

## **ASSESSMENT ON SOLID WASTE MANAGEMENT IN CHITTAGONG CITY, BANGLADESH: A CASE STUDY OF SANONDA R/A**

A. Akbar\*, S. Akter, B. Rokeya, A. Dev & T. Zannat

*Department of Civil Engineering, Southern University Bangladesh, Chittagong, Bangladesh*

*\*Corresponding Author: saymaaktercu42@yahoo.com*

### **ABSTRACT**

Generation of solid waste (SW) is a major problem in urban areas and its management is obligatory functions for both urban local authority and the urban people. This study was conducted at Sanonda Residential Area of Bagmonirum Ward 15 under Chittagong City Corporation (CCC). The study involved a questionnaire and encompassed 50 households from three different socioeconomic groups (SGs): middle (MSG), upper middle (UMSG) and high (HSG). It was found that the residential waste generation rate was 0.35 Kg/person/day and an average household generation of 2.02 kg of waste per day. The household solid waste (HSW) comprised of nine categories of wastes with vegetable/ food waste being the largest component (64%). Vegetable/ food waste generation increased from 52% (observed for HSG) to 76% (for MSG). By weight, 65.9% of the waste was compostable in nature. Finally, the research suggests some appropriate recommendations on how a participatory-sustainable residential solid waste management system could be developed in the area of CCC to achieve its goals.

**Keywords:** Solid waste; generation; composition; recovery potential; house hold stage

### **INTRODUCTION**

Solid waste generation has increased proportionately with the growth of urban. Chittagong city is facing great difficulties because of high rates of urbanization due to rural exodus/migration. Municipal solid waste (MSW) management systems are becoming more complex in many countries with movement from landfill-base systems to resource-recovery-based solutions (Abu-Qdais, H. A. (2007) ). The average generation of solid waste in the urban areas of Chittagong is 1550 tons per day. Berkun et. al(2005). The quantity of household solid waste (HSW) generated is much higher than the amount of waste generated by industries and health sectors (Culot et.al(1999). The domestic wastes (mostly inorganic) comprise about 80% of total generated wastes in major cities (Pongrácz, 2009).Solid waste disposal is a greater problem because it leads to land pollution if openly dumped, water pollution if dumped in low lands, and air pollution if burnt. Inadequate management of solid waste in Chittagong leads to problems that impair human and animal health and ultimately result in economic, environmental and biological losses(Josiah et. al(2004). The objectives of the survey study are:

- ❖ To explore the present scenario of solid waste management system of Chittagong city by analyzing a housing society (Sanonda Residential Area).
- ❖ To determine house hold solid waste (HSW) generation and its composition.
- ❖ To recommend some remedial measures in order to improve the present waste management system

### **METHODOLOGY**

Firstly, a study involving the assessment of documents and records relating to municipal solid waste in Chittagong City has been conducted. Reconnaissance survey was conducted in July'2014 to February'2015 identify the socioeconomic status and solid waste generation scenario of the study area, especially the sources and sub-sources of household solid waste generated, physical composition and information regarding quantity and quality of solid waste (SW). Ward number 15 was selected purposely for the present study and has a population of about 150000 residents. The study area comprises of Sanonda R/A, Baghmonir about 10.36 sqm. at ward 15 and has inhabitants about 1100-1200 under Chittagong City Corporation (CCC) of Bangladesh.

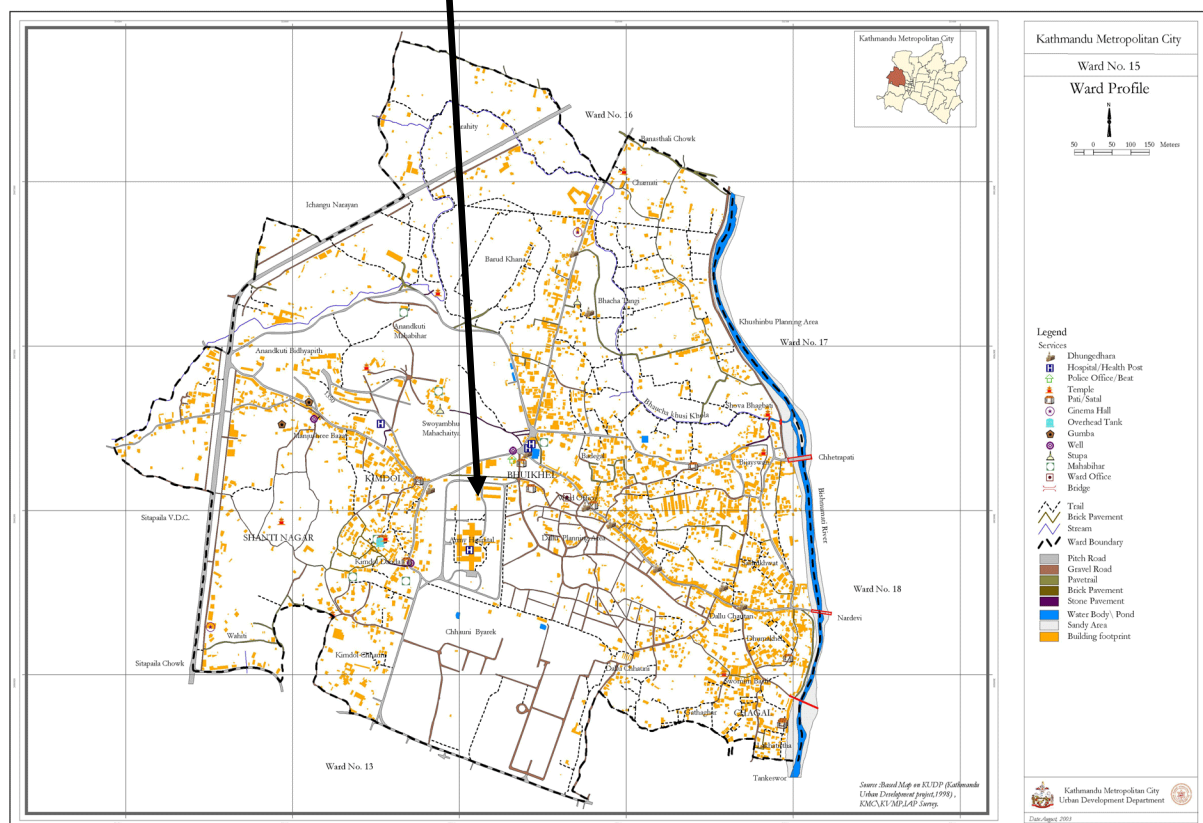
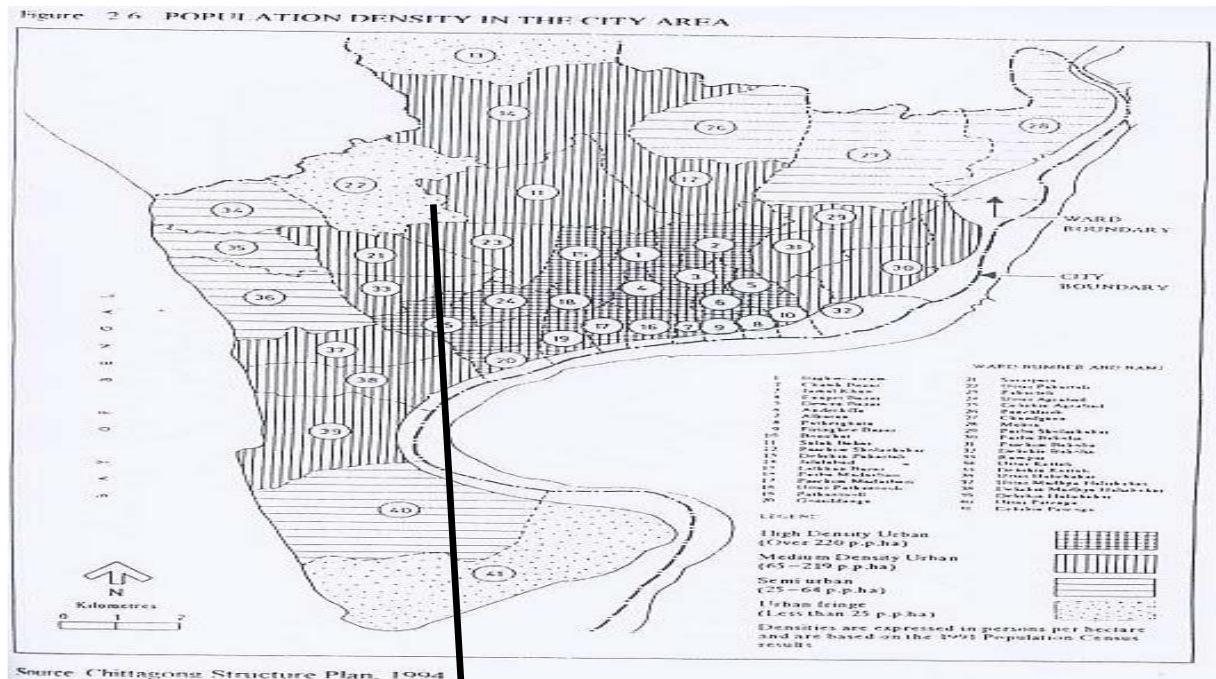


Fig. 2: CCC Ward no. 15

## SECONDARY DATA OF SANONDA R/A UNDER WARD NO –15, BAGHMONIRAM:

Table 1: Waste management facilities in ward no. – 15

Sl no	Particulars	Quantity
1	Total Dust-bin	43 nos.
2	Total Generated Solid Waste	About 57 tone/day
3	Total Waste Transport Vehicle	2 nos.
4	Schedule of waste disposal time	6 am – 8am
5	Solid waste carrying vehicle type	Truck & Van
6	Number of waste crew	46 nos.
7	Total population	About 100000 nos.
8	Total House in Sanonda R/A	180 nos.
9	Total inhabitants in Sanonda R/A	About 1100 ~1200 nos.
10	Container	6 no
11	Waste Generation Rate	0.57 kg/Cap/Day

Source: Survey, June'2012, Study on MSWM, CCC

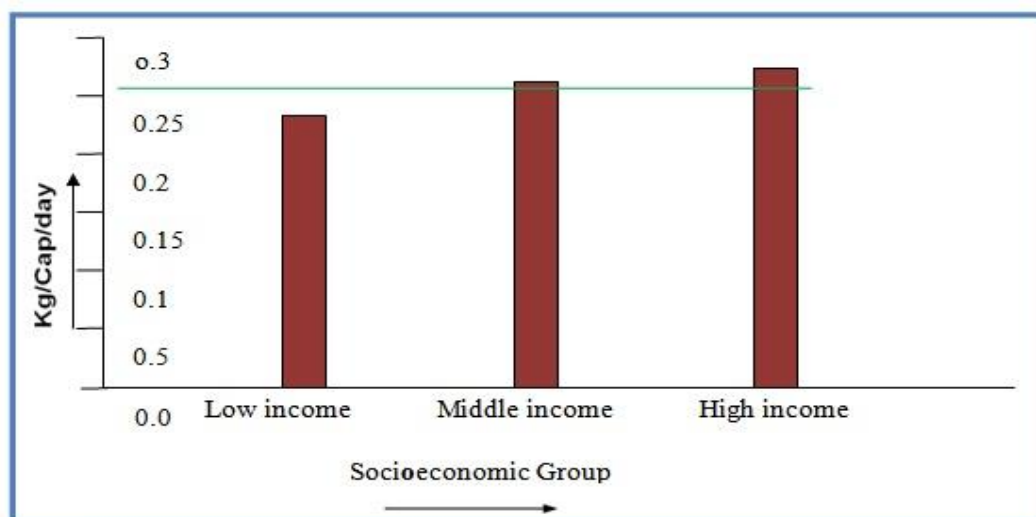
Table 2: Socioeconomic groups on the basis of the household's monthly income

SL. No.	Socioeconomic group	Monthly income level	Number of studied house	Number of person studied
1	HSG (High Socioeconomic Group)	above Tk. 50,000	14	70
2	UMSG (Upper Middle Socioeconomic Group)	between Tk. 20,000 and Tk. 50,000	20	125
3	MSG (Middle Socioeconomic Group)	between Tk. 10,000 and Tk. 20,000	16	112

Table: 3 Residential Waste Generation Rate

Socio-economic group	Number of hh studied	RWGR Kg/hh/day	Number of persons studied	RWGR Kg/person/day
HSG	14	3.13	70	0.62
UMSG	20	1.79	125	0.28
MSG	16	1.14	112	0.16
Total	50	2.02	307	0.35

hh = Household; RWGR=Residential Waste Generation Rate.



Waste generation rate (Kg/cap/day)

— Average domestic waste generation rate

Fig. 3: Variation of “RWGR” wastes Generation Rate of CCC at Sanonda R/A

## RESULTS AND DISCUSSIONS

Table 4: Physical Composition of RSW Generated By Different Socioeconomic Groups

Socio-economic group	Waste Category (%)								
	Non-Compostable							Compostable	
	Paper	Pack	Can	Plastic	Glass	Bones	Textile	Vegetable	Wood
HSG	9	12.6	10	3.35	2.55	3.5	4	52.7	2
UMSG	6.3	9.5	5	3.6	2.20	2.5	5.3	63.2	1.7
MSG	5.4	2.45	3.38	3.82	1.85	1.42	3.6	76	2
GW per day by all SEGs.	6.9	8.18	6.12	3.57	2.18	2.49	4.3	64	1.9

G W =Generation Waste; SEGs =Socioeconomic Group

## PHYSICAL COMPOSITION OF COMPOSTABLE AND NON COMPOSTABLE SOLID WASTE

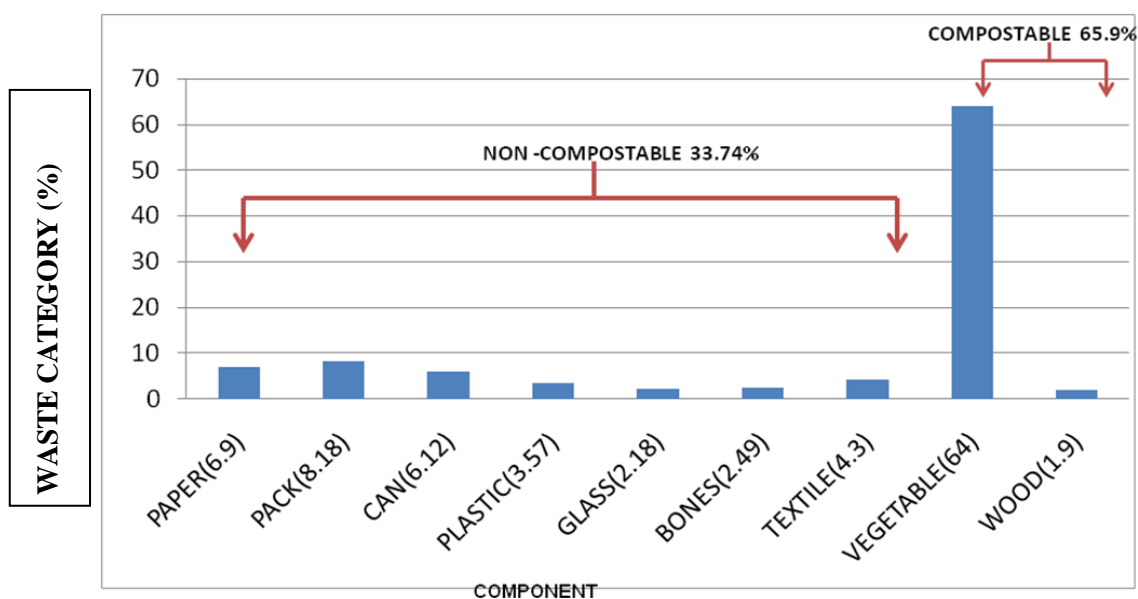


Table 5: Comparison of Solid Waste's Physical Composition data between SANONDA R/A and CCC Study

Component	CCC MSWM Household (%)	Sanonda R/A Assessed Household (%)	CCC MSWGR Kg/Cap/Day	CCC Ward No. 15 Generation Rate g/Cap/Day	Sanonda R/A Assessed Generation Rate Kg/Cap/Day
Paper	4.68	6.9	0.420	0.57	0.35
Pack	ND	8.18			
Can	2.65	6.12			
Plastic	8.70	3.57			
Glass	0.00	2.18			
Bones	0.63	2.49			
Textile	2.40	4.3			
Vegetable	70.50	64			
Wood	1.20	1.9			
Compostable	71.70	65.9			
Non Compostable	28.30	33.74			

### DATA INTERPRETATION

- CCC RWGR of HSG 0.281 Kg/cap/day which is different from Assessed waste generation rate of Sanonda R/A, HSG RWGR 0.57 Kg/cap/day but average data of UMSG and MSG RWGR 0.27 Kg/cap/day almost same as CCC RWGR.
- From above analysis it is seen that CCC MSWGR is 0.42 kg/cap/day which has studied on entire Chittagong city which includes not only domestic waste but also commercial and market wastes of composition.
- Ward no. 15 is Baghmoniram ward where Kajir Dewri Kaccha Bajar, lots of academic institution and press are situated. So waste generation is higher in this ward (0.36 kg/cap/day) compared to the average city data.
- It is mentioned that assessment of our study is based on three socioeconomic level (HSG, UMSG & MSG) where as CCC also included lower income group. It is also notice that CCC MSWM composition is not similar with Sanonda R/A.

### CONCLUSIONS

Solid waste generation has increased proportionately with the high density of population but support for waste management is inadequate. The purpose of this study is to analyze the existing solid waste management system in Chittagong City Corporation. Moreover, it also evaluates priorities for sector reforms as well as identification of investment projects in the aforementioned urban local bodies. HSWM refers to all activities pertaining to the control, collection, transportation, processing and disposal of waste in accordance with the best principles regarding public health, economics, engineering, conservation, aesthetics and other environmental considerations. The generation of 9 category house hold wastes are paper, packaging materials, cans, plastic, textiles, glass, vegetable, bones/dirt and wood which has 65.9% wastes is compost able & 33.74% waste is no compostable& total waste produce from this society about 400 kg/day. On the other hand the study also exposed that CCC is not fully capable to properly & regularly handling the wastes from the city without environmental interfere, so MWMS has to be integrate to disposal the solid waste with best practice.

### ACKNOWLEDGEMENTS

The authors would like to acknowledge the help of the authority of University for providing various facilities.

## **REFERENCES**

- Abu-Qdais, HA. 2007. Techno economic assessment of municipal solid waste management in Jordan. *WasteManagement*, 27(11):1666–72.
- Berkun, M; Aras, E and Nemlioglu, S. 2005. Disposal of solid waste in Istanbul and along the Black Sea coast of Turkey. *Waste Management*, 25, (8):847–55.
- Culot, M; Bastien, C; Etienne, M and Becker, H. 1999. Evaluation des actions à mener en vue de l'assainissement global (déchets et eaux) de la ville de Kigali.
- Josiah, MA and Akuro EG. 2004. [13] (Mugambwa, 2009:1) Pongrácz, 2009:93.