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Waste Management in Dhaka City: Private-Public-Community Initiatives

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1. Introduction

Waste generation is the byproduct of modern city life. Industries and newly sophisticated consumption by the citizens left a considerable amount of waste. Management of the waste including reduction, collection, transportation, and treatment is considered as the vital phenomenon of aestheticism, public health, and environmental concerns. Counting many years, waste management has been the most ignored issue of government though it is one of the core concerns of the urban environment. In spite of emphasizing waste management, is it beyond the ability of City Corporation's resource to manage this immense amount of trashes. With this proliferation of population, waste generation rate also increasing day by day. The city is facing severe problems to treat its own produced filth and trashes. Undermined structure of municipality and lack of adequate policy, the waste management system is still not efficient to drive well-organized initiatives. This inadequacy of formal authority has created the working opportunity for the private informal sector and community-based organizations.

Waste management denotes the generation of waste and the collection, processing, transport, and disposal of waste include the process of 'waste management.' (Rushton, 2003) The processes refer treatment of solid waste from door to door collection by vans, transporting with trucks and other vehicles and dispose of them in dumping station. Reduce the generation from household level and awareness building among citizens also recognized as management procedure.

From the very beginning of this century, in many parts of the city, the community-based initiative has commenced keeping the area clean. Recently, collection and transportation of household waste are controlled entirely by the private and community enterprise, whereas city authority is carrying those from certain spots to landfills. This paper aims to reveal the level of intersection and relation to collect and dispose of waste by both private and public involvement. Furthermore, it will also present the nature of individual initiative where various kinds of entrepreneurship are forming a new informal sector in the economy. This paper intends to reveal the existing waste management system in Dhaka city with a motivation to present an image depending on the systematic dimensions and constraints.

From the 1980s, the city corporation of Dhaka has come through some technological advancement to control the increased amount of waste. The city is collecting different

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kinds of solid wastes from household, industrial level, commercial and hospital facilities. The most significant portion of municipal solid waste is originating from the household level. Inadequate technology and with insufficient workforce, City Corporation of Dhaka is unable to keep clean the entire city alone. For poor service of city authority and awareness, people of the community involved in the process of waste management. Community-based initiatives and effort from some handful NGOs are now seen in the city waste management system. Municipal is providing land for local dumping sites, transportation logistics to carry wastes from the local dump site to landfill station, whereas community-based organizations have taken the responsibility to collect household wastes from door to door which is covering major areas. Though the process of collecting and transporting those type of trashes may harmful for everyone.

A general history posed that the Mughal Subadar Islam Khan was living in the fort situated in Chakbazar. The people build their houses around the fort area. Subadar, made a canal to adjoin Buriganga River and Dholaikhal, and all the wastes were passing through this channel in that time. In 1700s, the city Dhaka expanded till Mirpur area, and about 300000 people were living this town. Waste disposal passed through the river at that time. In 1830, the collector of Dhaka Mr. Walters had commenced a committee to keep clean this city. After the establishment of Dhaka municipal, the people were increasing, and authority convinced them to build their houses by filling the low lands (Shafiq 2001).

Dhaka Municipality established in 1864. Population and Production of waste were tiny in amount then, through disposal was an act of sweeping and keep the community clean. As far the literature conserves the history of waste disposal; it has started at the year 1717 by manual night soil collection system. Consequently, city municipal has involved in removing wastes from different areas of Dhaka. The development of the waste collection in Dhaka was described by Zahur (2007). A summary of the description has been presented in the Table below (based on Zahur, 2007).

Table 1: The development of the waste collection in Dhaka

1717	Manual waste collection/ night soil collection started
1864	Night soil collection by bullock cart by Dhaka Municipality
1963	Liquid waste collection by DWASA & Dhaka Municipality side by side
1982	Bullock cart system suspended, night soil collection replaced by Septic tank, the introduction of the open truck for solid waste collection by Dhaka Municipality
1989	Introduction to nighttime waste collection instead of daytime collection
1993	Demountable container introduced along with the closed and open truck
2002	Open truck replaced by the covered truck

Until 1982, the waste transporting system was driven by bullock cart system. From 1983, the motor vehicles have started to transporting trash, and it has taken a significant shift in the history. City authority has put 402 waste containers in different areas of the city in 1994. But, within five years, 90 containers have rusted and been unusable. City Corporation has 160 trucks of 1.5-5 tons capacity which are not sufficient for transporting about four thousand tons of wastes. Moreover, workforce under city authority is unable to manage this enormous amount of trashes. Where informally 100,000 laborers are working for collecting waste which are facing severe health problems. Among them, a big part of the workers are children (Shafiq 2001, Hasan, Tetsuo, and Islam 2009). It is

estimated that in the year of 2025, the waste generation of this town will increase at 10,942 tons per day.

In the early age of human civilization, people produce a small amount of waste those were not directly hazardous, and it was perishable. But with the rise of cities, many metals and non-perishable debris is found by people and they are being scattered without the proper management system (Al Muti 1996). Hafiz, Rana, and Shanaz (2000) have alleged population expansion is the main reason of waste generation in their study. They argued that the responsibility of managing waste is on City Corporation, who is successfully collecting only 42% of generated waste. Rest of are being uncollected and keep beside the road and community. Zahur (2007), addressed urban solid waste management is one of the most immediate and severe environmental problems confronting municipal authorities in developing Asian Countries. The new venture form of waste management through public, privet and community initiative collaboration. The involvement of waste concern with the partnership of municipal and driving 'community based urban solid waste management' system, the city authority is providing land for dumping, supervising personnel. On the other hand, 'community based initiatives' are working for awareness building among citizen, give the effort to collect wastes from door to door and run bio-fertilizer transforming plant from perishable scraps. The author also addressed some problems faced by the project such as lack of demand of organic compost in the market, unwillingness of the municipal to put any effort into small-scale recycling projects, etc.

Abbasi, Krishnakumari, and Khan (1999) and Asaduzzaman, Islam, and Chowdhury (2014) argued that the generation of solid waste has become an increasingly pressing issue over the last two decades due to the escalating growth in population and the massive increase in waste production in Dhaka city. They presented a comprehensive study of the legal framework of solid waste management after reviewing the Environmental Conservation Act, 1995; Environment Conservation Rules, 1997; National Environmental Management Action Plan; Urban Management Policy Statement, 1998; Urban Management Policy Statement, 1998, etc. In spite of having rules and policies in the legal framework, Bangladesh could not build up a well-managed waste management instance. This paper also revealed the three 'systems' of waste management existing due to the insufficient ability of city authority in Dhaka city: the legal and national level involvement of the city authority, the initiatives from Community, and the informal system. These three methods have the efficacy of managing 55-65% of generated waste.

Department of Environment (2009), published their plan and strategy of solid waste management in Bangladesh. This policy has been developed based on the 3R approach: Reduce, Reuse and Recycle. This reported that about 13000 tons of waste are producing every day in the whole country. It also gives the direction to the municipal to create awareness among citizens to follow well segregation and dumping system. Muhammad and Manu (2013), have described informal initiatives of waste management in developing cities besides the role of women in informal waste picking sectors. They argued that the sophisticated sorting of waste initiated by the female worker in Bangladesh.

2. Objectives, Methdology and Study Area

This study was conducted with specific objectives such as to reveal the existing waste management system and associated sectors, and the initiatives of public and private agents in the waste management in Dhaka City. The study of the paper conducted in-

depth interview among participants of waste management activities in Dhaka City. To understand the diversified scenario, the study included 24 respondents to investigate existing efforts in waste managenment including the officials of the City Corporations, local NGOs and personnel involved with waste concern. The respondents were selected from 15 dumping spots from five regions of the city: Uttara, Gulshan, Karwan Bazaar, Mirpur and Mohammadpur.

3. Waste Generation Scenario in Dhaka City

There are four major categories of waste in the city: i) Residential waste that are generated from household chores, it includes perishable kitchen waste, paper, glass, wood, concrete construction, etc, ii) Commercial waste that are produces by trade or business or the purpose of sport, recreation, education or entertainment, etc., iii) Industrial Waste that are from massive production of the industry, tannery waste, residues from garments, pharmaceticals many manufacturing sectors, and iv) Medical waste which are called hospital and clinical waste. Those are putrescible or potentially infectious. It includes packaging, fresh bandages, infusion kits, test tubes,etc.

From domestic sources, it creates 1718 tons waste per day, industries are creating 835 tons, commercial wastes are 722 tons, and another 255 tons of medical wastes from the hospital are mixing up with other wastes. (Asaduzzaman et al., 2014). The Dhaka City Cooperation determined that, of the total daily generation of 3500 tons of solid waste. 1800 tons are collected and dumped by them, 900 tons go to the backyard and landfilling, 400 tons go to the roadside and open space, 300 tons are recycled by the Tokais (mostly the kids of slum dwellers), and 100 tons recycled at the creation point. Nevertheless, the amount of solid waste differs depending on month and term by a factor of about 20%, the generation being higher during wet months and fruit seasons. (Bahauddin and Uddin, 2012)

Dhaka City Cooperation (1999) conducted a survey and estimated an average waste generation of 2.326 kg/family/day for the high-income group, 1.260 kg/family/day for medium income group and 0.461 kg/family/day for the low-income groups. Dhaka City Cooperation provided the most recent estimates of per capita waste generation. By the 1981 and 1991 census data, Bangladesh Center for Advanced Studies calculated a compound growth rate of 2.74% for the Dhaka City Cooperation population during this period and estimated a population of 4.64 million for the year 1998 using the growth rate. With the estimated daily generation of 2398 tons, this gives a per capita generation of 0.52 kg/capita/day. Dhaka City Cooperation, on the other hand, reported a population of 7 million for the Dhaka City Cooperation area, almost 1.5 times higher than that estimated by Bangladesh Center for Advanced Studies. However, since the waste generation estimate of Dhaka City Cooperation is also much higher (3500 tons/day). Per capita generation calculated from Dhaka City Cooperation data (0.50 kg/capita/day) is very close to the value reported by the Bangladesh Center for Advanced Studies (Bahauddin and Uddin, 2012).

According to recent statistics of Dhaka City Corporation, city inhabitants are producing 0.31-0.59 kg waste per day with the average rate of 0.5kg/day. In the year of 2015, the waste generation has increased by an amount of 7000 tons per day. Four types of waste streams, i.e., domestic (60%), commercial (17%), industrial (19%), and hospital (4%) constitute the total solid wastes of Dhaka city.

Table 2: Waste Generation and Disposal Scenario of Dhaka City, 2015

Wastes	Approximate Generation (Tons)	Disposal (tons)
Household	4200	2730
Commercial	1190	770
Industrial	1330	840
Hospital	280	210
Total	7000	4550

Source: Waste Management office; Dhaka North City Corporation (Fieldwork, 2015)

A engineer from the Waste Management Department of Dhaka City Corporation North, described the waste generation and disposal scenario of Dhaka City as follows-

> *It was a little amount of waste generating after the liberation war when Dhaka was not such a big city. In 1980s, population flow has shown towards the city core as with the economic development and centralized government. Consequently, waste generation made a headache of city authority to manage. In the 1990s, we were disposing of our wastes in some location, among them, Matuail was the most prominent site. In that time, City authority did not have any managed system to dispose and collect wastes. Municipal received only a part of 15-25% of total waste by their workforce. In the mid-90s and beginning of the current century, community-based waste collection system has started in different areas of the city. City Corporation after that decided to deploy their workforce only to sweep the road and inner part of the community.*
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> *In recent years, we have two parts of City Corporation. In the northern part, we are the success to gain about 55-65% disposal rate of total waste generation. City authority is now handling only the transportation part of waste disposal. Sweepers are just deployed to sweep the roadside, collect them with a cart and gather a specific local dumping site. From door to door waste collection along with the hospital, commercial and industrial waste management at the primary level are conducting by community-based organizations, NGOs or own industrial authority. The primary waste collection is now driven entirely by the private sector. It has made this work more efficient. Dhaka city authority is now disposing of about 4000-4500 tons of wastes with the help of community-based initiatives. However, another 35-45% waste remains uncollected or disposed in low open lands. Among the generation of wastes, 60% are from household sources. Those scraps are carried 80% highly moisture elements. In fruit seasons it increases up to 4500 tons per day.*

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Abovementioned statistics show that a considerable proportion of wastes are generating from household source. With existing facilities, City Corporation, CBOs, NGOs, and private organization's effort can collect and dispose of maximum 65% of generation in a proper manner. The rest of the wastes are either uncollected or remaining improper treatment apart from local dumping site or landfills. In some areas of Dhaka city, these untreated wastes may dispose of in the swamp area, low laid the land, river bank, beside the road, into the drain and sometimes make them ashes by setting the fire which all methods are hazardous and harmful for the environment. An additional master plan and extra effort are needed from both formal and informal sector to manage these 2450 tons of unmanaged wastes.

4. Stake Holders and Initiative Patterns of Waste Management Sector: A Public-Private-Community Based Partnership Program

An organized system of waste collection, disposal, reduction, and management is a very recent phenomenon in Bangladesh. City Corporation has started their waste management department not more than a decade. With the realization of government, awareness also builds up among citizen with publicity and campaigning both from governmental and international donor organizations. As a consequence, there has initiated community-based waste collection effort in many parts of the city and started from Lalmatia, Dhanmondi.

4.1 Conventional Policy and Regulations for Solid Waste Management:

National Environmental Management Action Plan (NEMAP) has been initiated as a 10-years (1995-2005) extended strategy, by the Ministry of Environment and Forest (MoEF) of the Government of Bangladesh in consultation with different classes of people. It has taken to identify critical environmental issues and recommended the measures to conserve, improve and reduce environmental degradation, promote sustainable development and raise the characteristic of human life. NEMAP has advocated for actions in the areas of hygiene, solid waste control, water supply, and environmental consciousness. Based on the findings and suggestions of NEMAP, the government has initiated up projects like community-based water supply and sanitation, community-based solid waste management and community-based wastewater treatment. (GoB, 1995)

Urban Management Policy Statement, 1998 has been prepared by the Government of Bangladesh has recommended the municipalities for privatization of services as well as giving priority to facilities for slum dwellers including a provision of water supply, sanitation, and solid waste disposal. The policy considers the interest of providing economic, efficient and reliable services; municipalities shall endeavor to contract out solid waste disposal, public sanitation, drain cleaning and road maintenance. (GoB, 1998a)

National Policy for Water Supply and Sanitation 1998 was formulated by the Local Government Division of the Ministry of Local Government Rural Development & Cooperatives gives particular emphasis on the participation of private sector and NGOs in water supply and sanitation in urban areas. Some solid waste and recycling related strategies under this policy given below:

Local Government Organizations (City Corporations and municipalities) may shift, where the possible collection, removal, and management of solid waste to the private sector. Measures to be taken to recycle the waste as much as possible and promote use of organic waste materials for compost and biogas production. Private sector including NGO participation in sanitation is encouraged. (GoB, 1998)

National Clean Development Mechanism (CDM) Strategy 2004 is prepared by the Ministry of Environment and Forest (MoEF) has identified the waste sector as one of the potential sectors for attracting CDM finance in the country. CDM allows foreign direct investment (FDI) in projects, which reduces greenhouse gas emissions. The waste sector options prevent methane from bio-methanation processes. The methane collected can be flared or used to generate electricity. The waste sector options for Bangladesh can be landfill gas recovery, composting, poultry waste, and human excreta management using eco-sanitation and wastewater treatment.

The responsibility of removal and disposal of municipal solid waste lies with the City Corporations and municipalities. The six City Corporation Ordinances and Pourshava Ordinance 1977 are the only local law that gives some idea about the disposal of municipal waste. These ordinances contain identical provisions relating to solid waste management, which are as follows: i) The Pourashava or city corporation shall be responsible for the sanitation of the municipality/city corporation area and the control of environmental pollution. For this purpose, the city corporation or Poursahava may cause such measures to taken as are required by the ordinances, ii) City Corporation or a Pourashava or shall make adequate settlements for dismissal of refuse from all public streets, public latrines, urinals, drains, and all buildings and land vested in the Pourshava or city corporation and for collecting and proper dumping of such waste, iii) Subject to the general control and supervision of the Pourashava/City Corporation, the occupiers of all other buildings and land shall be responsible for removal of refuse from such buildings and lands, iv) The Poursahava/city corporation may, and if so required by the governments shall provide public bins or other receptacles at suitable places and by public notice, require that all refuse to accumulate in any premise or land shall be deposited by the owner or occupier of such premises or property in designated bins or receptacles, v) A Pourashava/city corporation shall afford sufficient public drains in the municipality/city area, and all such draining constructed, maintained, kept clear, and emptied with due regard to health and convenience of the public, and vi) A Pourashava/city corporation shall provide adequate public drains in the municipality/city area, and all such drains shall be constructed, maintained, kept clear, and emptied with due regard to health and convenience of the public (DoE, 2004).

By reviewing existing policies and regulations, it seems that as the part of recent environmental concerns, the government of Bangladesh is trying to take adequate measures to deal with hazardous waste treatment. Primary responsibility has handed over to the local bodies like Municipal/City Corporation to work out, where any foreign financing also greeted in this sector.

4.2 Activities of Solid Waste Management and Regulatory Bodies

Dhaka city authority has the lack of workforce, technology, and budgets. For this reason, Dhaka City Corporation is unable to deal with waste all alone. In that circumstance, many parts of the city, community-based initiatives have commenced due to the poor service getting from authority, to manage own community wastes. Few number of NGOs initiate their program for aiming of a green Dhaka City. The most prominent activities is running by ‘Waste Concern’. This organization was engaged in transforming bio-fertilizer from perishable part of the collected waste. In recent years, World Bank, Practical Action, Water Aid, USAID, UKAID and many other international organizations are providing donation, sharing expertise and campaigning among the citizens to make the concern about the proper treatment of solid wastes. Incorporating those efforts, Dhaka is walking towards an efficient waste management structure.

4.3 Operations of Waste Disposal

Efficient solid waste management process combines three necessary steps: Reduce, Reuse and Recycle. There are mainly four sources of municipal solid waste. Household, commercial, industrial and hospital wastes are then generate through following

management processes: i) Waste pickers collect the maximum of them from the door, some of the portions treated as valuable, and those are either being reused by the people or sold as a money making scrap, Waste pickers collect wastes with their manually operated van.

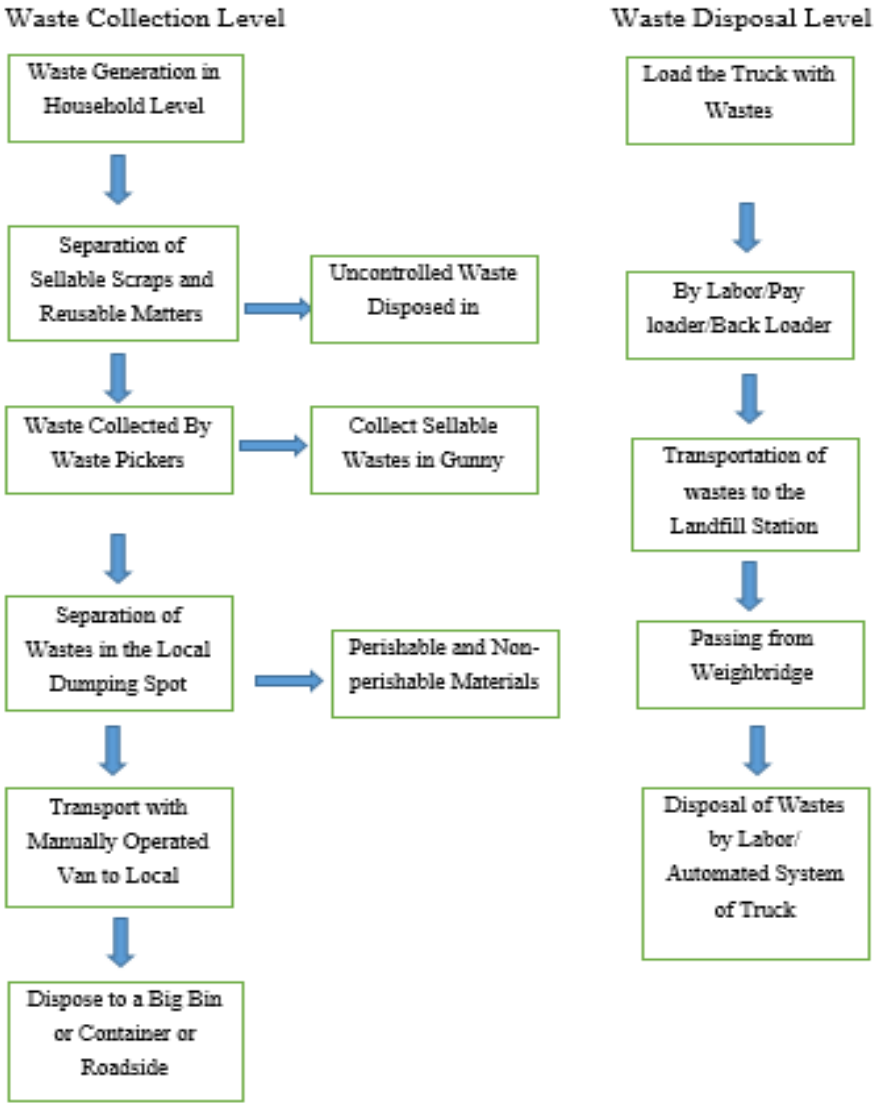

Figure 1: Process of Waste Management in Dhaka City (Source: Fieldwork, 2015)

Usually, they carry different gunny sacks to separate valuable scraps from selling later in the market. Waste pickers carry those trashes to local dumping spots and dispose it into a bin or big iron container provided by City Corporation. There was another group from City Corporation, who sweep the roads and clean drain, they collect those residual by pulling cart and also dispose of it in a nearby dumping spot, ii) After gathering collected

wastes from residential, open/ covered trucks come to the local dumping sites to load and transport them. Waste pickers are assigned to upload wastes from container to the truck, some trucks have the facility to carry container whom they do not need to take any others help, and in very few spots City Corporation has assigned some labor to upload the wastes into the truck. Recently, in two places of Dhaka North City has uploaded the residues by payloader and back loader like machines, iii) Trucks are taking wastes from local dumping spots to landfill stations. After passing weighbridge trucks are being unloaded by labor for the manual system, and automatically in advanced automated trucks.

4.4 Engagement of Different Partnership Initiatives

It is beyond the capacity of the city authorities to control this massive amount of generated trashes. Unsatisfactory service had come in front when inhabitants realized the importance of controlled waste disposal. Though proportionately waste disposal not gained excellent success rate, lack of efficiency have demanded private initiatives to involve in the management system. In the 1990s and end of the following decade many parts of Dhaka City, citizens showed their responsibility to initiate community-based workforce to keep the own area clean and healthy.

Approximately 80% of household sourced wastes are organic. Waste Concern along with other some small NGOs are also working to produce bio-compost fertilizer, extracting from organic part of scraps which collected from different areas of the city. Apart from formal city authorities and NGO's workforce, the moderate informal sector is also involved in managing wastes either directly or indirectly. Though city authorities do not control efforts of this informal sector, their contributions are accredited.

Three systems of waste management are coexisting in Dhaka City. Their positive contribution is enhancing the success rate of controlled waste management.

a) Formal System:

Currently, two City Corporation of Dhaka (DCC) city is governing the formal system of waste management. These two pars are co-operatively disposing of 4500 tons of municipal solid waste in two big landfills. They are providing site facilities for the local dump, bin and container to gather scraps primarily collected from different sources, open/ automated/ container trucks to transport wastes from local dumping site to landfills and finally the facility of the landfill. Formal authority is also responsible for arranging sweeping road facility along with the collection of roadside wastes. Aprons, sweeping equipment, pulling cart, and co-operative financing of Van service is being provided to collect door to door wastes with CBOs and informal practitioners. City authorities furthermore monitor the whole procedure of waste disposal by their Conservancy Inspector though it has the allegation of irregular basis.

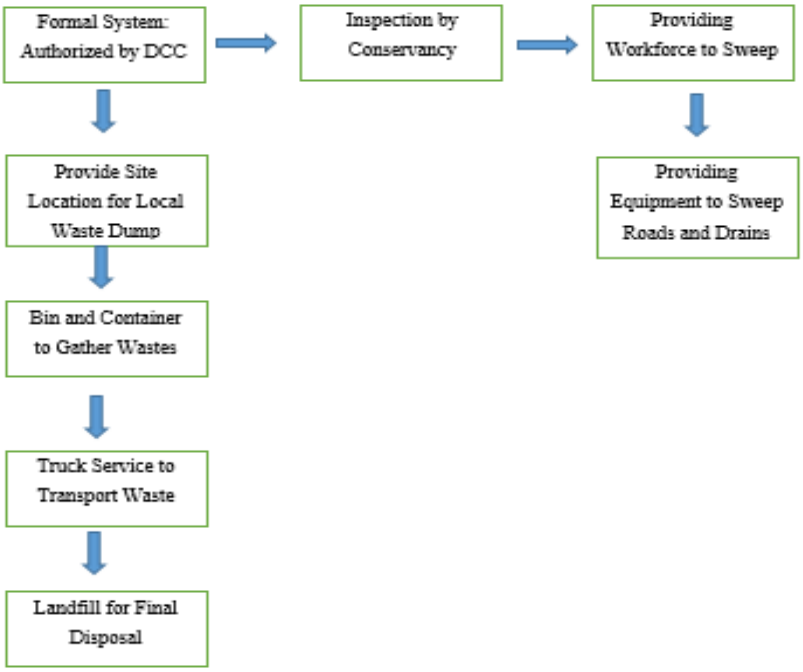

Figure 2: Formal System of Waste Management (Source: Fieldwork, 2015)

b) Community and Informal Systems:

Community initiatives have started by primary waste collection. Proportionately this CBOs and informal workforce are contributing in the most crucial portion of management. Previously, people used to through their waste in roadside and non-permitted places

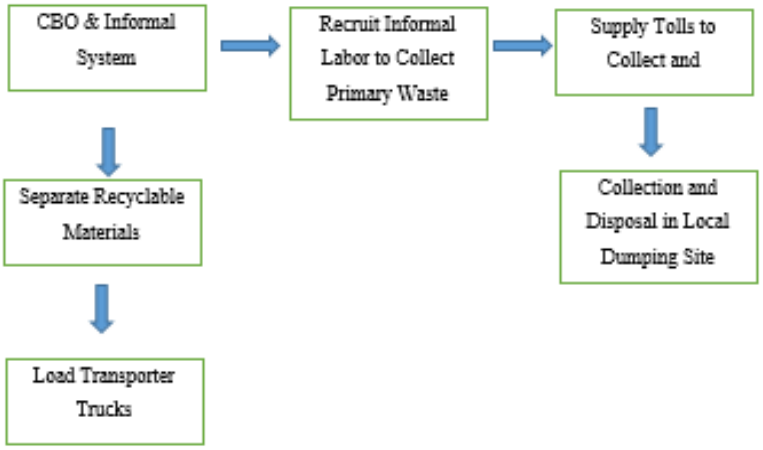

Figure 3: CBO and Informal System of Waste Management (Source: Fieldwork, 2015)

. It has made the work tougher which is now conducting this informal workforce. Some works of literature do not consider community-based organizations as informal sector. There is no unified system within CBOs. Thus various kinds of affairs make the demand to incorporate CBOs as informal sector. CBO is now assigned to collect door to door municipal wastes with pulling carts, mainly by the help of manually operated Van. Laborers are then responsible for reaching them in local dumping sites. They also, separate perishable and non-perishable wastes and sell recyclable materials to local market. In most acses, informal laborers load the trucks which are transporting wastes in the landfill.

c) NGO Initiatives:

Waste Concern, a regional NGO, has been first, initiated a community based decentralized composting project in Dhaka city in 1995. This group was founded with the vision to contribute towards waste recycling, environmental enhancement, renewable energy, poverty abatement through job formulation, and sustainable development. In Dhaka, the team from Waste Concern collects rubbish for recycling. These wastes are taken to several food processing centers and turned 100 tons of garbage daily into compost. Currently, this organization produces 7,500 tons of fertilizer in Dhaka every year.

Some other small NGOs like Prism are working in some areas mainly providing tools and facilities for the door to door waste collection, and with the help of community inhabitants, run bio-fertilizer plants. Another influential work is conducted by NGOs to create awareness among citizens.

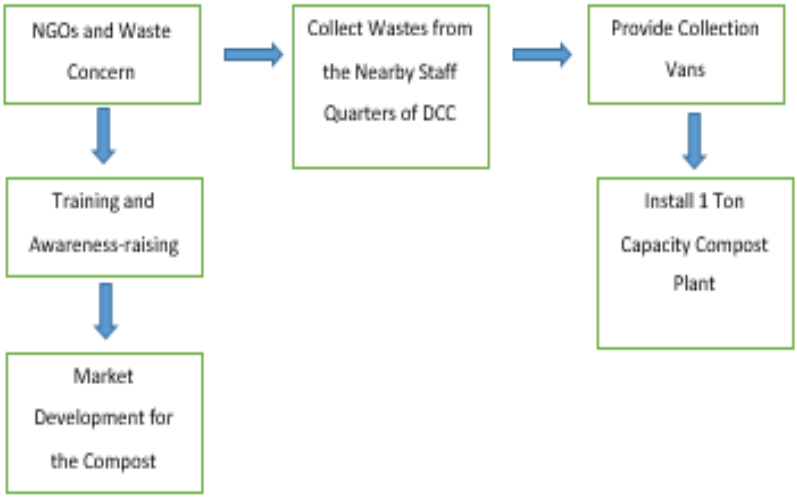

Figure 4: NGO initiatives in Waste Management Sector (Source: Fieldwork, 2015)

4.5 Featuresof Informal Sector of Waste Management

Informal efforts incorporate the new patterns of the community-based workforce and independent labors who are involved in collecting scarps from the waste disposal site.

Laborers are assigned to receive door to door household waste. They are working according to the direction of their regulatory bodies. Other workers who involve in driving business with scraps included in Informal Sector of waste management. Various initiative patterns are seen in different parts of the city. This informal sector is creating job opportunity for about 6000 peoples in this town. Management patterns are differentiated through its governing bodies. In some area, people from the flat owners association are regulating all household waste collection procedures. Political or influential personnel are also active to take part in governing in other regions. We can put some categories to address the characteristics of the informal sector.

Flat owners association articulates waste management regulation at primary level in the maximum area. Flat owners arrange an election to elect the responsible committee to inspect waste management system in their area. This regulatory body is assigned to gather the subscription fees from flat owners or renters. This body incorporates with City Corporation, individual van owners or from garage rent/buy vans and other necessary tools to collect wastes from flats. Some association in Uttara area has their vans and fund to purchase new equipment. This governing body, assign van pullers or labors to run the collection and disposal works.

Some areas of Dhaka city, *Leaders of the local wings of the ntional political parties and Local Government* control 15% of the primary waste collection procedures. This leadership also changes over time and political consideration. In some areas of Mirpur and Gulshan, political leaders are taking incentive from informal labors on a monthly basis. In exchange, they permit those laborers who are willing to work out. Flat owners association instead do not make their intervention in those areas are controlled by political leaders. This money making business is a prerequisite demand by the political persons as the part of election engineering. Senior leaders permit to collect subscription from community people to get support from their juniors at the time of election.

In very few areas about 5%, waste management regulated by some *Wealthy or Influential person*s. In Nakhalpara and Merul Badda, some influential persons have started to give awareness among community people. Slowly they have involved in arranging prerequisite steps of responsibility of waste management in their area. They operate all procedure with the help of other community people.

In many areas like Mirpur, Answar Camp, some *Van Owners* who are operating waste collection and disposal system for many years, are now having more than two vans. This kind of entrepreneurs collecting money from flats and recently driving their business by recruiting labors for their owned vans.

Approximately 1000 *Independent Van Pullers* have their van, among them, a portion has invested their money to avail the new job opportunity, and rest of are working a long time and work under others supervision. By the savings, they have bought own van. Recently, political leaders and flat owners are buying their vans, and sometimes snatching also happened in many areas. This kind of injustice making them van owners to terminal labor.

Aboreut 10000 *Scrap Collectors as Tokai* are engaged to separate and collect sellable scraps from wastes. Sometimes they are assigned by scarp businessmen, and some collectors are working individually known as Tokai.

4.6 Economic Contribution of Informal Sector

An enormous amount of waste generation demands to meet a tremendous amount of workforce, community-based and individually informal labor intervention is essential. This sector is rising for the time being with creating 6,000 job opportunities and now has

a significant influence on the economy. Many scrap collectors and people in business also depend on these informal facilities as well.

The most prominent portion of this money making job is contributing to the effort of scrap collectors. Approximate 10,000 laborers are involved in scrap collecting who they are earning 5,000 taka per month. Workers like helpers of the van can get more than 2,500 taka in every month. Some people are engaged in sweeping the place of local dumping site and loading the waste picking trucks collected from the household. This informal and sometimes day laborers are also earing 3,000 taka per month, whether from association or city corporation. Political leaders are taking illegal incentive from the pickers by using their power in the area. This type of people is getting highest money from waste management sector.

Table 3: The Estimation of Informal Sector's Contribution to Waste Management

Informal Sector	Approx. workers	Income/month	Total currency (million taka)
Scrap Collectors	10000	5000 TK	50
Waste Pickers	6000	8000 TK	48
Helper of the Waste Pick-up Van	4000	2500 TK	10
Political Leaders	200	80000 TK	16
Others Labors	1000	3000 TK	3
Total	21,200	-	127

(Source: Fieldwork, 2015)

5. Conclusion

The tremendous amount of waste generation and inadequate facilities get plunged the formal authority into a severe problem in Dhaka city. Total 17 million inhabitants from 360 sq. km area is producing 7000 tons of wastes every day. City Corporation along with Informal initiatives can deal with maximum 4500 of them, consequently disposed of by City authority. Community-based informal workforce conducts first collections of waste from households which is the most significant source of waste production. Some NGOs like Waste Concern are now collecting a few organic household wastes transforms it to bio-fertilizer. Community initiatives, independent van pullers, scrap collectors are contributing a great effort to make the Dhaka city green and clean, also consisting of an informal workforce, working side by side with the government.

Waste management in Dhaka city yet not organized and the existing technology and methods could not be able to reduce the health hazard to adjacent people and waste picking workers. Ordinance and policies of government sited that City Corporation is responsible for waste management. But the contemporary National 3R Strategy for Waste Management (2009) has escaped swiftly to site about the responsibility of waste management. Whereas, municipal is assigned to make citizen aware, and run the supervision through officials. City Corporation of Dhaka is now only transporting wastes from local dumping sites to landfill station. As a result, community-based initiatives have been inevitable to keep the management system running. This informal sector is not only affording the whole system but also

creating job opportunities for twenty-one thousand peoples including waste collectors from household, scavenger in local dumping sites, helper of transporting van and the personnel of surveillance. These informal initiatives have initiated in the mid-90s and now contributing 127 million taka in every month.

Bangladesh is following open dumping method which recognized as landfilling. Waste of Dhaka city goes to mainly two landfill sites.

Ensuring a healthy and aesthetic city well-managed waste disposal system is pivotal of all. The weakness of policy and coordination with stakeholders, Dhaka city, is experiencing a drastic problem with its waste. Being unaware citizens of this town ordinarily trashes are transformed into hazardous waste. Waste has its hazards as well. People living beside the dump station and landfill site are unable to lead a nuisance-free residential life. Business and the land utility are also hampering in the highest level. The principal responsibility of waste management is dealing with informal sector in Dhaka city leading a partnership with government.

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