THE FINANCIAL IMPLICATION OF THE WASTE GENERATED IN URBAN AREAS OF NIGERIA: A CASE STUDY OF MINNA, NIGER STATE. (1999-2007)

Makinde Joseph Kolawole
Department Of Quantity Surveying, FUT, Minna.

ABSTRACT

This study focuses on the financial implications of disposing the waste generated in an urban area of Nigeria. It aims to establish if proper attention has been devoted to the waste disposal system. Minna the capital city of Niger state is divided into five districts namely; Minna, Tunga, Chanchanga, Maitunbi and Bosso, out of which three districts namely; Minna, Chanchaga and Bosso were randomly selected to test the following hypotheses formulated- that (i) the cost of waste disposal in the selected districts has no significant relationship with the volume of waste generated. (ii) there is no significant relationship between the population of selected districts and the volume of waste generated per year. A statistical package (SPSS) of Simple linear regression was employed to determine the relationship between the variables. The result of the findings shows that volume of waste generated and cost of waste disposal depend on each other with coefficient of determination (RSQ) value of 99.7%. And the population of the selected districts has significant relationship with the volume of waste generated in the year under review with RSQ value of 55.5%. From the findings, it is concluded that the cost of waste disposal depends largely on the volume of waste generated by the teeming populace. It is therefore recommended that since most of our cities are plagued with mountains of refuse dumps, State government should partner with private environmental protection organizations in the disposal of refuse. This can be implemented through the PPPs initiative.

Keywords: cost, generation, population, refuse, volume,

INTRODUCTION

The very act of consumption whereby food is eaten and digested to produce energy, produces human waste, in much the same manner, the consumption and utilization of materials produce wastes. Increasing amounts of all types of waste are being produced as the world's population grows and people's lifestyles change. The advancement in technology and the consequent effects of improvements and modifications of old products have led many people to change their consumer products as often as possible. These and the short lifespan of many products have created the tendency of people to discard old products for new ones the resultant effect being the large volume of waste in our environment.

The state of the environment is more degrading in the developing countries. This is as a result of poor waste disposal attitude and management. According to a UNDP/World Bank (1994) report "Towards Environmental strategies for Cities", the critical and most immediate problems facing developing countries' cities are health impacts of urban pollution that derive from poor urban and industrial waste management and air pollution.

AIM

The aim of this paper is to ascertain the financial implications of waste generated in urban areas of Nigeria. This provides policy parameter for the stakeholders in waste management scheme.

WASTE DISPOSAL PROBLEMS

Bad refuse disposal characterize most Nigerian cities. Refuse mounds and dumps are common features of our town landscape. Often in desperation, people dispose their refuse in gutters, drains, streams and rivers which later become clogged up and cause over flooding during the raining season. (Durotoye, 1983).

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Max Lock (1980) opined that refuse and old chattel disposals have been very difficult to be made effective. Major refuse dumps exist in large size. There is no doubt that not every rubbish dump is agreed with the Ministry of Health programme of refuse collection and disposal. Smaller dumps spring up from time to time on almost every street with rare motor traffic. The hidden and motorably inaccessible areas are more fond of indiscriminate refuse dumping. Firewood for sale or use has been noticed in heaps, building materials- blocks and wrought iron bars –have been delivered on the road side near building sites only for work to begin in the future. These features of nuisance are not uncontrollable, what is needed is the force to keep them at a tolerable level. A more reliable system of refuse disposal is necessary in the redevelopment scheme for the town centre.

The problem of waste disposal lies on the mode of collection. Although points have been located in different areas, they seem to be too far from some users' abodes. This has something to do with the education and level of sanitation of the people. Dalil (2002), in his view explained that waste disposal should be recognized as a major problem of urbanization requiring special planning and management through an understanding of the geoenvironment, particularly permeability properties of the soil sub-base. The practice of building soakaway is a major source of contamination of groundwater supply especially of the common shallow hand dug well in highly permeable sub surface rocks. Soakaways are impracticable in waterlogged areas. Frequently over-flowing septic tanks and drains not only contaminate surface and ground water but also pollute the environment by emission of foul offensive odours and sordid sights.

AREA OF STUDY

Niger state is one of the 36 states in Nigeria and has the largest land mass/ geographical area in the country. The states capital is Minna, and the other major cities are Bida, Kontagora and Suleja. Yams, guinea corn, and ginger are the main agricultural products of the city. The economy also supports cattle trading, brewing, Shea nut processing and gold mining. Traditional industries and crafts in Minna include leather work, metalworking, and cloth weaving. (Max lock, 1980).

MAP 1: THE MAP OF NIGERIA SHOWING THE LOCATION OF NIGER STATE.

Source:http://upload.wikimedia.org/wikipedia/en/

METHODOLOGY

Minna, the capital city of Niger state has five districts namely, Minna, Tunga, Chanchaga, Maitunbi and Bosso. Three districts were selected using systematic random sampling namely- Minna, Bosso and Chanchaga districts respectively. Questionnaire were prepared covering the cost of disposing a cubic meter of refuse waste, the volume of waste generated in each major refuse dump/ location within a district and administered to the Director of Niger State Urban And Development Board whose major responsibility is to dispose the waste generated. Population and geographical area of selected districts were obtained from National Population Commission, Minna .

Oral interviews were conducted in each district using systematic random sampling to targeted population which in this case were the residents through personal contact. The data gathered from both primary and secondary sources were tabulated below.

RAW DATA

Below is the raw data collected from the field. The population of the sampled areas was obtained from National population commission, Minna. The volume of the waste generated was obtained on the site during the evacuation exercise using 10 tonnes capacity dumper vehicle and the study period span from 1999-2007.

S/N	LOCATION	YEAR	Popn	GeoArea (Sq.M)	PopDens	Wastevol. (Cu.M)	Cost (#)	Trips (No)	DumpDist. (Km)
1	Bosso	1999	37,081	93	399	70	56,000	7	4
2	Bosso	2000	38,428	112	343	75	60,000	7.5	4
3	Bosso	2001	39,822	112	356	75	60,000	7.5	4
4	Bosso	2002	41,268	131	315	75	60,000	7.5	4
5	Bosso	2003	42,766	131	326	80	64,000	8	4
6	Bosso	2004	44,431	150	296	100	80,000	10	4
7	Bosso	2005	45,927	150	306	120	96,000	12	4
8	Bosso	2006	47,594	150	317	150	120,000	15	4
9	Bosso	2007	49,261	169	291	180	144,000	18	4
10	Chanchaga	1999	19,654	75	262	35	28,000	3.5	4
11	Chanchaga	2000	20,368	80	255	38	30,400	3.8	4
12	Chanchaga	2001	21,107	80	264	45	36,000	4.5	4
13	Chanchaga	2002	21,874	80	273	45	36,000	4.5	4
14	Chanchaga	2003	22,608	80	283	65	52,000	6.5	4
15	Chanchaga	2004	23,490	80	294	70	56,000	7	4
16	Chanchaga	2005	24,343	85	286	85	59,500	8.5	4
17	Chanchaga	2006	25,227	85	297	105	84,000	10.5	4

18	Chanchaga	2007	26,111	85	307	155	124,000	15.5	4
19	Minna	1999	191,369	174.5	1097	80	64,000	8	5
20	Minna	2000	198,343	174.5	1137	100	80,000	10	5
21	Minna	2001	205,543	174.5	1178	110	88,000	11	5
22	Minna	2002	213,004	174.5	1221	135	108,000	13.5	5
23	Minna	2003	220,736	174.5	1265	180	144,000	18	5
24	Minna	2004	228,749	174.5	1311	220	176,000	22	5
25	Minna	2005	237,053	174.5	1358	235	188,000	23.5	5
26	Minna	2006	245,658	174.5	1408	255	204,000	25.5	5
27	Minna	2007	254,263	174.5	1457	275	220,000	27.5	5

SOURCE (i) National Population Commission, Minna

(ii) Niger State Urban and Development Board

REGRESSION MODELS

Regression analysis is a technique that finds a formula or mathematical model which best describes a set of data collected (Ashworth, 1986). While simple linear regression models quantify the relationship between two variables, multiple regression models relate three or more variables. No matter the number of variables involved, there is always one dependent variable while the others represent the independent variable(s). The variants of regression models used for this study included the following:

1. Simple linear models

This is represented by the mathematical formula

$$Y = a_0 + a_1X + e$$

Where Y is the dependent variable
X is the independent variable

a_0 and a_1 are constants called regression parameters.

e is the error term.

THE SUMMARY OF THE EXPERIMENT

EXP	VARIABLES		OBSERVATIONS					INFERENCES
	X	Y	REGRESSION EQUATION	R^2 (%)	F	$F_{CRITICAL}$	P_{VALUE}	REMARKS
1	WASTE VOL	POPN	WASTE VOL = 0.001 + 65.236 POPN	53.5%	28.8	4.92	.000	Fairly relationship; volume of waste increases with population increase; Ho rejected
2		COST	WASTE VOL = 0.001 + 0.828 COST	99.7%	7723	4.92	.000	Very strong relationship; Ho rejected
3		POPN DENS	WASTE VOL = 0.104 + 52.113 POPN DENS	51.6%	26.6	4.92	.000	Fairly strong relationship; volume of waste increases with population densities increase; Ho rejected

KEY: SS= statistically significant.

HO= null hypothesis

DISCUSSION OF RESULTS

From the experiment one the volume of waste generated and the population the selected districts show a fairly strong relationship with the coefficient value (R-SQ) of 53. 59%. This indicates that as population of the selected districts increases the volume of waste generated also slightly increases. The correlation value between the variables tested would have been higher, but for the human activities on the various dumping sites through refuse burning, scavenging greatly reduce the volume of waste generated on yearly basis. This same goes for experiment two (cost of waste disposal and volume of waste generated) with the coefficient of determination(R-SQ) value of 99.7%. In this experiment, the financial commitment of state government to waste disposal increases as volume of waste generated increases. Apart from this, the non-availabilty of equipment and dumping vehicles for the purpose of waste disposal in some urban areas makes disposal cost expensive. These statistical findings affirmed the several authors submission that population influenced the volume of waste generated in urban area.

CONCLUSIONS

From the results of the findings, the following conclusion can be made-: Increasing population density doubtlessly implies increase in the generation of solid waste and trash. The influx of people from rural areas to urban areas contributed immensely to the increase in the volume of waste generated and this has direct impact on the cost of waste disposal. A more reliable system of refuse disposal is necessary in the redevelopment scheme for the town centre. There is no doubt that not every rubbish dump is agreed with the Ministry of Health programme of refuse collection and disposal.

RECOMMENDATION

State governments should as a matter of urgency involve the participation of private organization (s) specialize in waste disposal and recycling strategy to reduce the volume of waste being generated by the inhabitants of the state, especially in the urban centres. This can be implemented through (i) Public- Private Partnership initiative. (ii) Sensitizing the populace on the danger of indiscriminate dumping of refuse along street and residential areas.

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