Journal of ENVIRONMENTAL Treatment Techniques

J. Environ. Treat. Tech.
ISSN: 2309-1185

Journal web link: http://www.jett.dormaj.com

Solid Waste Management of Dhaka South City Corporation (DSCC)

Mahmuda Hasan[1], S. M. Saify Iqbal[2]*

1- Department of Geography and Environment, Faculty of Earth and Environmental Science, University of Dhaka, Bangladesh.
2- Research Assistant, Centre for Climate Justice, Bangladesh (CCJ-B).

Received: 22/02/2016 Accepted: 18/03/2016 Published: 30/09/2016

Abstract

Dhaka, the capital city of Bangladesh is the only mega city of the country has a population nearly 15 million. About one third of the total urban population of the country lives in this city. Although Dhaka is the heart of the country, this city has been facing serious crisis environmentally. One of the most important environmental crises of this city is solid waste management. City authority has failed to manage the waste due to lack of manpower, necessary equipment and poor governance. This study has been undertaken to identify the methods used to collect waste. Ward 33 of Dhaka South City Corporation (DSCC) has been selected as a study site. Ward 33 is located in the older part of Dhaka city, characterized by high population density and high density of economic activities. Waste generation is the highest in this area in comparison with other areas. But waste collection service is not sufficient. On the other hand, some parts of the area do not get service properly. Some maps were prepared using Arc GIS 10.1 to identify the available dumping spots, van routes and also those areas where adequate service is not sufficient or missing.

Keywords: Environmental Crisis, Solid Waste Management, Waste Collection Service and Arc GIS 10.1

1 Introduction

At present Bangladesh is a standout amongst the most populated nations in South Asia having roughly 150 million individuals where the quantity of populace per square kilometer is 1,125 [1]. During the period of 1951, rural area of this country had 95.67% of the entire population [2]. Only 4.3% people lived in city, but this circumstance began to change because of quick urbanization as population of urban area has been expanding at a disturbing rate every year (3.27%) while 1.4% is calculated in case of rural area which brought about migration from rural region to urban region for having a better life and better civilities [2]. The urban population of this nation is presently 40 million, which is 28% of the total population of this nation and it is anticipated that it will be 140 million in 2040 which is unquestionably going to be a fiasco [3,4]. Among the urban zones of Bangladesh, Dhaka city is at the most noteworthy danger. As per the Economics Intelligence Unit, Dhaka city is the second most exceedingly bad place of this planet to live. This city of 14.2 million [5] individuals, where the population is expanding at a rate of 6% every year [6] and it is assessed that by 2020, population of this city will be 20 million [7]. In spite of the fact that Dhaka is the heart of the nation, yet with the quickly expanding population, the physical development of Dhaka is extremely impromptu and erratic [8]. On account of the impromptu and unmanageable development, the city is confronting major issues like poverty, inadequate lodging for the city tenants etc. [9]. Under these situations, Dhaka city has also been facing several environmental issues like sanitation blockage, absence of water supply, air contamination, water pollution, traffic congestion, waste management problem, deforestation etc. [10]. Among these, solid waste management has turned into a noteworthy concern towards the urban communities and towns of Bangladesh. Controlling urban solid waste is an inevitable challenge in developing countries, basically in the larger urban centers like Dhaka city [11]. Hasty and unpremeditated urbanization leaves regions to a great extent, overpowered with regards to the gathering and dumping of mounting measures of solid waste [12]. Absence of monetary assets, institutional shortcoming and inappropriate choice of technology and absence of public consciousness have made solid waste management services far from satisfactory [2]. City administrations in many urban areas and towns are as of now over-troubled, and just can't take care of the developing demand for municipal administrations, bringing about unhygienic and smudged living condition in the areas [13]. So as to manage the overall circumstance, legitimate study is required to break down the urban waste management situation of Dhaka City [14].

Economic improvement, urbanization and enhancing expectations for everyday comforts in urban areas have prompted an increment in the amount and multifaceted nature of producing waste [7]. Solid waste management represents a prominent issue in light of the fact that it prompts land contamination if transparently dumped, water contamination if dumped in the swamps and air contamination if smoldered [13]. Dhaka city is confronting serious environmental imbalance because of the

Correspoding author: S. M. Saify Iqbal, Research Assistant, Centre for Climate Justice, Bangladesh (CCJ-B). E-mail: dusaify@gmail.com.

uncollected transfer of waste on avenues and other open territories, obstructed seepage by tainting of water assets [15]. The residents of this city are not content about the present circumstance. Authority is searching for approaches to enhance the general circumstance likewise by expanding recycling rates [16,17]. A huge volume of solid waste is produced each day in the city regions and shockingly solid waste management is being disintegrated step by step because of the constrained assets. The urban zone of Bangladesh produces roughly 16,015 tons of waste for each day, which indicates more than 5.84 million tons every year [18]. It is anticipated this sum will grow up to 47,000 tons per day and near 17.16 million tons for each year by 2025 because of rapid development, both in the population and the increment in per capita waste generation [18]. Per capita waste generation rate is estimated at 0.41 kg on a daily basis in urban territory of Bangladesh [2]. If we think globally, the calculated amount of Municipal Solid Waste (MSW) is 1.7 – 1.9 billion metric ton [19]. Near about 40% waste is collected by the authority, but uncollected waste is dropped in open dustbin beside the road which is very detrimental to the environment. Considering the Dhaka city's fast development and lacking waste management, the requirement for enhanced strong waste management shows a key open door for concurrently tending to the environmental and health issue [20]. There is a variation of waste generation between Old Dhaka and New Dhaka. Dhaka creates roughly 1.65 million metric waste every year and per person waste generation is somewhere around 0.29 and 0.60 kilograms dependent upon the people of various income levels [4] and this city is now producing 4,600-5,110 tons of waste per day [21].

The two administrative units of Dhaka city (Dhaka North City Corporation and Dhaka South City Corporation) are in charge of collecting waste and its disposal in their particular ranges. A recent report of 2007 assessed that around 42% of the whole city's waste are managed by DSCC and DNCC and 14-17% of the city corporation budget is used for solid waste management [22]. Around 7,500 cleaners are occupied with road clearing and waste accumulation action as they collect waste from the bin located at several points in the area, but there is no specific rule and regulation of locating the dustbin [23].

Old Dhaka, part of the DSCC is extremely dense in terms of population, trade and business activities. Very old and compact building structures, tight roads, commercial activities, absence of open spaces and inadvertent growth are the main characteristics of the area. Because of the profoundly populated region, it is extremely difficult for the city corporation authority to afford adequate support for waste collection. It is previously specified that, waste collection is unsatisfactory in DSCC regions as the administrative capacity of the authority is very poor. Considering the capability of the authority and context of the Old Dhaka region, this study was attempted to investigate the waste collection status, coverage of waste collection service, waste collection system, status of waste dumping station, proficiency of ward authority of waste collection and to sort the areas where waste collection service is not present.

2 Objectives and Site Selection

In the broader context, the aim of the study is to explore the waste collection status and system in the study area. More specifically the objectives of the study are

a. To identify the methods and coverage of the waste collection services.
b. To identify the waste dumping spots in the study area.
c. To explore the strength of the authority to collect the wastes.

Ward 33 of Dhaka South City Corporation (DSCC) has been chosen for the present study. This area is very compact in terms of population and commercial activity. As indicated by Population and Housing Census 2011, more than 65 thousand individuals live in 12,891 family units (BBS, 2012). The size of the average family size unit is 4.9. 10,723 households live in residential units, 16 households are official and 2,152 households are kept in another category [12]. Most of the household's source of income is service activity. Table 1 illustrates the basic statistics of ward 33 and figure 2 shows the administrative units of the study area.

3 Methodology

Base map of ward 33 was collected from two sources. One is from the Dhaka City Authority (DCA) and another is from the Center for Urban Studies (CUS). Both these maps comprehend the major characteristics of the study region. Secondary data have been collected from different reports and statistics. Magellan Triton 300 Handheld GPS (Global Positioning System) was used in order to identify the van routes by which city authority collects waste, bin & its capacity, unauthorized dumping spots and those areas which do not get any waste collection service. Institutional survey was directed to identify the capacity of the ward authority regarding waste collection system by consulting with the people of ward office. Collected data were analyzed using Microsoft Excel 10 and mapping was done using ArcGIS 10.1.

3 Results and Findings

Like other parts of the city, Ward 33 has a likewise absence of solid waste management service. It is difficult to collect waste material from each part of the area due to the mixed land use pattern, high population density and narrow road structure. According to Ward Authority, everyday more than 32 metric tons of household solid waste are generated in Ward-33. But the city authority can collect and manage only 80% of the generated waste. Around there are two sorts of waste collection framework existed in the vast majority of the zone. In most of the area, the city authority collects the household and industrial waste. City authority provides door to door services in some areas.

.

Figure 1: *Map of Dhaka City [24]*

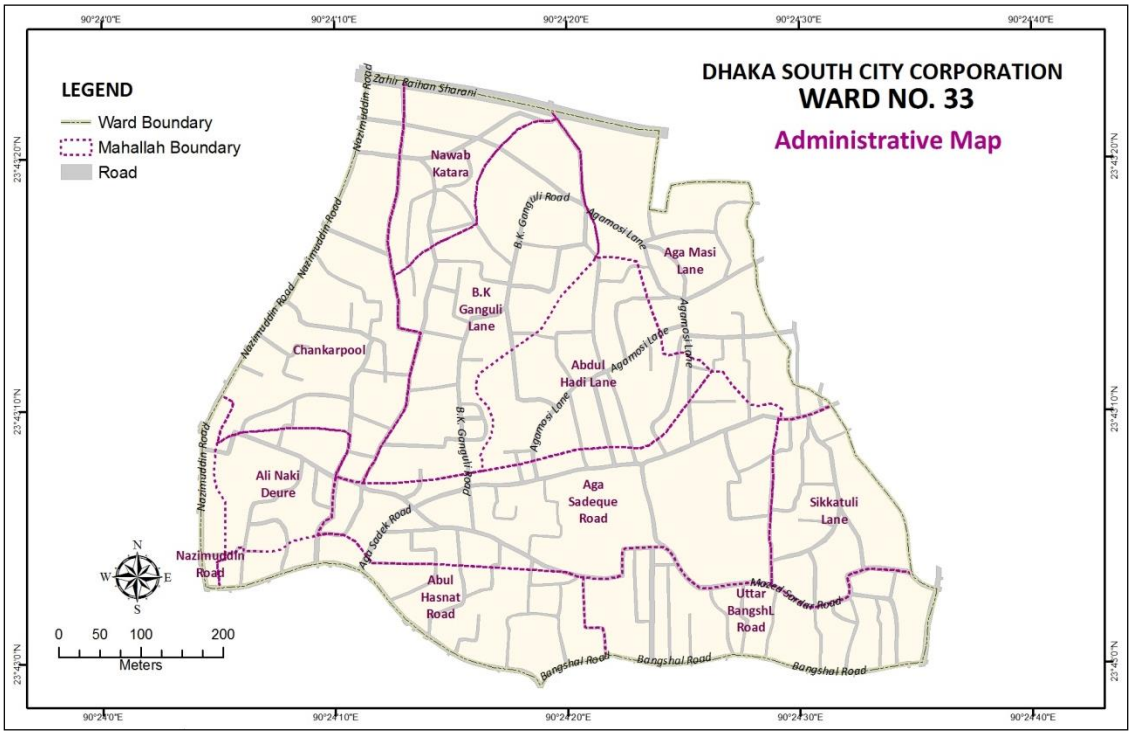

Figure 2: *Administrative Map of DSCC (Ward No.33)*

Table 1: Demographic Characteristics of the Study Area (Source: BBS, 2012)

Population	65,289	
Households	12,891	
Average Household Size	4.9	
	Household Types	
Dwelling	**Institutional**	**Others**
10,723	16	2,152
Literacy Rate	73.40%	
	Source of Income	
Agriculture	**Industrial**	**Service**
Male-17, **Female**-0	**Male**-395, **Female**-9	**Male**-5,168, **Female**-789
Electricity Coverage (% of HH)	99.80%	
Sanitation Coverage (% of HH)	96.90%	
	Sources of Drinking Water	
Tap	**Tube well**	**Other**
96.10%	3.60%	0.20%
	Type of Household Structure	
Pucca	**Semi Pucca**	**Jhupri**
86.20%	13.20%	0.30%

Figure 3: *Methodology of the Study*

In some important areas, the authority provides bin where local people dump their waste and city authority collect that waste. There are some locations where city authority does not provide any service. In that case, some persons are employed to collect their waste and they are paid monthly for their services. These people dump the collected waste in the nearest dustbin so that city authority can collect all the generated waste.

3.1 Household Waste Collection by Vans

Household waste collection through van service is a compelling approach to collect household waste. Waste collection is done by this procedure in most of the part of ward 33. Some of the dwellers claimed that, "the van services are insufficient and in some areas they do not collect waste regularly". The following map shows the route of garbage vans in ward 33. It is clearly identified on the map that the service is insufficient in the western and southern part of the ward.

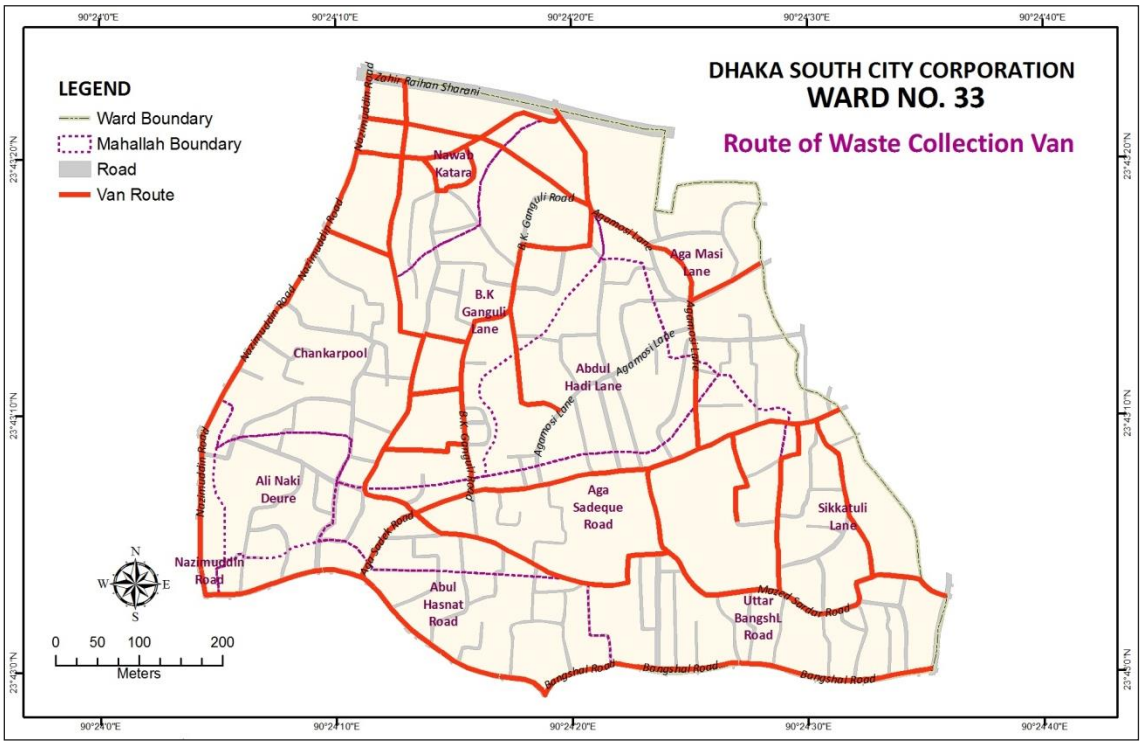

Figure 4: Route of Waste Collection Vans in Ward 33

Figure 5: *Waste Collection Vans*

3.2 Collection from Dustbin (Authorized)

City authority provides dustbin to dump waste in some important locations in spite of the fact that these are not adequate. There are 12 dustbins in Ward 33 provided by City Corporation which are located in Chankharpool lane, Ali Naki Deury lane, Bangshal road, Aga Sadeque road, B.K Ganguli lane, Bangladesh Math, Shikkatuli lane and Agamasi lane. Consistently waste collection truck and van collect waste from those dustbins to the dumping station.

Figure 6**:** *City Corporation Dustbin in Ward 33*

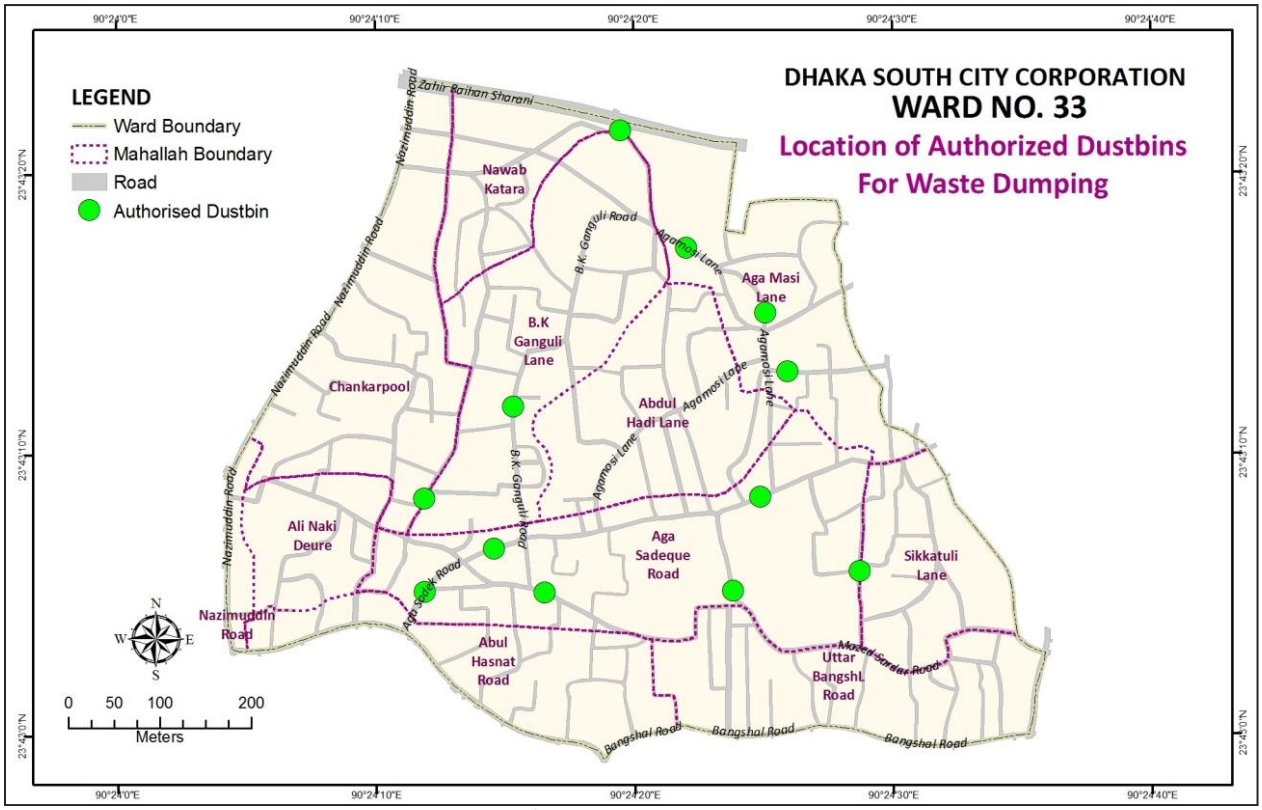

Figure 7: *Distribution of Dustbins Provided by City Authority in Ward 33*

3.3 Road Side Dumping Area

Due to lack of door to door service and lack of dustbin, sometimes people throw their daily waste in the road. In most cases, they throw waste in some specific locations. This study identified some locations where people throw their waste. Figure 9 demonstrates those areas which are generally extensive and city authority additionally collects waste from those points.

There are 11 *mahallahs* in Ward 33. Status of waste collection of each *mahallah* is described below

3.3.1 Abul Hasnat Road

Most of the part of Abul Hasnat road is neat and clean. Sufficient numbers of dustbins are available in this *mahallah*. Household waste is collected by door to door services. Waste collection van collects household's waste

every day. Due to some narrow roads, van cannot reach every house. People keep their waste in front of their houses in a small bin and waste collector collects that. There is no road side unauthorized dumping stations.

Figure 8: *A Road Side Waste Dump Spot in Ward 33*

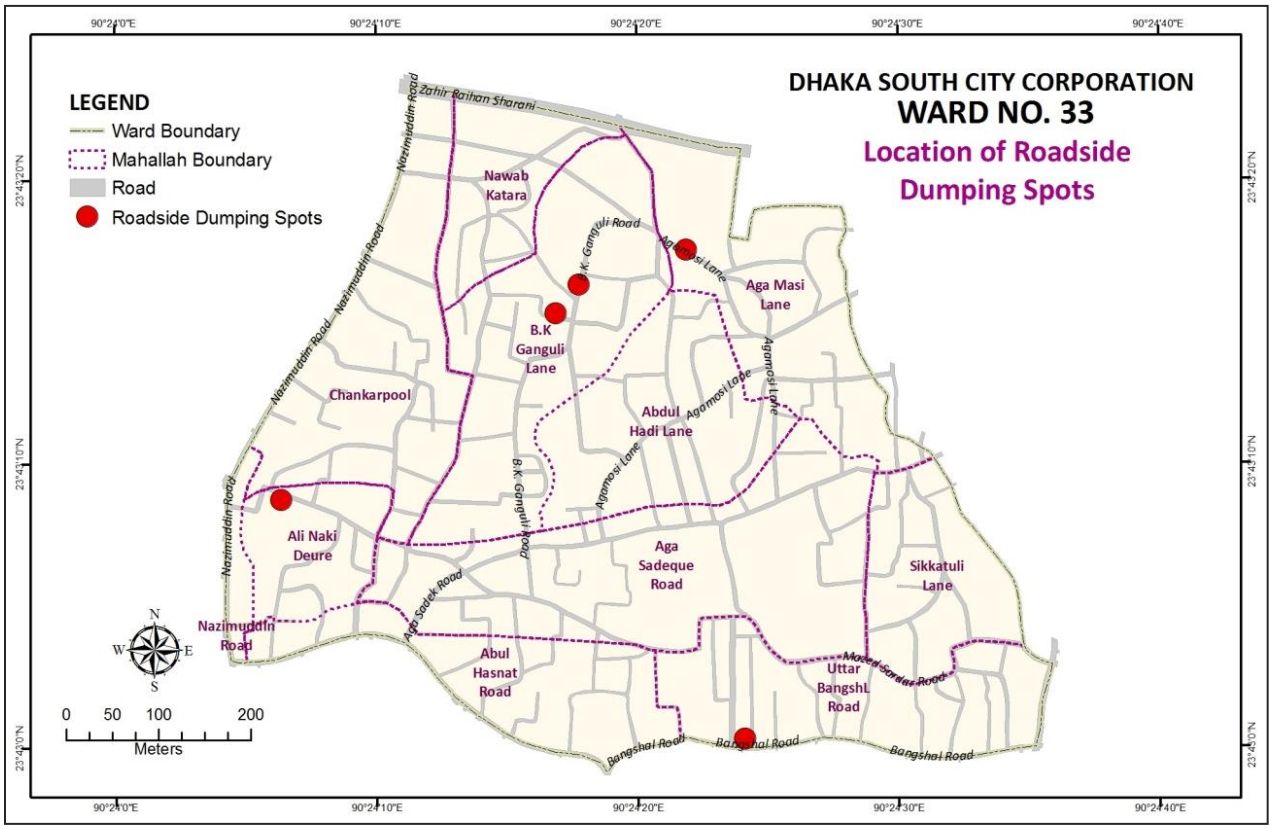

Figure 9: *Location of Road Side Waste Dumping Sites in Ward 33*

3.3.2 Agamasi Lane

Waste collection service in Agamasi Lane is good and fully covered by the city authority. Door to door waste collection by a van is sufficient and there is a sufficient number of dustbin in this area.

3.3.3 Ali Naki Deure

Ali Naki Deure area is generally overlooked region by DCA in light of the fact that city authority van does not come here. On the other hand, there is no accessibility of dustbin available in this *mahallah*. Dwellers of this area employ a person to collect household waste (two or three days in a week). Every household pays him monthly 30 BDT for his service.

3.3.4 B.K Ganguli Lane

B.K Ganguli Lane is a unique area because the city corporation van comes every day and collect household waste and road side waste till 11 am. After this time some people dump waste in the road side and make the area dirty.

3.3.5 Abdul Hadi Lane

This area is very clean because dustbin is not available here, but van coverage is 100%. DCA collects waste regularly in this area.

Table 2: Waste Collection System and Coverage

Mahallah name	Coverage (%)	Service available		Road side dumping
		Van	Dustbin	
Abul Hasnat Road	Maximum (70%)	✓	✓	No
Agamasi Lane	Full	✓	✓	Yes
Ali Naki Deure	Partiall (30%)			Yes
B.K Ganguli Lane	Full	✓	✓	Yes
Abdul Hadi Lane	Full	✓		No
Sikkatuli Lane	Partiall (40%)		✓	No
Chankharpool Lane	Maximum (80%)	✓	✓	No
Nawab Katara	Full	✓	✓	No
Nazimuddin Road	Full	✓		No
Uttar Bangshal Road	Partiall (20%)			Yes
Aga Sadeque Lane	Full	✓	✓	No

3.3.6 Sikkatuli Lane

Sikkatuli Lane is mainly an industrial area. Van service is not available in this area. People use the nearest dumping station to dump the waste. The city authority collects waste from those dustbins 3-4 days in a week.

3.3.7 Chankharpool Lane

Approximately 80% area gets services from the city authority. Although door to door service is available, but it is not on a regular basis (only a few days in a week). Road side waste dumping was not seen in that area during the survey.

3.3.8 Nawab Katara Road

The waste collection service of this area is satisfactory. Door to door collection by van service is available in the whole area and road side dumping is not visible in this area.

3.3.9 Nazimuddin Road

Nazimuddin Road area is mainly a commercial area but there are some households also. Although van service is available, but there is no dustbin in this area.

3.3.10 Uttar Bangshal Road

This area is mainly an industrial area and road side dumping is the highest in this area. Sometimes the city authority collects waste from the road. In areal context, the coverage is not more than 25%.

3.4 Capacity of Ward Authority to Collect Waste

Capacity of ward authority to collect waste is limited. There is an acute shortage of manpower and equipment also. This ward is different from the other regions of Dhaka city because of its high population density and waste generation. The management system is also found very week. There are only two trucks for transporting collected garbage, but each truck has $1^1/_2$ tons capacity only (Table 3). To collect waste from household and road side garbage, there are only 8 vans, which are insufficient to collect and manage the regular waste.

4 Conclusion

In the old part of Dhaka, solid waste management is relatively much poorer than the other area. In this study, it has been tried to explore the state of solid waste collection system in ward 33 of old Dhaka. Ward 33 is one of the most densely populated areas in Dhaka city and the land use pattern of the area is characterized by intensive commercial, industrial and residential uses. Because of the high density, generation of solid waste is also very high. The overall solid waste collection was found to be moderate. In most of the areas, household wastes are collected by vans although the service is not regular. Central part of the ward 33 is found quiet good because of the availability of the door to door waste collection system. Six *mahallahs* among eleven are fully under coverage of waste collection. Van service is available in eight

mahallahs and authorized dustbins are available in seven *mahallahs*. The route of vans and location of authorized and unauthorized dumping stations are mapped in order to identify the service gap in Ward 33. The capacity of the authority is not sufficient to support all the areas of ward. So for the proper management of the waste, it is necessary to enhance the capacity of the authority and aware people to participate in that process.

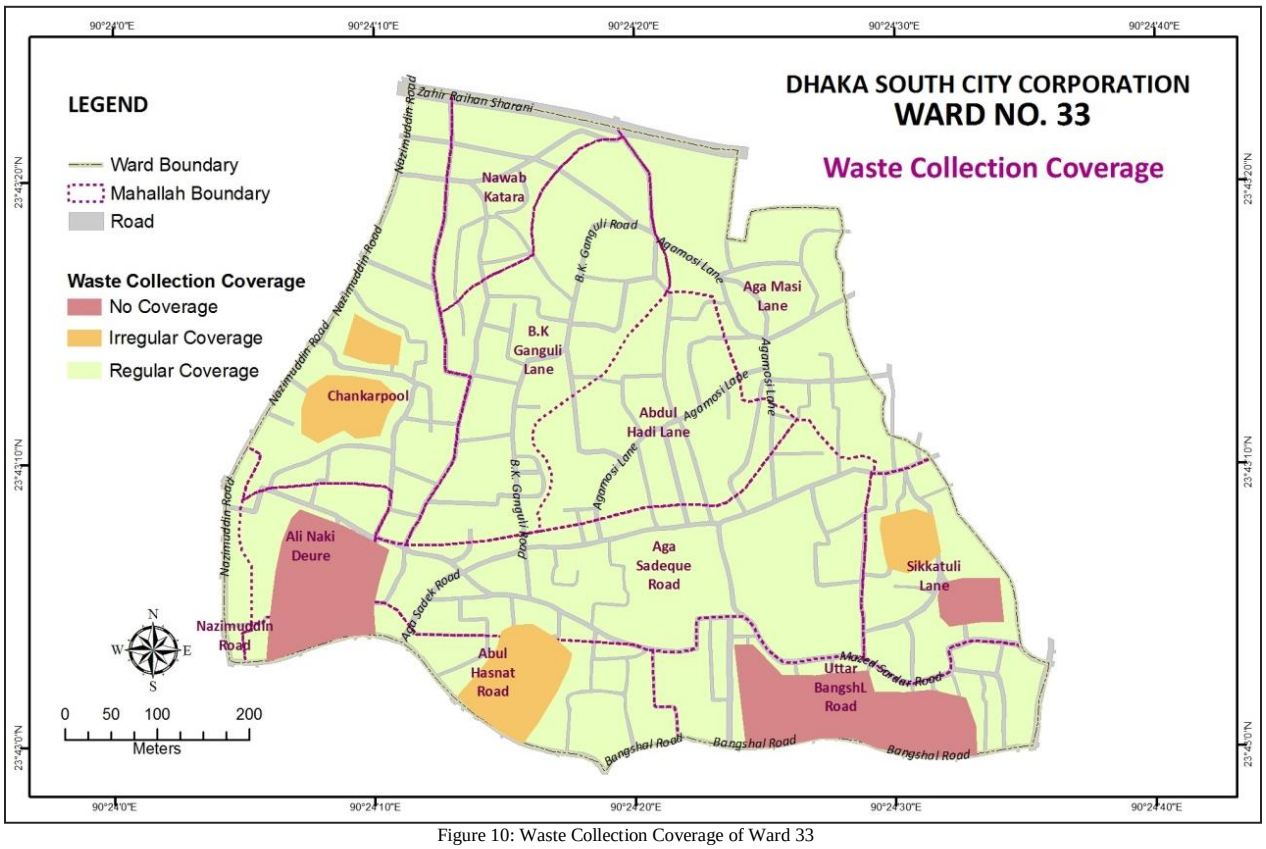

Figure 10: Waste Collection Coverage of Ward 33

Table 3: Capacity of Waste Collection of Ward Authority

Name of the equipment	Number of the equipment	Capacity
Bin and Container	11	5 tons (2) and 3 tons (9)
Open Truck	2	1.5 tons
Van	8	-

References

1- Hossain, L. and Uddin, J., 2005. Medical Waste Management at Upazila Level in Bangladesh. *Journal of Environmental Treatment Techniques* 2(3), 85–94.

2- DOE, WC and ITN-BUET, 2004. *SAARC WORKSHOP On SOLID WASTE MANAGEMENT*. Dhaka, Bangladesh: Department of Environment, Waste Concern & International Training Network-BUET.

3- BMDF, 2012. *Study On Municipal Solid Waste Management*. Dhaka. Bangladesh: Bangladesh Municipal Development Fund.

4- APO, 2007. *Solid Waste Management: Issues and Challenges in Asia*. Tokyo, Japan: Asian Productivity Organization.

5- BBS, 2012. *Population and Household Census 2001, Community Series, Zila: Dhaka*. Dhaka: Bangladesh Bureau of Statistics.

6- Zahur, M., 2007. Solid Waste Management of Dhaka City : Public Private Community Partnership. *Brac University Journal* 4(2), 93–97.

7- Matter, A., Dietschi, M. and Zurbrügg. C., 2013. Improving the informal recycling sector through segregation of waste in the household - The case of Dhaka Bangladesh. *Habitat International* 38(May), pp.150–156. Available at:

http://dx.doi.org/10.1016/j.habitatint.2012.06.001

8- WSP, 2000. *Community Based Pilot Project on Solid Waste Management in Khulna City*: *General Project Description*. World Bank Office, Dhaka: Water Sanitation Programme.

9- Ahmed, A. and Quader, M. A., 2011. Environmental Aspects of Solid Waste Management : A Case Study of Narayanganj City. *ASA University Review* 5(1), 133-143.

10- Alam, M. J. and Boie, D. I. W., 2001. ENERGY RECOVERY FROM MUNICIPAL SOLID WASTE IN DHAKA CITY. IN: *4th International Conference on Mechanical Engineering, 26-28 December 2001, Dhaka*, 125-130.

11- Afroz, R., Hanaki, K. and Tudin, R., 2011. Factors affecting waste generation: A study in a waste management program in Dhaka City, Bangladesh. *Environmental Monitoring and Assessment* 179(1), 509-519.

12- Medina, M., 2005. Serving the unserved: Informal refuse collection in Mexico. *Waste Management and Research*, 23, 390-397.

13- Tania, F., 2014. Solid Waste Management of Dhaka City : A Socio-economic analysis. *Bangla Vision* 13(1), 91-100.

14- Enayetullah, I., Sinha, A. H. M. M. and Khan, S. S. A., 2005. *Urban Solid Waste Management Scenario of Bangladesh: Problem and Prospects*. Dhaka, Bangladesh: Waste Concern.

15- UN Habitat, 2010. *SOLID WASTE MANAGEMENT IN THE WORLD'S CITIES WATER AND SANITATION IN THE WORLD'S CITIES 2010*. London, UK: United Nations Human Settlements Programme.

16- MoEF, 2010. *National 3 R Strategy for Waste Management*. Ministry of Environment and Forests, Dhaka: Government of the People's Republic of Bangladesh.

17- Bahauddin, K. M. and Uddin, M. H., 2012. Prospect of Solid Waste Situation and An Approach of Environmental Management Measure (EMM) Model for Sustainable Solid Waste Management: Case Study of Dhaka City. *J.Environ. Sci. & Natural Resources* 5 (1), 99-111.

18- Ahmed, M. F. and Ashfaque, K. N., 2002. Sanitation and Solid Waste Management in Dhaka City During the 1998 Flood. *Engineering Concerns of Flood*, 1–13.

19- Ray, A., 2008. Waste Management in Developing Asia: Can Trade and Cooperation Help? *Journal of Environment & Development* 17(1), 3-25.

20- CCAC, 2014. *Solid Waste Management in Dhaka*. USA: Climate and Clean Air Coalition Municipal Solid Waste Initiative.

21- Mukti, S. A., 2015. Solid Waste Management In Dhaka City: Problems And Prospects. *International Journal of Innovative Research & Development* 2(11), 33–37.

22- Zerin, S. A. and Ahmed, M. B., 2009. Hospital Waste Management in Dhaka: A Threat. *Bangladesh Research Publications Journal* 3(1), 796–811.

23- Hai, F. I. and Ali, M., 2005. A Study on Solid Waste Management System of Dhaka City Corporation: Effect of Composting and Landfill Location. *UAP Journal of Civil and Environmental Engineering* 1(1), 18-26.

24- Dhaka Calling, 2015. Dhaka City Map [Map on the Internet] [Cited 25 SEP 2015]. Available from: http://www.dhakacalling.com/dhaka_city_map.php