Managing municipal solid waste through household waste reduction strategy: a case study of selected households in Lokoja, Nigeria

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Introduction

One of the numerous problems facing urban centres both the developed and developing countries in recent times is the management of the municipal solid waste generated on daily basis. Many of the developed countries have devised modern technologies, policies and approaches to tackle this problem by taking into consideration the triple bottom principles (Clift, *et al.,* 2000). Different researchers have done considerable work in this field ranging from problem identification to proffering solutions with respect to the peculiarities of the areas studied (Agunwamba, 1998; Brown, *et al.,* 2011; Kumar, *et al.,* 2017).

In developing countries such as Nigeria, much improvement is seriously desired in the management of municipal solid waste even though the level of technology is still developing. Apart from the low level technology, policies regarding municipal solid waste management are weak as they are not enforced appropriately (Agunwamba, 1998; Punch Newspaper, 2017; Amasuomo and Baird, 2017). The detrimental effects of improper management of municipal solid waste both at household and urban levels cannot be overemphasized. The breeding of rodents and disease causing insects in houses, emission of foul gases from dumpsites causing serious air pollution are some of the impacts of such improper management which also affect public health.

Population growth, level of income of households/inhabitants and attitudes of households/inhabitants are factor that influence municipal solid waste generation (Kumar, *et al.,* 2017; Abdef-Shafy and Mansour, 2018; Gutberlet, 2018; Bandara, *et al.,* 2006; Sivakumar and Sugirtharan 2010).

This research was carried out with the aim of determining the feasibility of achieving waste reduction at household level with the implementation of waste reuse and recycling techniques.

Methodology

The waste reduction strategy employed in this research involved the identification of both recyclable and reusable waste from the daily household generated waste stream. The weight of the household waste stream less the weights of the recyclable and reusable waste were computed to obtain the household waste reduction per household. The basic household wastes identified in the course of the field data collection as recyclable and reusable included: paper, polythene, cans, foils, bottles/glasses, rags, vegetable/food waste; dust, plastics and wood. The study town, Lokoja, was divided into six (6) zones for ease of administration of the study namely: Adankolo (AD); Felele (FL); Gadumo (GD), Kabawa (KB); Lokongoma (LK) and Otokiti (OT). Three (3) households were randomly selected from each zone for this study. Waste bins were procured for each of the selected households for the collection of household generated waste. These bins were collected very early the following day from each household for analyses. The average weights of the generated household wastes and corresponding reduction via sorting were computed on daily basis for each of the zones for a period of 4 weeks.

Table 1. Results					
		Week 1	**Week 2**	**Week 3**	**Week 4**
Adankolo	Waste Generated (Kg)	34.2	36	35.4	37
	Waste Reduction (Kg)	19.5	18.9	20	19.3
	APPH	6	6	6	6
	Per Capita Waste Generation (Kg)	5.70	6.00	5.90	6.17
	Per Capita Wate Reduction (Kg)	3.25	3.15	3.33	3.22
Kabawa	Waste Generated (Kg)	36.2	38.7	39.4	39.6
	Waste Reduction (Kg)	22.9	22.4	24.1	20.7
	APPH	9	9	9	9
	Per Capita Waste Generation (Kg)	4.02	4.30	4.38	4.40
	Per Capita Wate Reduction (Kg)	2.17	2.10	2.22	2.14
Lokongoma	Waste Generated (Kg)	34.4	36.9	37.8	39.5
	Waste Reduction (Kg)	16	22	19.2	21.1
	APPH	8	8	8	8
	Per Capita Waste Generation (Kg)	4.30	4.61	4.73	4.94
	Per Capita Wate Reduction (Kg)	2.00	2.75	2.40	2.64
Otokiti	Waste Generated (Kg)	27.7	32.2	33.4	34.8
	Waste Reduction (Kg)	11.2	17	17.6	17.4
	APPH	7	7	7	7
	Per Capita Waste Generation (Kg)	3.96	4.60	4.77	4.97
	Per Capita Wate Reduction (Kg)	1.60	2.43	2.51	2.49
Gadumo	Waste Generated (Kg)	30.9	32.5	32.8	34.7
	Waste Reduction (Kg)	14.7	17.5	15.1	16.7
	APPH	7	7	7	7
	Per Capita Waste Generation (Kg)	4.41	4.64	4.69	4.96
	Per Capita Wate Reduction (Kg)	2.10	2.50	2.16	2.39
Felele	Waste Generated (Kg)	35.1	35.4	37	38.4
	Waste Reduction (Kg)	16.8	19	19	19.2
	APPH	6	6	6	6
	Per Capita Waste Generation (Kg)	5.85	5.90	6.17	6.40
	Per Capita Wate Reduction (Kg)	2.8	3.17	3.17	3.20

(Source: APPH = Average Persons per Household)

Conclusion

Household waste reduction potentials in urban centres can be achieved by promoting segregation and sorting of such waste to give room for recycling and reuse of the generated waste. Household waste reduction is feasible and achievable in developing countries. The reduction of waste for disposal from households as shown in this research work translates to reduction of large volume of waste to be managed at the municipal level.

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