

Solid Waste Management in City Area: Perspectives from Waste Cleaners in Dhaka City

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Abstract

Waste management is an important global issue to protect the environment. It is more vital for a city where millions of people are living like Dhaka in Bangladesh. The aim of this study is to explore the governance system of city solid waste management as well as the livelihood of the workers who are engaged to the management system. The study uses a quantitative approach to ascertain the objectives. The study area is Dhaka South City Corporation (DSCC). The study reveals that most of the waste cleaners of the DSCC are middle aged like 30 years to 45 years. Some of them are young aged like 20 years to 29 years. The results also reveal that a number of family members are dependent on their income. It varies from respondent to respondent and ranges from 5 to 7. Most of them are illiterate and their job type is temporary but some of them have a permanent job. Some of them have training but most of them. The study suggests that a long-term program should be triggered by the government for raising awareness about the cleanliness of the city for getting a best working and livelihood condition for the waste cleaners as well as a smart capital city.

Keywords

DSCC, Livelihood, Working Environment Waste Management, Public Health

1. Introduction

Waste Management is an obligatory and a core utility service of urban people. It has a strong linkage to a range of other global challenges: health, climate change, poverty reduction, food and resource security, sustainable production and consumption [1]. Surface water communication, soil communication, land & air pollution and leachate are environmental factors which directly dependent on a waste management system [2]. Besides, some economic factors, including municipal wellbeing and recycling revenue are also dependent on waste management system [3-4]. For that, ensuring social justice and social inclusion through protecting the rights of these unprivileged waste cleaners is the pressing demand to attain sustainable environmental management [5-7]. Socially just, sustainable and green dynamic growth are three basic condition for a good society, according to EoT matrix, where socially just is driven by fair incomes and inclusion of all talents [8-9]. This study is based on all three conditions for a good society and mainly focused on socially just. Analyzing EoT, it is clear that environmental management in its heart. A sound waste management system includes all components of EoT. Waste management is a global as well as a local issue [10-11]. Increasing population, urbanization, industrialization, faced by developing countries in Africa, Asia, South America, are all pointing out to further increases of refuse [12]. Every year, an estimated 11.2 billion of solid waste is contributing about 5 per

cent of global greenhouse gas emissions. Lower income cities in Africa and Asia will double their municipal solid waste generation within 15-20 years [1]. In developing countries, waste per capita is raising as economy is developing, number and size of the cities increasing and population continues to grow [13-14]. Globalization results in industrial and hazardous waste generation shifting to developing countries.

Innovation in waste management is one of the preconditions for sustainable growth that is in the heart of EoT concept, and it is also a component of Sustainable Development Goal announced by the UN. A sound waste collection system is important for the healthy urban life that will enhance productivity and human capital development [15]. Therefore, access to health and education of waste cleaners, sweepers is important for better urban life and environmentally friendly city that will ultimately produce an environment friendly good society with full capabilities for all [16-17]. Since waste management is a vital issue of city governance as well as the livelihood of city dwellers. Considering the importance of the issues this piece of research is undertaken. The main purpose of this study is to explore the governance system of city waste management. The article is organized as the second section deals with review of literature, third section deals with methodology fourth section deals with results and discussion, the fifth section deals with policy implications and final section concludes the article.

2. Literature Review

Solid waste management is defined as the discipline associated with control of generation, storage, collection, transport or transfer, processing and disposal of solid waste materials in a way that best addresses the range of public health, conservation, economics, aesthetic, engineering and other environmental considerations. Waste Cleaners, known as Sweeper, Cleaner, Methor are a socially excluded community in Bangladesh. Their service that fuels city dwellers life never brought any recognition rather they are considered as "untouchable" by the society. They are deprived of a healthy housing facility, sanitation and other social benefits. Dhaka South City Corporation (DSCC) is one of the two municipal corporations in Dhaka created when the former Dhaka City Corporation was divided into two. The Corporation was created by the Local Government (City Corporation) Amendment Bill 2011 on 29 November 2011, passed in the Parliament of Bangladesh, following the

President's approval. The DSCC consists of 57 wards covering the thanas of Azimpur, Maghbazar, Malibagh, Motijheel, Jatrabari, Dhaka Kotwali, Sutrapur, Bangsal, Wari, Gendaria, Lalbagh, Hazaribagh, Dhanmondi, Shahbagh, New Market, Khilgaon, Kamrangirchar & some others. Existing solid waste management system focusing on functioning of the various stages of the SWM process and its governance. SWM system in the perspective of urban poor, sweeper and cleaner. High-rise buildings manage waste better than the slums [15]. Environmental features of SWM include sorting and separation of waste at household level for recycling, proper knowledge on waste separation, willingness to recycling and a proper SWM system, the study finds 39% marked waste management system in Dhaka as a very severe issue [18].

2.1. Overview of SWM in Dhaka

Dhaka is considered as a rapidly growing and an unplanned city where approximately 12 million people reside including 3 million people who live in unincorporated areas. Global Livability Index 2018 marked Dhaka as the 2nd worst livable country, although it has moved two places up in this year. Suffice to say, it is one of the most polluted cities in the world and one of the issues concerned is the management of municipal waste. According to BIGD (2015), Dhaka generates 1,168,000 t/yr. solid waste and per capita waste generation is 160.0kg/yr [25]. The waste generation rate is 0.56/person that is expected to increase 0.6/person by 2025. These implies the astronomical growth of solid waste in the city [19]. Considering the city's rapid growth and insufficient waste services, the demand for improved solid waste management presents a key opportunity for simultaneously addressing health, development, and environmental issues [20-24]. A recent study by the Rajdhani Unnayan Kartripakkha (Rajuk) has concluded that the capital's waste management service has been able to collect only 51% of the wastes produced per day for proper disposal. About 1,800 tons of MSW, that is 51% of total wastes produced per day, are collected for disposal at two landfills at Matuil and Amin Bazar respectively of Dhaka South City Corporation (DSCC) and Dhaka North City Corporation (DNCC) (Figure 1). Moreover, 11% of the wastes (about 400 tons) are dumped on the roadside or in open spaces, 26% dumped in backyards and landfills, 9% recycled by rag pickers and 3% recycled at generation point. The survey also observed that biodegradable organic matter constitutes more than 60% of the wastes produced in the capital.



Figure 1. Waste collection process in Dhaka.

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Primary waste management is the process of removing solid waste from the central storage point of a primary gathering source, households and roads and open space, to a disposal site earmarked on non-earmarked by City Corporation [25]. Both DNCC and DSCC have installed waste-bin in every corners of the city in April 2016 through its good results are yet to come. Door to Door waste collection system has been practicing for more than 20 years, a good number of households are yet to avail this facility. A study by BIGD (2015) finds that 50.63 percent households did not avail due to non-availability of the service in their area [25]. Irregular collection and lack of knowledge about the service were also reported by the respondents. For household waste collection, the city corporation is working with NGO and CBO. There are 300 vans along with 3000 Waste Cleaners of NGO & CBO are working for household waste collection. Word based waste collection system beings some positive changes and developments. Recently added 3 UPs added challenge to DNCC in waste collection. Secondary waste management involves the collection from secondary collection points and other secondary waste storage premises and onward transport to disposal site [1]. In DSCC a total of 5300 waste cleaners are working. There are 140 open trucks, 73 container career and 16 modern compactors serving every day in DNCC, beside this 3-wheel dodgers, 3 excavators and 3 bulldoggers are serving for landfill waste dumping and compaction. Dhaka has initiated two major initiatives for its solid waste management- Master plan of Dhaka city in 2005 and 3R strategy in 2010. Both have played a vital role in developing the scenario. JICA undertaken the first program, master plan of Dhaka city, with an objective to develop capabilities and management skills of DCC. This master plan brought a radical change in both waste collection and disposal system. The 3R Strategy that was undertaken in 2010 by Department of Environment (DoE), Ministry of Environment and Forestry of the Government. The principle of reducing, reusing and recycling of resources and products is often called the 3Rs. This is a globally recognized modern approach of SWM.

2.2. Key Innovations in DSCC

Waste Management Department of both city corporations is primarily responsible for coordinating Solid Waste Management in Dhaka. These departments brought a good progress in SWM. It was found that DCC collected a total amount of 42,000~45,000 tons waste in 2015 that was less than half of this amount in 2005. Besides, DSCC in a way to set up Secondary Transfer Station in each ward that will erase public sufferings from roadside dumping station. Almost every mega city is already using this model for secondary waste management. The DSCC has acquired adjacent 81 acres land of Matuail Sanitary Landfill as it will expire its capacity by 2007, among these 31 acres will be used for recycling waste. In addition, the first leachate treatment plant has built in Matuail Sanitary Landfill that is refining 2, 50,000 liter of water every day and making it usable for agricultural purpose. In addition, a number of 5700 waste bins placed at different points in DSCC area and two Vacuum Cleaner also augmented for secondary waste management.

2.3. Policy Innovations in Bangladesh

There are no comprehensive legislation, regulations, and policies adopted at the national level solely for the purpose of solid-waste management in Bangladesh till date. Municipal Act 1864 is the first act that described SWM. After that, Dhaka City Corporation Ordinance 1983 played as the legal basis of SWM till 2009 and this legislation described waste management more broadly, including collection and dumping process & stakeholders involved in the process. The NEMAP adopted in 1995, emphasizing on the recycling process and promoting EMS among industries. The National Policy for Water Supply and Sanitation adopted in 1998 that suggesting recycling and using organic waste materials for compost and bio-gas production. Dhaka Declaration on Waste Management by SAARC is the strategy based on 4R principals. Lead Acid Battery Recycling and Management Rules adopted in 2006 recommended Dhaka Environmental Management Plan. Draft National Urban Policy adopted in 2006 also emphasized in recycling and CDM.

Table 1. Various policies regarding city management.

Time	Legislation
1864	Municipal Act
1983	Dhaka City Corporation Ordinance
1995	National Environmental Management Action Plan (NEMAP)
1998	National Policy for Water Supply and sanitation
2004	Dhaka Declaration on Waste Management by SAARC countries
2006	Lead Acid Battery Recycling and Management Rules
2006	Draft National Urban Policy
2009	City Corporation Act 2009
2010	National 3R Strategy

Source: [25]

3. Methodology

A quantitative study has been employed for this study. The methodology of the survey consists of field-based data collection. A predesigned questionnaire has been used to collect data from the respondents. Random sampling is used to explore the state of those waste cleaners and their knowledge [17]. Besides qualitative instruments like KII and in-depth interviews have been done. Key Informant Interviews (KII) are conducted with DSCC officials and community leaders. In-depth Interviews are conducted with male and female waste cleaners who work in both public and private sector [26]. A total of 26 waste clear have been interviewed to explore the livelihood condition, job status and working environment.

4. Results and Discussion

The study selected some demographic characteristics like

age, dependency of the family member, wage, education and training, recruitment type and job type for exploring the livelihood conditions of them.

4.1. Age

Most of the waste cleaner of the DSCC are middle aged like 30 years to 45 years (Figure 2). Some of them are young aged like 20 years to 29 years. The results also reveal that a number of family members are dependent on their income [15]. It varies from respondent to respondent and ranges from 5 to 7.



Figure 2. Distribution of respondents according their age.

4.2. Wage

A study by Sheltech in 2004 found all types of waste cleaner's wage below 4,000 taka. This scenario has been changed. Though all living expenses increased by this time, no waste cleaner earns below 4000 taka now even who works 4 hour in a private company. DSCC increased their wage with a new pay-scale recently and, for that, the corporation is spending more 100 crores taka per year for their new increments, according to DSCC official (Table 2).

Table 2. Income pattern of waste clear

Monthly Income (BDT)	Frequency	
<5000	3	
5001-6000	5	
8001-9000	5	
10000-12000	4	
12000-14000	2	
14000- 16000	7	

Permanent DSCC waste cleaners earn more than 12,000 taka per month, but it is now very tough to manage a city corporation job as last recruitment was in 2001. A primary waste cleaner, government official usually demands 5-6 lacks of taka of bribe for as DSCC job. Under the circumstances. Young people are working in private sector where payment is low and below BDT. 8000 (Figure 3).



Figure 3. Distribution of respondents according their type of recruitment.



Figure 4. Distribution of respondents according to their working hour.

Most of the primary waste cleaner don't receive any bonus, DSCC and government service holder get bonus twice in a year. Only 40% of respondents do not receive any bonus (Figure 4).

4.3. Health Condition

"I have to clean toilets without using any protective gear, those are expensive to me. Sir do not provide us any glove or mask"- According to Brikisno who works at Shahjahanpur Officer's Colony. Some respondents have shown their concerns for health risk; however a few respondents said they are used to it and they do not face health problem. Kashu who works for DSCC said government do not provide any costumes or safety equipment. 20 respondents (86%) out of 23 said that they do not receive any risk allowance aiming their high risk at work. Residues who work for primary waste collection in apartment said they receive allowance of 500~1000 taka depending on the problem. DSCC official also acknowledged the fact and said they only provide 50,000 taka for death at workplace. Street sweepers manually handle a variety of waste – domestic, industrial, and commercial. Their work involves collecting, sweeping and dumping garbage on the streets every day.

4.4. Education and Training

Almost all of the respondents (96%) said that they do not receive any formal training for the job and most of them said that they already know everything as it is their family job. They do not even feel that they need any training (Figure 5).



Figure 5. Distribution of respondents according to their training experience.

One of the respondents who work in an autonomous govt. institution said that he went to take a training from Fire Service and they refused as he had not completed his secondary education. City corporation officials acknowledged lack of training and urgency of training. Official said that the trainings stopped since 2013, yet do not have any plan to restart it. Regarding education of waste cleaner's children, many of them said that they can now enroll their children in any school hiding their identity and address. Many universities including Dhaka University reserve quota for Dalit that made them hopeful about their children's career.

4.5. Work Environment

This study attempted to analyze waste cleaner's work environment, especially from women's perspective. Survey reveals that the majority of the cleaners (98%) does not receive any maternal leave. Women who works at DSCC have to substitute someone on her behalf on pregnancy, otherwise she will not get her salary and might lose the job. Road cleaners have to start their work by 3 am that make women road cleaners to suffer harassments at roadside. Sabira Khatun who works for DSCC at Dhanmondi said that men, especially rickshaw pullers, usually harass her when she works at dawn. A number of female respondents said that they faced harassment by rickshaw puller. Babu who works in a private company, Decent Bakery, said that his work environment is worse than govt. job. He faces immense suffering with a huge work pressure.

4.6. Social Status

The survey finds that 6 out of 22 respondents said they have to hide their identity for taking public services. Six respondents argue that the situation is now ameliorating and they do not feel being discriminated [27]. Residues said that they have a bad experience about it. Kashu said that a tea stall opposite to the colony do not even want to sell tea to cleaners. They behave rude when cleaners ask for a cup of tea, even though they are paying money themselves. Some of waste cleaner including Abdul Kadir said that even a rickshaw puller does not behave cleaners genteelly. On the other hand, Cleaners like Devid who work at apartment for primary waste collection said residents behave cleaners very good and they even phone them when they feel sick.

4.7. Utility Received

There a number of utility services received by the waste cleaner of the DSCC. The study explores the real conditions of the livelihood of the waste cleaner according to the utility services received by them (Figure 6).

4.7.1. Sewerage

People who work for everyone's sewerage system, unfortunately, live in the worst sewerage condition. Out of 22 respondents 13 marked their sewerage system as the poor. Sometimes they manage themselves to ensure sound sewerage in the colony (Figure 6).



Figure 6. Distribution of respondents according to their utility service received.

4.7.2. Housing

Housing is one of the major problems that waste cleaners have been facing. Table shows that 72.72 percent (16) respondents marked their housing as the worst. A family with the member of more than 5 have to reside in a single room. In Dholpur Colony, a three-storage building known as Jhukipurno Building has found as not-live able, the building seems intolerably filthy. Some reported that they always pass the night under fear and threat of eviction. It is great to know from DSCC officials that government is already started constructing therein (13) ten storage buildings, that may erase their housing problem.

4.7.3. Gas

Gas was a common problem in sweeper colony, but the situation is now improving. Cleaners who reside out of city corporation building face gas problem most. Many families have to share a single kitchen that causes some problem.

4.7.4. Water Supply

Most of the respondents were satisfied with water supply as it was worse before. But it is observed that scarcity of pure drinking water is very high and water supply is dirty. There are a number of water coupes in those colonies where people have to wait hours to reach their queue. There are no separate arrangements for female.

4.7.5. Electricity

Electricity is available in every house at colony. It is better in City Corporation building than other adjacent houses in colony.

4.7.6. Sanitation

Sanitation is the worst in each colony. A number of 12 toilets for male and 12 toilets for female available at Doyagong Colony that have to share with all people who reside outside the city corporation building. So, a log queue is a very common scenario [28]. Among respondents, 54.54 percent said that the sanitation is poor at their colony.

5. Policy Recommendation

Community involvement in the sustainable waste management process is a vital issue for city management. This can range from the contribution of cash and labor to consultation, adaptation of behavior, involvement in administration, management and decision-making [29-30]. It can ensure transparency and accountability of City Corporation including community participation in decision making process. Partnership with NGOs and corporate organization ensures sustainability. Awareness raising campaign is essential for sustainability of waste management program [31-32]. There is a visible lack of awareness exists among city dwellers in Dhaka. Many waste cleaners in their interview also recommended for public awareness program. Formal Media can play a key role in this process. NGOs and Corporate organizations can be partners. Awareness should be raised for changing people's mind-set toward waste cleansers, promoting waste separation at household level, enhancing green mindset and raising awareness for changing habit regarding throwing waste randomly. Decentralization of SWM at word level has a long success story in different cities. It can ensure monitoring day to day activities and engage staffs and infrastructure at word level. Devaluation of power is recommended for effective decentralization. Appropriate capacity development programs at grass root level recommended to empower people so that they will perform better [33-34]. Developing tool-kits to apply new

innovations. Government has a dire need for skilled human resource and infrastructure to implement National 3R Strategy 2010. City Corporation should provide necessary safety equipment, i.e. uniform, glove, mask to all waste With growing demand of modernization, cleaners. development is infrastructure mandatory. Capacity development of waste cleaners to become familiar with new technology and to make them aware about environment issue. Capacity development through education and training can ensure efficiency and effectiveness of their work. Key stakeholder's capacity development program also recommended. Improved Work Condition is recommended as it will motivate waste cleaners to perform better. Women friendly environment is essential to ensure safety and security of women waste cleaners. Implementation of existing policy, National 3R Strategy 2010. This policy can solve most of the existing problems. Effective steps should be taken to implement this policy investing more on solid waste management. Ensuring waste cleaners' right to health, education and shelter, so that they can be motivated to perform better.

6. Conclusion

The study explores the governance system of city solid waste management as well as the livelihood of the workers who are engaged to management system. Quantitative as well as qualitative approaches have been applied for this study. The results reveal that community involvement in the sustainable waste management process is a vital issue for city management. The study explores that there is a wellplanned waste management system in DSCC (Dhaka South City Corporation) which covers from primary waste collection from household to final disposal system. Though the system is well planned but the governance system is weak. The management of DSCC neglect to provide the facilities to cleaners for maintaining their livelihood. The study reveals that majority of the cleaners are middle aged who have 5 to 7 family members. The wage of the cleaners is varies from each other and ranges to BDT 5000 to BDT 16000 (USD60 to USD190) per month. Most of the respondents (86%) does not get any risk allowance though they are always engaged to risky works. Similarly, majority of the respondents (96%) does not receive any formal training. It is also found that majority (98%) of the waste cleaners does not receive any maternal leave. The social status of the cleaners is very pathetic because of societal culture. The community people do not want to accept them as equal to others. As a result, about 27% respondents hide their identity for taking social services. The utility services of their living places are also not satisfactory. This study also emphasizes that capacity development of waste cleaners to become familiar with new technology and to make them aware about environment issue. Capacity development through education and training can ensure efficiency and effectiveness of their work.

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