

## Solid wastes management system at Dhaka cantonment area of Bangladesh

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### ABSTRACT

The study was conducted to investigate the present scenario of solid waste and its management practice at Dhaka Cantonment area. Huge solid wastes are generated every day in these areas but the waste management is not properly done because of their irregular waste management activities and unconsciousness. Maximum respondents (40%) discharged 1-5 kg solid waste from their households in a week. Among the other respondents 12%, 16% and 32% household discharged 6-10 kg, 11-15 kg and 15 kg and above solid waste respectively from their house in a week. A majority percent of people dumps the produced solid waste near their home which produce various hazards in human health and environment. It was revealed from the study that due to lack of people knowledge about solid waste management, lack of adequate budget for waste management, lack of available transport vehicles for waste management, lack of proper solid waste treatment plant etc. The total solid waste management system required following the recommendation which include proper planning, creating awareness, developing infrastructure, providing logistic support and finally involving NGOs, CBOs, public in this process. The municipality and other related NGOs should work together to solve these issues.

### INTRODUCTION

Waste Management (WM) is defined as the activities of “collection, transport, processing, recycling, disposal and monitoring” of the wastes in a way that minimizes the damage to the Earth (Demirbas, 2011). Population, industrialization, urbanization, and economic growth are the factors causing the increase in solid waste (SW) generation in developing countries (Dhokhikah and Trihadiningrum, 2012). The evolutionary waste quantity and characteristics accordingly challenge the municipal authorities in management, demanding more and more resources and technological capability. In developing countries where resources and capacity is constrained, the challenges thus become serious. (Penjor, 2007). As a developing country like Bangladesh a huge amount of solid waste generated in municipal areas but most of them are not managed properly. For unplanned solid waste management practice causes various problems in human life. Inherent human desire in resources consumption governs the waste generation

capacity. People are growing rapidly in municipal areas and increase solid waste for their daily resource consumption (Halder et al., 2014).

MSW can harm humans and environments well-being, but also represents a potential source of materials. Prevention of waste is more desirable than recycling, and recycling more than disposal. While most high income countries (HIC) have designed highly complex and cost-intensive waste management systems to reach the objectives of SWM, countries with low and middle income (World Bank, 1999) and thus lower revenues from taxes and contributions to finance their waste management systems, find it difficult to apply these systems (Brunner and Natw, 2008). The study was conducted to assess the present status of solid waste management practice in Dhaka cantonment area of Bangladesh.

### MATERIALS AND METHODS

#### Study area

Dhaka Cantonment is located in the northern part of Dhaka, Bangladesh located at 23.8222°N 90.4083°E. The headquarters of Bangladesh Army, Navy and Air Force are situated within this cantonment. The Cantonment is located on the north-east end of the Dhaka metropolis. It has 36540 units of household and total area 8.6 km<sup>2</sup>. At the 2001 Bangladesh census, Cantonment had a population of 131,864, of whom 114,817 were aged 18 or older. Males constituted 55.53% of the population, and females 44.47%. Cantonment had an average literacy rate of 88% (7+ years), against the national average of 78.56% (BBS, 2011 and NILG, 2012). The study was conducted from July, 2016 to December 2016.

### Document study

Secondary sources like research papers and study reports on waste generation and management will be used for data gathering and getting in depth knowledge regarding the issue.

### Informal group meetings

To support the main data collection method of semi-structured interviews informal group meetings will take place. Ethical issues, informed consent, right to privacy and protection from harm will be discussed and consent forms will be distributed. Subsequent group meetings will occur occasionally throughout the research process as a form of 'member checking' to keep all participants informed of the progress of the research. Both FGDs and IDIs will be used for data collection. A field level survey was conducted to have the detail idea about the waste management scenario.

### Data analysis

The data was classified according to the contents. The organized data was then overviewed to get a general sense of emerging trends, patterns and concepts. The data was divided into broad categories like major sources of wastes, waste collection and transportation, waste decision making process, public involvement in the decision making process and so on. The collected data is analyzed by using Microsoft office excel 2010.

## RESULTS AND DISCUSSION

Hundred respondents were interviewed in the study area whom were relevant to the study. Both male and female respondents were in interview, where 43% female and 57% male respondent. The respondents were of of 25-40 years aged.

### Major sources of wastes

#### Domestic wastes

Domestic wastes include the wastes generated in houses and offices in the study area. It includes paper, plastic, glass, ceramics, polythene, textiles, cans, bottles, vegetable waste, etc. Out of 100 respondents, 40% dump 1-5 kg, 12% dump 6-10 kg, 16% dump 11-15 kg and 32% dump 15 kg and above in a week (Figure 1).

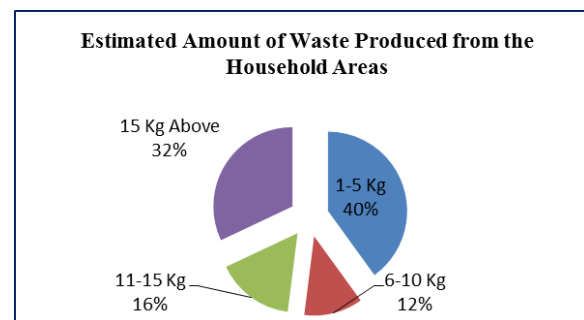


Figure 1  
Amount of the wastes produced from the household areas

#### Commercial wastes

The waste generated in commercial establishments like CSD shops, printers, offices, restaurant etc. It includes packing materials, spoiled goods, vegetable, foods and meat remnants, bottles, plastic bag, disposable cooker, polythene, polypropylene, printer paper, etc.

#### Ashes

They come from the burning of solid fossil fuels like coal, wood and peat. Many houses and road side footpath still use these fuels. Open burning of wastes also generates ashes in there. They are very few in amount.

### Biomedical wastes

These wastes are generated from the CMH and include expired drugs, plastic syringes, surgical dressings, instruments etc. They can be infectious.

### Construction wastes

Construction activity was going on in the cantonment areas. They also generate garbage like metal rods, bricks, cement, concrete, roofing materials, etc. This type of wastes is also generated by the digging activities of the various departments like the telephone, electricity, drainage, etc.

### Sewer

The sewer removed from the sewerage during cleaning is often left on the roadside.

### Waste collection and transportation

Cantonment generally produces waste from household, Office, CSD, shop, Gas pump waste Office etc. And the waste is generally plastic, metals, glass, cloths, rubber, biological, chemical and medical waste. These all waste is gathered at their respective places. The cantonment board van collects these from cantonment, Baridhara DOHS, Banani DOHS, Mirpur DOHS, Mohakhali DOHS after the wastes have been separated at their sources and kept it in Nazir road and finally the board truck carries waste to the Dhamal Coat at road no 9 in cantonment. For the collection of waste about 400 labors, 40-50 van and 14 trucks are engaged. Several questions were asked during the primary data collection process in the household areas from where we may find out the contribution of the household people to the collection and transportation process. Several bins had been used for the separation of wastes. Out of 100 respondents, 60% replied they have metal or plastic container, 10% have basket or carton container and 28% have both type of container (Figure 2). On the other hand only 2% do not have a container. According to the respondents cantonment board collects most of the waste more than 3 days in a week from the major location of cantonment (Figure 3). On the contrary, in some remote locations they collect once in a week. The

respondents were asked, how much money they spend for waste collection. In replied 10% spend BDT 100, 67% spend BDT 200, 18% spend BDT 300 and only 5% spend BDT 300 (Figure 4). The respondents were again asked about their thinking in paying more for this collection system, and where 75% replied yes and 25% said no (Figure 5).

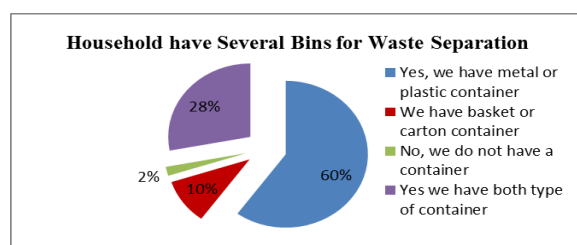


Figure 2  
Percentage of household bins for waste separation.

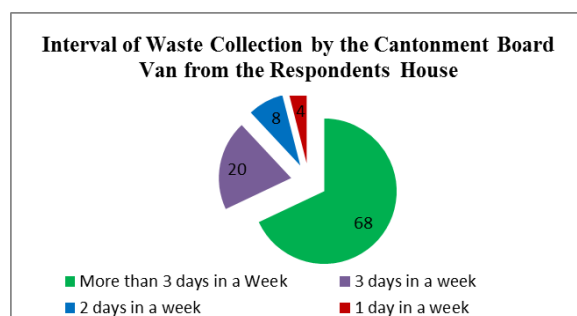


Figure 3  
Percentage of the respondents about the collection of wastes.

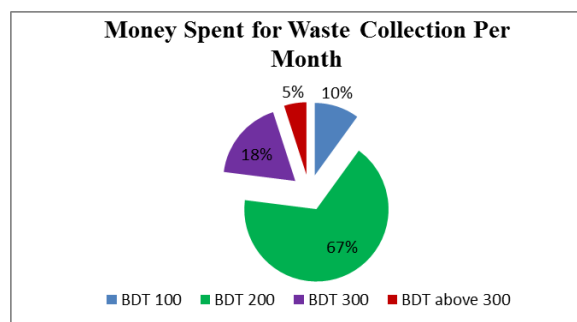


Figure 4  
Percentage of people spending money for waste collection per month.

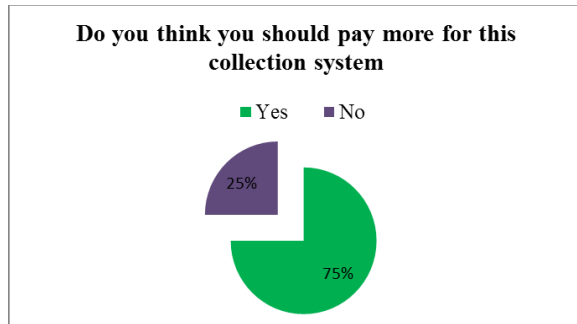


Figure 5  
Percentage of people wants to paid more money.

### Waste management

The information regarding dumping of wastes and the management of wastes in the study area are described below. The recent dumping sight of Dhaka cantonment wastes is at Dhamalcoat, which is at road no 9 in cantonment near Dhamalcoat bazaar. It's about 1 sq km. and or better security it remains closed for civil people. The wastes from different places are open dumped here by truck. Everyday the dumping process is conducted at morning around 10-11 am. All types of waste are dumped here without separation. So the waste gets decomposed and smells very pungent.

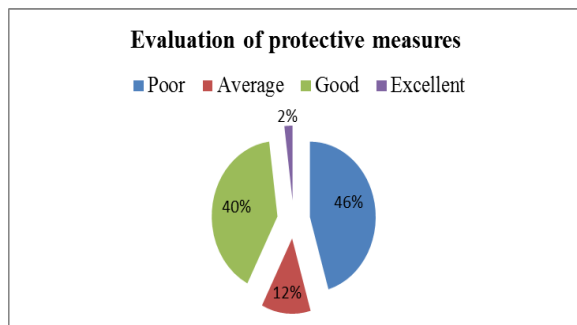


Figure 6  
Percentage of people's protective measures.

Wastes were normally collect from the place and through it in the dumping sight at Dhamalcoat. No incineration or landfilling or any modern technology was used. Some of the waste decomposes there and some were collected by the waste pickers and the rest remained untreated. The sanitation system was directly linked to safety tank. In household management practice

respondents had been asked about the protection measures. Out of 100 respondents, 46% replied that the waste management protective measures they currently have are poor. About 40% respondent believed that they are good enough. 12% think that the protective measures are not good not bad. Only 2% think that it is excellent (Figure 6).

Whereas the waste management scenario was different in Combined Military Hospital (CMH). About 400-450 kg wastes produced per day on an average in the CMH which has managed very prudently to reduce the potential effects of such biomedical waste. CMH has a contract with Prism ([www.prismbd.org](http://www.prismbd.org)) for its collection of waste for 3 years and they have been paid 400 thousand taka each month for the collection of wastes. 4 types of dustbin (red, yellow, green, blue) are used at CMH for the separation of waste. A 3 ton truck collects waste and transports it to Matuail at savar. There is an incinerator. This process is carried out for since 2012. There is an incinerator at CMH which is not functional as the higher official has veto issues. At present the CMH waste is dumped at the wall near the Shainik mass, CMH. People trained by PRISM on the waste collection process are linked for out sourcing and 200-300 people engaged on overall management of the CMH.

### Causes of mismanagement

Cantonment authority is totally unaware of the importance of proper management. Due to their financial crisis they are not being able to hire new man power, and implement new process. However the minimum unskilled man power they have. They are not aware of the impact of waste hazard.

### Management strategy

For the effective management of solid wastes in the cantonment area, the following things should be under concern.

**Manpower:** As in this section in case of man power we weak but we need to recruit large mass of men and enough qualified man to teach so that, they can perform the task properly.

**Introduction of training:** Every staff related with waste collection and management system should be trainee under a qualified authority. So that they can performed their properly.

**Strict observation:** laws and policies should establish and every people related to this committee and job should maintain strictly. The committee should strictly observe every task. Then it is possible to provide a healthy environment.

**Awareness programme:** Each and every person must beware of danger of improper waste management. It is important to educate and create awareness to resident, school, garbage collector, student, children, and maids.

**Bangladesh uniform colour code:** Government initiated to standardized colour coding of hazardous wastes for in house management.

Table 1  
Description of colored container.

Colour	Material
Yellow	Infectious
Red	Sharp
Green	Recyclable
Silver	Radioactive
Blue	Liquid

**Segregation:** Segregation of waste is important factor to manage waste properly. First classify waste into two dry waste and wet waste. Choose two different colors for waste bin like red and green. If we choose red and green, put dry waste in red bin which mainly consists Cartons, packets etc. Another bin green must be used to put wet waste such as dump vegetable and fruit peels or leftover foods, coffee and tea waste, garden waste and dry leaves.

**Prevention and reduction method:** It is one of the effective methods to control waste and manage them. It includes methods of reducing waste and avoids further wastage. Some of the methods used in avoidance and reduction are reusing of second hand products and repairing things than buying a new one.

**Participation of one and all:** The success of waste management needs co-operation of one and all. Whether we are residents, shopkeeper, owner of hotel or restaurant, student, professor or any vocation all of them need to work together for effective waste management.

**Incineration:** Immediately Cantonment Board should institute an incinerator. CMH should run their incinerator as early as possible.

## CONCLUSIONS

The solid waste management in Cantonment area appeared to be inadequate and it should be improved. The solid waste should be disposed of scientifically through sanitary landfill and recycle. Segregation of recyclable material would also leads to reduce in quantity for final disposal. Higher priority needs to be assigned to the management of municipal solid waste by the local authority and a system approach needs to be adopted for optimizing the entire operation of SWM encompassing segregation at source, timely and proper collection, transportation routes and types of vehicles and development and proper operation of sanitary landfill site. Cantonment authorities might need to look for better solution of waste disposal considering unavailability of landfill and disposal site. The waste generates from the cantonment not only effect its people but also the overall environmental pattern.

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