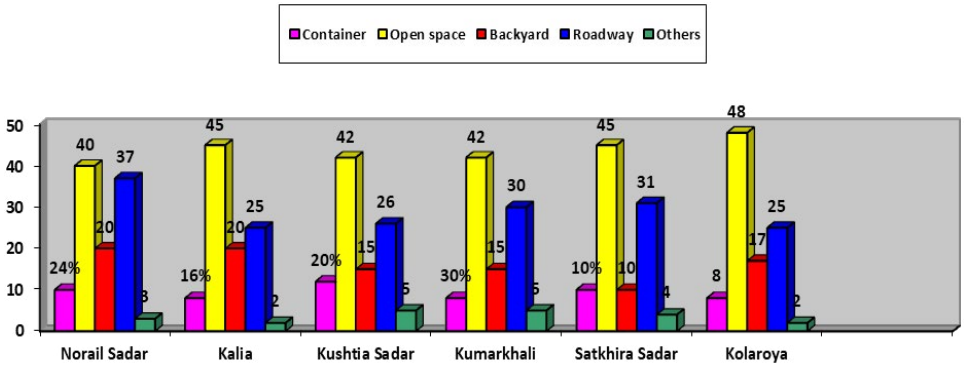

Figure 2: Place of dumping household waste by the participants.

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					
	Narail 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%**

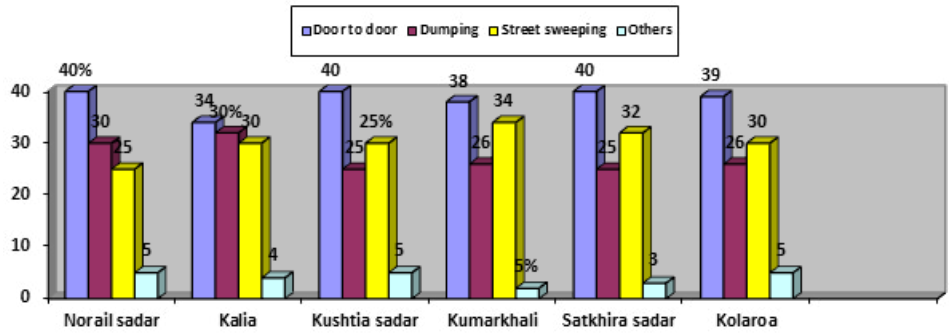

Figure 3: Types of waste collection system in the society/locality.

that municipality's 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 municipality's 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 municipality's 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)

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

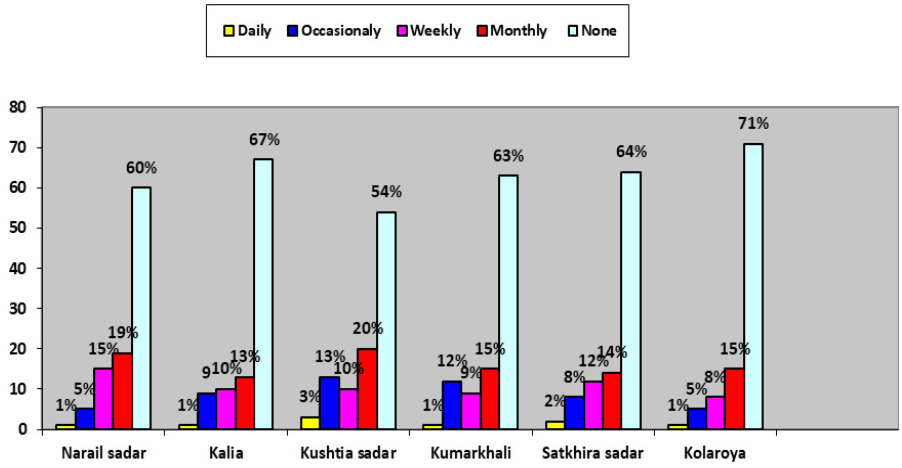

Figure 4: Nature of monitoring in waste management.

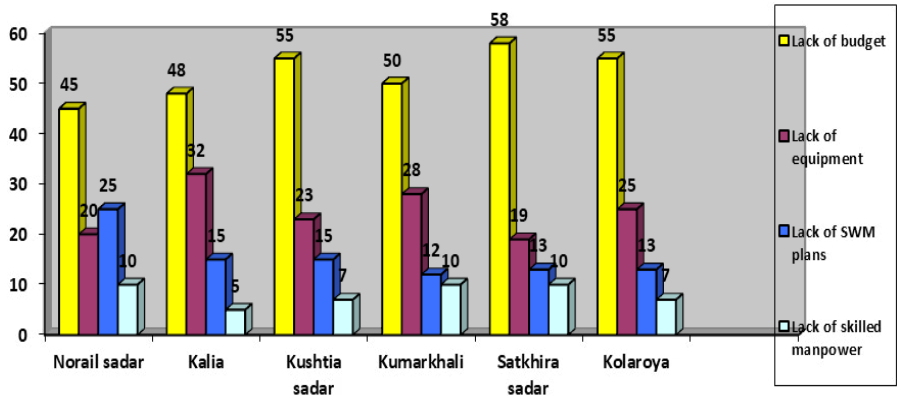

Figure 5: Major problems of municipal waste management system.

wastes management.

(Figure 5)

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 Kolaroa 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 Kolaroa 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 Kolaroa 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 Kolaroa 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)

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,

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 endurable 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%
Rese 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%**

Table 6: Opinions of increasing of wastes in municipalities.

Causes of increasing wastages	Scenario of Municipalities					
	Narail sadar	Kalia	Kushtia Sadar	Kumarkhali	Satkhira Sadar	Kolaroya
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%**

individuals become lazier and sell recyclable rubbish. Residents recycle rubbish more for the financial gain than for environmental or waste reduction purposes.

Authority's 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)

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 cause's 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. 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)

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.

Table 7: Respondents' suggestions about reuse reduce and recycle (3rs).

Respondents' suggestions on 3Rs	Municipality					
	Narail sadar	Kalia	Kushtia Sadar	Kumarkhali	Satkhira Sadar	Kolaroya
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%**

Conclusion

Solid waste management is a global issue that is getting more and more attention. From an organizational standpoint, this problem is extensively debated in Bangladesh and seen as being of utmost importance. The services that an organization provides to the community have a significant impact on how well it performs. In Bangladesh, urban and municipal governments are in charge of all public services, including getting rid of garbage. Many things inside and outside of an organization have a big impact on how solid waste is handled. In the management system, these components have individual and collective responsibilities. This research examined Pourashavas organizational structure, management methodology, and functional groupings for waste management. Due to a lack of human, financial, technical, and technological resources and supports, the service that municipalities provide does not meet the needs of the community. These choices are about the people in the community, who are key to managing solid wastes well. They can make sure that less waste is made, that it is separated, and that it has a place to go. Because of this, these actions need a lot of help from everyone in the community. Integration of both intra- and inter-organizational factors and their balanced performances could speed up sustainable solid waste management. Government should set up systems for regular monitoring and supervision, and local governments should do a good job of carrying out government rules and laws. Integration of all actors and players is the only way to make sure that municipal solid waste management is sustainable.

References

1. Milgram S (1967) The small world problem. Psychology Today 2: 60-67.
2. http://library.uc.edu.kh/userfiles/pdf/18.Models%20and%20Methods%20in%20Social%20Network%20Analysis.pdf
3. Schwartz MF, Wood DCM (1993) Discovering shared interests using graph analysis. Communications of the ACM 36: 78-89.
4. Kautz H, Selman B, Milewski A (1996) Agent amplified communication. Proceedings of AAAI: 3-9.
5. Domingos P, Richardson M (2001) Mining the network value of customers. Proceedings of the seventh ACM SIGKDD international conference on Knowledge discovery and data mining 57-66.
6. https://jqichina.files.wordpress.com/2012/02/the-elements-of-statistical-learning.pdf
7. Heidelberg Bjorck A (1996) Numerical Methods for Least Squares Problems. SIAM Philadelphia.
8. https://experts.illinois.edu/en/publications/mining-hidden-community-in-heterogeneous-social-network
9. Benjamin N.A Aryee (2001) Ghana's mining sector: its contribution to the national economy. Resources Policy 27:61-75.
10. GN Kitula (2006) The environmental and socio-economic impacts of mining on local livelihoods in Tanzania: a case study of Geita DistrictJournal of Cleaner Production. Journal of Cleaner Production 14:405- 414.