



Sustainable Solid Waste Management for the Urban Poor (Detail Research Paper)

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List of Acronyms

CBO	Community Based Organization
DNCC	Dhaka North City Corporation
DOE	Department of Environment
DSCC	Dhaka South City Corporation
DSK	Dushtha Shasthya Kendra
EPA	Environmental Protection Agency
FGD	Focus Group Discussion
KII	Key Informant Interview
MSW	Municipal Solid Waste
STS	Secondary Transfer Station

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Section A: Introduction

The mega city Dhaka is a city of attraction, providing shelter to over 21 million people within an area of 360 square kilometers.¹ The rapid infrastructural development and increase in per capita income triggers unplanned urbanization, which is relentlessly deteriorating the urban environment of this mega city. The urban poor are the primary victims of the continuing environmental degradation. Thousands of tons of diverse category wastes are being generated here every day and two city corporations, responsible for overall management of city waste, are collecting less than a half.² The rest remains on roadsides, in open drains and in low-lying areas, and severely worsening the city's environment.

The current waste management practice in Dhaka city is the open dumping practice that involves collecting waste from sources to secondary transfer stations (STs) and then transferring to a low-lying landfill for dumping. With few exceptions, the overall waste management system of the city cannot be termed as an efficient sequential process of waste minimization, recycling, and disposal based on global standards. This practice causes various problems like environmental degradation i.e., water, soil and air pollution, odor pollution along with several public health risks. Surface as well as groundwater is contaminated by the current management of urban solid waste.

A UNICEF data shows around four million people are inhabiting more than 5,000 slums of Dhaka city. A major portion of the urban dwellers earn less than \$1.25 daily, and at the same time live in a substandard environmental condition.³ Approximately 75% households of the slums live in a single room.⁴ The slum dwellers, responsible for generating the municipal solid waste (MSW) the least, are paying price the most. The women, children, elderly people and their families dwelling in urban slums on one hand are the least aware about MSW and on the other hand have the least capacity to bargain with the MSW management service providers and demand their rights as a citizen.

Objectives

The specific objectives of this study are as follow:

- find out the gaps and challenges in waste management and implementations;
- analyze the best practices in neighboring countries that have similar socio-economic conditions;
- analyze MSW relevant laws, rules and policies to identify hindrances;
- provide a set of recommendations towards sustainable waste management system in the Dhaka city, with a particular focus on the slum areas of the city

Target Waste

The study covers the MSW being generated in the jurisdiction of the Dhaka city. However, liquid and gaseous waste have been dropped from the scope of this study.

¹ <https://www.macrotrends.net/cities/20119/dhaka/population>

² <https://learn.tearfund.org/en/resources/footsteps/footsteps-51-60/footsteps-59/household-waste-management-in-dhaka-bangladesh>

³ Organic Solid Waste Management and the Urban Poor in Dhaka City, International Journal of Waste Resources, 2018, Vol: 8; by Mitali Parvin and Anwara Begum, Bangladesh Institute of Development Studies (BIDS), Dhaka, Bangladesh

⁴ <https://www.unicef.org/bangladesh/en/children-cities%C2%A0>

Site Selection and Rationality

For primary data collection four slums have been selected. These slums include Molla Bosti at Ward-6 Mirpur and Korial slum at Ward-19 Banani under Dhaka North City Corporation, and Hazaribag Balurmath Bosti and Hazaribag Boubazar Bosti at Ward-14 under Dhaka South City Corporation. The reason of this purposive selection is to get easy and quick access to the community since the time for field data collection was limited. The already established connections of Dhaka Calling project of Dushtha Shasthya Kendra (DSK) with the communities and relevant stakeholders helped the research team to collect data within the agreed time.

Methodology of the Study

The study have been completed following several stages. After preparing the research design and setting up the implementation strategy a couple of presentations have been delivered to shall the DKS team as well as with the consortia members of Dhaka Calling.

Qualitative research method has been followed in this study. For secondary data information retrieved from different journals, articles, blog posts, websites of relevant authorities and agencies, research papers, newspaper articles and so on. Key informant interviews (KIIs) have been conducted both online and on-site. The key informants include slum dwellers of different status, waste collectors, community based organizations' members, youth group members, representative of Department of Environment (DoE), waste collectors, labor supervisor, and field facilitator of Dhaka Calling project. Information also have been collected from the projects staffs of Dhaka Calling Project.

Besides two focus group discussions (FGDs) have been conducted, one was with the female slum dwellers and another one was with the CBO members, and the youth group. Primary data has been collected from all the selected four fields. Different checklists have been used to conduct KIIs and FGDs.

Field visits have also been conducted in the fields to observe the overall situation related to SWM and collect evidence by taking photos.

Section B: Current Status of Solid Waste Management in Dhaka

Define Waste and Types of Waste

"Waste" means any solid, liquid, gaseous, radioactive substance, the discharge, disposal and dumping of which may cause harmful change to the environment.⁵ According to Environmental Protection Agency (EPA) household waste includes any solid waste, including garbage, trash, and sanitary waste in septic tank derived from houses, apartments, hotels, motels, and picnic grounds.

Facts of Dhaka

Dhaka is one of the most populated cities in the world, with a density of 23,234 people per square kilometer within a total area of 300 square kilometers. According to World Population Review Dhaka's 2021 population is now estimated at 21,741,090.⁶ More than 31% of urban dwellers are living in slum in Dhaka City, mainly, they are the rural-urban migrants.⁷

The Dhaka City Corporation was dissolved by the Local Government (City Corporation) Amendment Bill 2011 on 29 November 2011 and divided into two autonomous bodies, Dhaka South City Corporation (DSCC) and Dhaka North City Corporation (DNCC).⁸ DNCC has an area of 192.66 sq. km, consists of 54 wards, with a population of 24,97,116,⁹ whereas with an area of 109.25 square kilometer, consists of 75 wards DSCC has a population of approximately 1,20,00,000.¹⁰

Waste Management Responsibilities of DNCC and DSCC

Functions of Waste Management Division of the City Corporations of Dhaka include:¹¹

- Collect solid waste from domestic, business, hospital, street, public toilets and drains and clean the road of the city
- Provide dustbins and other receptacles for accumulating the waste
- Sanitary landfill Management
- Arrange community meeting for promoting community base solid waste management
- Community based waste management activities.
- Compost from Waste

Dhaka South announced BDT 6731 crore budget for FY2021 – 22¹² and Dhaka North City Corporation (DNCC) on Monday approved a budget of BDT 4,806.45 crore for the fiscal year 2021-22. The DNCC has set the total revenue expenditure at BDT 619.85 crore for the new fiscal year. Of this, BDT 100 crore has been set aside for "waste management".¹³

⁵ Source: The Bangladesh Environment Conservation Act, 1995

⁶ <https://worldpopulationreview.com/world-cities/dhaka-population>

⁷ http://urc.or.jp/wp-content/uploads/2014/06/0612_bangla_2.pdf

⁸ https://en.wikipedia.org/wiki/Dhaka_North_City_Corporation

⁹ <http://www.dncc.gov.bd/site/page/c0b6953f-16d3-405b-85e9-dece13bb98de/Location-and-Area>

¹⁰ <http://www.dsc.gov.bd/site/page/c918f990-1f75-46cb-95ad-c08d10197af5/->

¹¹ <http://www.dsc.gov.bd/site/page/a3ab3b69-590a-4a87-bc5b-875e9cc6cf59/->

¹² <https://www.tbsnews.net/bangladesh/dhaka-south-announces-tk6731-crore-budget-fy2021-22-275413>

¹³ <https://www.daily-sun.com/printversion/details/564366/DNCC-approves-Tk-4806cr-budget-for-FY-202122>

Waste Generation in Dhaka City Corporation Area

The solid waste being produced in Dhaka City Corporation (DCC) area mainly by the household activities, commercial as well as industrial ventures. Different studies show different amount of waste being produced here. On an average 6000 tons of solid waste in DCC, amongst 2500 tons wastes are being generated at DNCC area and 3500 tons wastes in DSCC area.¹⁴ DNCC and DSCC are collecting respectively 1600 tons and 2200 tons every day. Whereas, everyday almost 1600 tons of solid waste remains uncollected and can causes numerous pollutions and create obstacles in the drainage system.

The generated waste is mainly organic in nature that counts almost 70% of total waste. However, due to increasing construction works this calculation might be altered by construction garbage in coming days.¹⁵ Data of a DNCC waste report shows that DNCC collected 8,52,391 tons of waste in FY 2016-2017 and the waste collection growth was 24.77%.¹⁶ In DNCC area per capital per day waste collection is 0.513 kg.

Mobile phone is a major source of electronic waste. 6% to 8 % highly toxic cadmium is found in the battery of cell phones and the out of work phones are indiscriminately being handled by the waste workers without any environmental treatment. The survey of Retem Corporation of Japan projected that by 2021 E waste from mobile phone in Dhaka city shall be 1170 tones.¹⁷

Conditions of the Landfills of Dhaka

The ultimate destinations of MSW being collected by the two city corporations of Dhaka city are Amin Bazar and Matuail landfill. The total area of Amin Bazar and Matuail Landfills are respectively 52.88 acres and 100 acres, the both landfills are about the reach the maximum limit of waste storage. The waste accumulated in Matuail Lanfill is almost 20 metres high, while Aminbazar Lanfill is nine meters high.¹⁸ Every year the amount of waste has been creasing in an alarming rate; for instance, in FY 2017-2018 in DNCC 21.93 percent waste increases than the previous year.

The capacity of Amin Bazar Landfill already exhausted according to a projection of JICA. DNCC is thinking of incineration to reduce the waste. If used, according to a DNCC waste report, this technology can reduce the waste volume 80%-90%. DNCC has the vision to develop a sports complex after 30 years of completely settling down operation.

Reasons of Increasing Waste in Dhaka

The reasons behind the ever increasing rate of waste are in DSCC and DNCC areas are mainly:

- Economic development triggered a change in the lifestyle;
- Increasing population in different areas of the city corporation;

¹⁴ Executive engineer of DSCC provided the info to the Daily Start journalist. Link:

<https://www.thedailystar.net/frontpage/news/wastes-world-worries-1732753>

¹⁵ Published article of the Daily Star quoting the DNCC Chief Waste Management Officer.

<https://www.thedailystar.net/frontpage/news/wastes-world-worries-1732753>

¹⁶

http://dncc.portal.gov.bd/sites/default/files/files/dncc.portal.gov.bd/notices/6fbdcf34_b55a_4fd2_887f_6e78d5a_da3c5/Waste%20Report%202016-2017.pdf

¹⁷

http://dncc.portal.gov.bd/sites/default/files/files/dncc.portal.gov.bd/notices/6fbdcf34_b55a_4fd2_887f_6e78d5a_da3c5/Waste%20Report%202016-2017.pdf

¹⁸ Time to be WARY of Waste, by Mahbubur Rahman Khan, published on the Daily Start on 21 April, 2019. Visit the link to read the article: <https://www.thedailystar.net/frontpage/news/wastes-world-worries-1732753>

- A rise in the super markets, grocery shops, vegetable markets, restaurants and hawkers; and
- In 2016 the inclusion of 16 unions with the DSCC and DNCC also driving to an increase in per day waste volume being generated

Section C: Problems and Impacts of Existing Waste Management Practice

Existing Problems

From behavioral to institutional, there are a series of problems linked current waste management practice. For instance, in 2016 an initiative had been taken by the city corporation authorities to set up 6000 mini bins around the Dhaka city. However, in reality it is found that rather using the bins the pedestrians are still littering the streets.

There are hundreds of thousands of people who either cannot afford the service charge, or out of the service of door to door waste collection. Hence, these people often through their everyday waste onto streets, drains or nearby water bodies which eventually is polluting water, making blockage in the drains and causing one of the major reasons of city's waterlogging. Refusing to take part in recycling and lack of awareness are also keeping alive and accelerating existing problem of waste management in Dhaka. With poor waste management and limited availability in the landfills, waste generation continues to be a problem. As more waste is generated, space runs out in landfills. In addition, the landfills are not in a sanitary state and have resulted in worsening Dhaka's environment.

Impacts of Existing Waste Management Practice

Uncontrolled waste disposal generates air and water pollution, soil contamination, and an increased risk of exposure to pathogens and toxic substances. Poorly managed waste also contributes to climate change through methane off-gassing and can, in some circumstances, threaten biodiversity.

Environmental Impacts

Environmental pollution refers to all the ways that human activities harm the natural environment. Generation of gas, foul smell, and noise dust and so on are the common environmental impacts in the existing disorganized MSW management.

Impacts of Air

Open burning of municipal waste poses serious negative impact upon the air. The unauthorized and uncontrolled burning of waste at the existing disposal site also causes serious air pollution. Due to open dumping, air pollution is common problem in the landfills. Landfill gases also have been largely affecting the environment by emission of methane and carbon-dioxide into the atmosphere.

Effects of Water

Chemical and oil spills, which are mixed with solid wastes are caused serious water pollution. During rainy season the water level rises up to the ground surface of the disposal site. Infiltration of leachate to the ground water table pollutes the groundwater.

Ground Water Contamination

Public concern have been increasing about the hazards associated with the landfills. Particularly people living with the close proximity of a landfill site are aggrieved of the continuation of the site since it has been directly impacting upon the lives and livelihoods of the people. Ground-water contamination is one

of the major risk factors of the landfills since people of Bangladesh are mostly dependent on aquifers for their drinking water. Additionally, ground water also being used for irrigation as well as industrial production. Hence, once polluted the cleaning up contaminated of ground water is almost impossible.

Soil Contamination

Indiscriminate disposal of wastes into the open field, drains, roads etc. also responsible for land contamination. Various heavy metals and some organic compounds such as petroleum, pesticides and so on from the landfills are also polluting the soil.

Health Hazards

Different vector borne disease spread due to improper management of municipal waste. Flies and mosquitoes are commonly found in municipal waste during transfer as well as in the landfills. Mosquitoes spread diseases like malaria and dengue.

Other Impacts

- Animals like rats are found in waste dumps. They consume food from waste, damage electrical cables and other materials.
- Traffic congestion takes place on the main streets and other access roads during waste loading and unloading. At the same time dumping of waste and abandoned vehicles block the streets.
- Haphazardly disposal of waste creates a severe aesthetic nuisance.
- A landfill site is also associated with driving down the property values.

Section D: Best Practices in Other Countries

Position of Bangladesh in Global Ranking on Waste Management

Sustained growth of Bangladesh's economy and urban population has seriously polluted the environment of Bangladesh and made it a country with the poorest environmental performance.¹⁹ In 2020, Bangladesh ranks 117 out of 133 countries on waste management analyzed by the Environmental Performance Index (EPI) 2020.²⁰ The score of Bangladesh is 5 out of 100. The highest scorers, scored 100 out of 100, are Colombia and Netherlands. Countries like Denmark, Sweden, and Singapore also scored more than 99. The regional rank of Bangladesh in EPI is 6 among the eight South-Asian countries in Waste Management metric. Bhutan ranked the first position with 59.7 score out of 100. Pakistan, Nepal, India, Maldives are other countries doing better in solid waste management than Bangladesh. Only Sri Lanka and Afghanistan scored lower than Bangladesh.

Waste Management Practices by the EPI 2020 Toppers

The waste management EPI toppers adopted different forms of waste management strategies and implementing on ground, which can be a set of good examples to be followed for policy formulation as well implementation in the cities of Bangladesh, in particular by the DSCC and DNCC.

- 100% of waste generated by the Colombians is controlled just because of the recognition of and support for informal waste pickers. Colombian municipal authorities are ensuring required infrastructure and equipment to the waste picker cooperatives and recognize the waste pickers as public service providers by law.
- EU and North American states have adopted of strong waste management policies and infrastructure for recycling, composting, and waste-to-energy incineration to ensure highest levels of value recovery from waste.
- Implementing a volume-based landfill tax, banning landfill disposal Netherlands reduced the amount of waste sent to landfill from 35% in 1985 to 2% in 2016.
- Mauritius controls 98% of its waste through a system of transfer stations and sending it to the island's sanitary landfill or its large-scale composting facility.
- Vanuatu, on the other hand, has made strides towards relieving the pressure on two controlled landfills through a comprehensive ban on single-use plastics.

¹⁹ <https://documents1.worldbank.org/curated/en/761221585204062672/text/Concept-Project-Information-Documents-PID-Bangladesh-Environmental-Sustainability-and-Transformation-Project-P172817.txt>

²⁰ <https://epi.yale.edu/downloads/epi2020report20210112.pdf>

India and Nepal are two neighboring countries doing better than Bangladesh in solid waste management according to EPI 2020 data. A few of the best practices of different cities of India²¹ and Nepal²² have been analyzed from secondary sources.

SWM Best Practices in Selected Indian Municipalities

SWM of Kochi City Corporation

Kochi, a city in southwest India's coastal Kerala state, the Kochi module of SWM reflects the best practices on source segregation of waste as exemplified by the Kochi Municipal Corporation. The case study shows how source segregation, composting, stringent legal system coupled with multi-stakeholder participation leads to effective waste management in urban places which are devoid of adequate landfill spaces.

SWM of Panaji City Corporation

Panaji, the capital of Goa state of western India, the Panaji module follows the vision to attain zero landfilling and has been successfully translated into reality by the Corporation of the City of Panaji. The entire city segregates waste into a minimum of 6 fractions. The dry waste is further segregated into 18-20 fractions for recycling, organic waste is composted and dry waste rejects sent for co-processing among others good practices. One vision, stable leadership, repeated and targeted campaigns, and continuous innovation have helped Panaji achieve this success.

SWM of Vijayawada Municipality

Vijayawada module of the Vijayawada Municipal Corporation of Andhra Pradesh has followed the simple and effective management of organic waste through decentralized vermicomposting facilities. The module details out the step by step guide to vermicomposting technique - its operation, maintenance, pre and post care.

SWM Best Practices in Selected Indian Municipalities

SWM of Bhaktapur Municipality

Bhaktapur is one of the three municipalities of Kathmandu valley. Local community groups provide waste management services under an annual contract to the municipality in 12 of the 17 wards here. However, the municipality still has overall responsibility for waste management in the five remaining wards. The municipality allocates one waste inspector to each of the wards. Both the municipality staff and the group contractors are local residents. The resulting knowledge of the areas in which they work and their accountability to the local communities are contributing to the effectiveness of the approach.

SWM of Tribhuvannagar Municipality

The location of Tribhuvannagar municipality is in the oldest in Rapti Zone. This municipality is not only handling solid waste properly, but is also generating income from the landfill site and waste recycling. This municipality is spending a considerable amount of its revenues for managing solid waste in safe and healthy ways.

²¹ Visit the following link to learn best practices of by the selected Indian municipal authorities: [Best Practices on Solid Waste Management in India - Resources • SuSanA](#)

²² Best Practices on Solid Waste Management of Nepalese Cities, by: Practical Action Nepal, November 2008.

Source:

<https://www.nswai.org/docs/Best%20practices%20on%20solid%20waste%20management%20of%20Nepalese%20cities.pdf>

Bharatpur Municipality

Bharatpur municipality is regarded as a middle-sized municipality and the commercial center of Narayani Zone in the mid-southern area of Nepal. This municipality has 14 wards covering an area of 162.16 square kilometers. Both for waste management and in recycling activities, considerable numbers of private organisations are expressing their interest. It is believed that significant numbers of jobs can be created for poor people and increased effectiveness in waste management can be achieved with minimal additional municipal expenditure.

Section E: Major Findings of the Study

Who are Collecting Waste?

“City corporation is not directly involved with waste collection from our slum”, said one respondent of Balurmath slum, Hazaribag. This reality is almost same in rest other slums of DNCC and DSCC. The counselor of respective wards appoint a contractor to collect waste from door to door. In most of the cases the contractors are politically involved and do not maintain any communication with the slum dwellers. “We want to share our sufferings with the contractor and the counselor. However, no chance ever been created. Discussion is ongoing among us under Dhaka Calling project’s platform. Hopefully we will be able to meet each other in near future,” said a dweller of Balurmath slum. Surprisingly, in some slum areas the counselors even do not appoint any contractor. For instance, there is no involvement of any contractor at Mollar Bosti area under DNCC in collecting waste.

Waste Collection Time

“It is expected that the waste collectors will avoid the active hours. Unfortunately, there is no timetable. It could be in the morning, afternoon or in the evening”, said an aggrieved slum dweller. The unplanned waste collection is posing health threat. Besides, for not having any specific time the dwellers frequently miss the van. During field visit waste collection vans were found almost all through the day. Observing the activities of two secondary transfer stations (STS) of DNCC and DSCC is found that there is no timetable even in the STSs. Vans are coming one after one, waste is getting dumped and for not having any rational working hour the people passing though the STSs have to pay the price by inhaling horrible odor.

Transportation of Waste to the STSs



Haphazardly parked primary waste collection vans beside a busy street, in front of a STS. Source: Field Photo

The waste collectors use paddle vans (three wheeler rickshaw van) to transfer solid waste from households to the designated STSs. These locally modified mobile bin like vans do not have any lid. Moreover, the primary waste collectors, also working as waste pickers, hang sacks from the top edge of vans' wall to segregate nonorganic waste. Strong foul smell of rotten waste, spillage of filthy water on the roads of slums literally create intolerable environment only for not covering the waste properly during households to STS transfer. Besides, during field visit the involvement of adolescents as the primary waste collector as well as the van puller have

been observed. A respondent of Korail slum said, "Our slum is divided into four parts for waste collection, and for each part one van and two waste collectors have been deployed."

Management of Waste in STSs

It is a common scenario of the STSs of both DNCC and DSCC that waste is kept outside the STSs since the STSs cannot provide primary storage facility to all the collected waste. Functioning of two STSs have been observed during the field visit. Both STSs are close to busy street and found functional. Vans loaded with household garbage were reaching one after another. The STS of DNCC near Gabtali Bus Terminal was found comparatively better managed. However, the workers were dealing with waste without any gloves, gumboots or any protective gear. This indicates alongside the infrastructural management of STSs the workers safety must be ensured.

An almost reversed scenario has been observed in the STS dedicated for DSCC ward no. 14. The primary waste collection vans were found parked haphazardly in front of the STS. Inside the STS working environment was literally messy and hazardous. Though there were vacant space inside, mound of waste was found outside the STS. Thousands of people and vehicles were passing through the street. The workers informed that around one hundred van have been deployed for this STS.

Recycling of Waste

There is no systematic waste recycling mechanism observed in MSW management collected from the selected urban slums. However, still recycling is a huge informal economic sector in context of two city corporations of Dhaka. A data shows approximately \$0.2 billion in being earned from waste recycling

sector. Around 1,20,000 poor people, exclusively from the urban slum are working as waste pickers.²³ In fact, these unrecognized waste pickers are playing the major role in waste recycling process.

The major concern is the health hazard associated with the working environment as well the persons who are workers as waste pickers. Mostly, the waste pickers are the children, adolescents and the females. They are completely unaware about the severe risk of segregating waste in open hands and without any sorts of protection. All the door to door waste collectors also work as waste pickers since it gives some extra bucks in their pockets. Alarmingly, during field visit with her son picking waste from an illegal roadside waste dumping site. The workers working inside the STSs are also working as waste pickers. No need to say that they all are slum dwellers and have taken this highly risky but 'easy' job since it does not require any investment. Moreover, they are fighting for survival and everyday dealing with waste-bomb

Arbitrary Attitude of Primary Waste Collectors

They do not collect the waste every day, rather in every alternate day, and sometimes they take even longer to collect the waste. 'Per day one van waste' strategy from a designated area is being followed by the household to household waste collectors irrespective the amount of waste being produced and needs to be collected, shared the slum dwellers. One of the informants said, "both are true here, on one hand they actually do not have the capacity to collect all the waste, and on the other hand they do not come twice even though sometimes they actually can, since they are not accountable to the local people."

They also complain about the arbitrary attitude of the primary waste collectors. A female informant shared, "they only collect the everyday household waste, and not any old clothes, blankets, or other forms of waste. However, if you pay some extra money charged by them, usually 50 to 100 bucks, they take everything."

Bargaining with, or questioning the activities of primary waste collectors is nearly impossible. "They will stop collecting waste from your home. If anyone do this, all other tenants shall be suffer and they will be quarrelling with you for arguing with the waste collectors. And, this is why we cannot raise questions on their activities", said a participant.

"We are being over charged and no ways to bargain"

The participants of Balurmath slum questioned the monthly service charge being collected by the door to door waste collection service provider, which is 100 taka per month per household. "Here usually households are small in nature. In most of the cases one room, one household. It doesn't matter what the size of the household is, if have to pay 100 taka", said one participant. A shopkeeper doing business here for long years said, "We were much better before our inclusion with the city corporation. We paid only 30 to 40 taka per household as the waste collection service. You will be surprised, even about one year ago we used to pay 60 taka per household and they increased it to 100 taka in a single jump. This is quite ridiculous and we do not have any option to raise question on their decision." The service charge is same at Bou Bazar slum. However, it varies from slum to slum. For instance, the waste collection service provider of Molla'r Bosti (Molla's Slum) shared that he charges 60 taka per household as service charge.

²³ Recycling and Waste Management, by A K M Maksud, Grambangla Unnayan Committee, Bangladesh. Int J Waste Resour 2017.

Where the Slums' Waste Goes?

One might say that the ultimate destination of city waste, irrespective of areas, are the designated landfills of the city corporations. However, the reality is not same to the slums and cities planned residential parts. The waste of a part of the Mollar Bosti, a huge slum at Mirpur 12 area, is being collected by a group of local political activists and the collected waste is not ending up to the Amin Bazar Landfill as it was supposed to. Eventually collected waste is being dumped to Jhilpar area. The uncollected waste of Mollar Bosti area is going to the nearby wetlands. "Putting in the sacks they are dumping waste in the wetland beside Notun Rasta (new road)", said one of the respondents.

However, the situation is not as deteriorating as Mollar Bosti in other slums such as Bou Bazar, Balurmath and Korail slum. Though a partial waste collection is operational in these slums there are many other issues.

Significant portion of slum waste is not being collected by the service providers. Eventually the uncollected waste is ending up to the street side, nearby fallow land, drains and canals. "We are highly concerned about the waste from live animals, in particular, the intestines and other body parts of chicken and fish. It's impossible to keep those longer at home. Since the waste collectors do not come every day, we actually cannot wait. We tie those up in the polythene bags and through away at a suitable place." Showing to a manhole one of the Civil Society Organization (CSO) members said, "Look the water planning area of the manhole is blocked with waste. When it rains all the waste will go down and create blockage in the drainage system."

Most of the slum dwellers are temporary migrants and they shift from one place to another place due to new opportunities and many other options. The waste getting generated during his shifting are not being collected by the primary waste collectors. Pointing to a fallow mattress a field facilitator of Dhaka Calling project said, "The waste collectors never take these blankets and people through these out here and there. This might impose serious threat to the drainage system, if washed out to drains and canals."

Alarmingly, the waste from cities so called urbanized parts is also coming to the slum areas. The participants in a group discussion shared that dead bodies of the animals, used clothes of deceased persons, construction garbage are coming to the illegal dumping points near by the roads. "We cover our nose with the scarf when pass these areas. This foul smell is intolerable. Though it's happening in our area, we are not responsible for this." Many females from slum area are working in apartments as maid. "They give their garbage to their maids and give them some money, mostly 20 to 50 taka, to through somewhere in a garbage pile on their way to home", said one informant.

A few number of illegal dumping sites have been pointed out during the filed visit. The illegal dumping site beside the designated secondary transfer station of ward number 14 is an ideal example. The participants in a discussion with the female group shared that garbage from Dhanmondi area comes here during night. The ward counselors blame each other for this illegal dumping.

Impact on Female Health, Children and Old

The improper waste collection poses serious health hazards in particular to the slum dwellers. “Here children frequently suffer from diarrhea, respiratory diseases, allergy problem and many other skin diseases. We do not have any government health care facilities, not even a community clinic nearby. Eventually we have pay a higher consultation fee to for the health care”, said a female respondent of Bou Bazar Slum. The elderly persons also face acute health hazard. Notably, the pregnant mothers suffer the worst. “They cannot tolerate the terrible odor of rotten waste. Sometimes they even vomit and it’s dangerous for the fetus.”

Additionally, the uncollected waste ending up inside the manholes can produce gas and accumulated gas can blast anytime without any clue, and this might toll the death of many. A few months back the Bou Bazar Slum dwellers experienced a similar incident though no one was injured. “It was like a huge bomb blast. Fortunately, no one was nearby, a vegetable van was parked over the manhole. The blast had blown away the van and broken it into many pieces”, said a Bou Bazar resident.

Involvement of Youth Groups and CBOs in Raising Awareness

During field visit presence of active youth groups and CBOs have been found the slums Dhaka Calling project working in. The youth group leader of Balurmath slum shared, “Our main role is to raise awareness among the urban slum dwellers. We are committed to change ourselves at home first. We do practice not to put the household trash in an improper place and ensure to hand it over to the designated vans”. A female CBO leader share with the research team that due to the project the youths are not comparatively more aware of waste management. The CBO members expect that this platform will help them for collective bargaining. However, there are still worries in the field. One respondent said, “Dhaka Calling is a two years’ project. It’s good that we are getting organized. But, we need such helping hands with us to raise our voice. No one of city corporation office will count us if we go alone. We really feel powerful we can find any forum or platform that can fearlessly meet the authorities.”

Section H: Existing Regulatory Framework

Till to date there is no act or rules regarding SWM. The SWM of DNCC and DSCC is being operated according to Local Government (City Corporations) Act 2009, Environmental Conservation Act (ECA) 1995, and Environmental Conservation Rules (ECR) 1997. A table is mentioned below highlighting legal mechanisms.

Existing Regulatory Mechanisms			
Year	Legal mechanisms	Implementing authority	Key provisions
1972	Constitution of Bangladesh (15 th Amendment, 2011)	GoB	Article 18A of the constitution of Bangladesh portrays that the state shall endeavor to protect and improve the environment and to preserve and safeguard the natural resources, bio-diversity, wetlands, forests and wild life for the present and future citizens

1983	Dhaka City Corporation Ordinance, 1983	DCC	Dhaka City Corporation held responsible for collecting waste from secondary waste collection points, i.e., its dustbins/ containers, and transport to final disposal sites
1992	National Environment Policy 1992	Department of Environment (DoE)	Activities which pollute and degrade the environment are identified and distinguishes and manages exercises that degrade and pollute the earth.
1995	Environmental Conservation Act 1995	DoE	Provides definition of wastes (Section 2L) and prescribes disposal standards for various kinds of waste and control the dumping of hazardous waste (section- C)
1997	Environmental Conservation Rules (ECR) 1997	DoE	<p>Focused mainly the hazardous industrial waste. Management responsibilities are given on respective industrial entities.</p> <p>Sets the standards for mechanical wastes and gushing release, and enterprises need to adhere with few principles to pick up a Clearance Certificate for their activity.</p>
2004	Dhaka Declaration on Waste Management by SAARC countries during 10-12, October 2004		The SAARC nations consent to support NGOs and privately owned businesses to build-up community-based composting, segregation at the source, separate collection, and resource recovery from wastes, with specific focus on composting
2005	Environment Management Plan 2005	DoE	Prioritizes reduction and recycling of wastes.
2005	Solid Waste Management Action Plan for Eight Secondary Towns in Bangladesh 2005	DoE	4R principle i.e. reduce, reuse, recycle, and recovery of waste was introduced in this plan
2008	Medical Waste Management Rules 2008	DoE	Source separation along with a separate SWM system development is recommended
2009	Local Government (City Corporations) Act 2009	LGED	Inhabitants should maintain buildings under city authorities jurisdiction Responsibilities remains same as Dhaka City Corporation Ordinance, 1983
2010	National 3R (Reduce, Reuse and Recycle) Strategy for Waste Management 2010	DoE	Promotes user pay principles and 3R strategies as well as implementation of proper technology.

2018	Solid Waste Management Rules, 2018 (Draft)	DoE	Encouraged public-private partnership (PPP) for composting and energy recovery
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Legal Provisions under Local Government (City Corporation Act) 2009

The Local Government (City Corporations) Act 2009 specifies waste disposal, collection and management as one of the major responsibilities of the city corporation. According to this act collecting waste from public spaces, toilets, drains, buildings and other places shall be the responsibility of the city corporation. The act also ensured that the ownership of collected waste by the supervision of City Corporation shall remain to this authority. This shall be applicable to other equipment and infrastructure related to collection.

Legal Provisions under ECA 1995

Based on Section 6C of Environment Conservation Act 1995 government can control the dumping of hazardous waste. However, separation of medical waste, electronic waste as well as other hazardous waste from the biodegradable household waste is rarely being practiced is entire waste management system of DSCC and DNCC.

According to Section 6D (uma) of Environment Conservation Act 1995 the place designated as wetland cannot be filled or the nature as wetland cannot be changed. However, in reality, the Amin Bazar land filing site (waste dumping site) of Dhaka North City Corporation under Konda and Boliarpur mouza is established on the flood flow zone of Dhaka City Corporation master plan. By acquiring 54 acres of land the site has been started on 2004 by the then Dhaka City Corporation.

Section 12 of Environment Conservation Act 1995 clearly mentioned that no project shall be taken without environment clearance certificate. Besides, sub-section 12 (4) emphasized on the evaluation of public opinion as well as ensure the access to information for the general people.

Legal Provisions under National 3R (Reduce, Reuse, Recycle) Strategy for Waste Management 2010

The Department of Environment under the Ministry of Environment and Forests has introduced the National 3R Strategy for Waste Management on December 2010. It provides detailed guidelines on proper collection, segregation and disposal of waste. The national 3R goal was to achieve total elimination of waste disposal on open dumps, rivers and flood plains by 2015 and promote recycling of waste by source segregation and creating market of recycled products.

Legal Provisions under National Strategy for Water Supply and Sanitation 2021 (Revised)

Strategy 5: Manage Solid Waste Judiciously mentioned that the national 3R (Reduce, Reuse and Recycling) Strategy for Waste Management, 2010 need to be revisited jointly by the LGD and the Department of Environment of the Ministry of Environment, Forest and Climate Change. National Strategy for Water Supply and Sanitation 2021 (Revised) suggested the following strategic directions for managing solid waste:

1. Promote (by City Corporations, Pourashavas and other LGIs) segregation of waste at source;
2. Encourage establishment of a community-based and/or private entrepreneur based primary collection system and link it with the city corporation's or Pourashava's secondary collection, transportation and final disposal;

3. Consider special handling and treatment for hazardous waste, like medical waste and emerging waste streams like electronic waste;
4. Pursue organic waste recycling through composting, biogas and refuse-derived fuel;
5. Plan sanitary landfills for an urban area or a regional landfill for a group of urban areas, to meet long-term needs keeping provision of dedicated land for this in city corporations, Pourashavas and where required at Union levels;
6. Design sanitary landfills with provision of collection of methane gas for use as a fuel and thereby reduce the emission of greenhouse gas of high global warming potential;
7. Prevent keeping of waste materials on footpaths, roadside and other public places;
8. The concept of waste management through incineration in big cities and cluster approach for the adjacent towns will be promoted gradually. Also opportunity for creating waste to energy will be explored further.

Section I: Recommendations and Suggestions

Limitations in Existing Legal Framework

There is no dedicate waste management rules so far in Bangladesh. Though ECA 1995 and Local Government (City Corporation Act) 2009 respectively emphasized on defining waste, and roles and responsibilities of the city corporations. However, there is not discussion on waste management. Hence, **a complete and dedicated rule is the utmost requirement.**

Recommendations for the DSCC and DNCC

- Since both DSCC and DNCC do not have the capacity to collect all waste being generated in city corporation area, capacity building through infrastructural development, engaging more human force must be ensured.
- City corporations have to strictly control illegal dumping in the close proximity of urban slums, roadsides and wetlands.
- The activities of appointed contractors shall be closely monitored so that complaints from the slum dwellers as well as general city dwellers drop down to the minimum.
- Mechanism shall be developed for receiving grievances from the urban poor since their voices are merely heard.
- Awareness development program must be taken by DSCC and DNCC to motivate special groups, in particular the youths, waste collectors, waste pickers, and specific groups.
- Arrange motivational campaigns targeting the behavioural change of the marginalized communities.
- Waste segregation at source shall be inspired by taking pilot projects in different wards of the city corporations.
- Ensure the representation of slum dwellers in existing waste management standing committees of the wards.
- NGOs and CBOs shall be engaged to motivate and making bridge between communities and authorities.

Proper Management of the Landfills

- establish structure to detect and prevent the disposal of hazardous waste;
- cover the solid waste with at least 6 inches earthen material at the end of each operation day to control vectors, fires, odors, and blowing litter;
- control the population of vectors such as flies, mosquitoes or other insects or animals responsible for transmission of disease;
- check the emissions of methane gas in every three months to protect human health and environment from excessive emission;
- stop open burning of waste in landfilling sites;
- prevent illegal dumping by controlling public access in the sites;
- prevent storm water from running on the active parts of landfills; and
- ensure that zero pollutants being release to the clean water.

Advocacy and Monitoring Mechanism Suggested for Dhaka Calling

- Arrange dialogue between policy and law makers, and the urban slum dwellers so that their needs are considered and thoughts are counted.
- Advocacy by the NGOs and CBOs with relevant state actors for waste management rules prioritizing the children, women and elderly.
- Arrange monthly meeting between the slum dwellers, contractors, ward officials and counsellors.
- Monitor whether voice of the slum dwellers are being heard by the authorities or not.
- Take initiative to aware and motivate the existing waste management ward committee.

- Arrange trainings and workshops for the slum dwellers as well as for the waste management authorities to get their view regarding an environment friendly waste management system and pass it over to relevant government ministry.

Conclusion

The Environment Conservation Act 1995 as well as the Environment Conservation Rules 1997 covered a broad spectrum of environmental management and control. However, neither the Environment Conservation Act 1995, nor the Environmental Conservation Rules 1997 shed light on solid waste management. Hence, targeting the Solid Waste Management a comprehensive policy needs to be formulated speedily to protect the environmental degradation and provide a more equitable and just living environment to the city dwellers. It is highly appreciated that finally a draft Waste (Solid Waste) Management Rules, 2021 have been formulated. It is now time to make the draft rules complete soon as possible and bring it into enforcement for a sustainable, pro-poor solid waste management in Dhaka city and beyond.

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Sustainable Solid Waste Management for the Urban Poor

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