



## THE INFLUENCE OF REFUSE DUMPSITE ON RENTAL VALUES OF RESIDENTIAL PROPERTIES

PETER NKOLIKA JOY, ONI ABIODUN SAMSON, IBISOLA ABAYOMI SOLOMON,  
BORONI EDAFE & AMUSAN LEKAN

Covenant University, Estate Department, Ota, Ogun State, Nigeria

### ABSTRACT

This study was aimed at examining the impact of refuse dumpsite on rental values of residential properties in Utako district, FCT – Abuja, Nigeria. This was with a view to investigating into the relationship between rental values of residential properties and distances away from the refuse dumpsite. In attaining the aim of this research, three objectives were formulated. Data were collected from primary and secondary sources. The primary sources were through self-administered questionnaires with the goal of obtaining reliable information from the residents of residential properties and Estate Surveyors and Valuers while secondary sources included past research projects, journal articles, property magazines such as Orbitals, Homes and Lands magazines etc. and literatures on similar topics. Appropriate sample sizes were determined using the Bartlett, Kotrlik and Higgins (2001) model.

From the study, recommendations were made based on the findings by the Federal Capital Territory Administration (FCTA), Abuja Environmental Protection Board (AEPB), and The Nigerian Institution of Estate Surveyors and Valuers (NIESV) that the Nigeria Institution of Estate Surveyors and Valuers (NIESV) should place more emphasis through the academic curriculum on environmental management taking into considerations issues like waste disposal and management knowing fully well that wastes if well managed can be recycled to create more wealth and employment opportunities for the Nigerian youth, similar studies should be extended to other major cities in the country and the world at large for comparison of differences and findings in property value trends.

**KEYWORDS:** Refuse Dumpsite on Rental Values of Residential Properties

### INTRODUCTION

The rate of change in municipal solid waste quantities and composition in developing and developed countries is unprecedented. In most urban centres in Nigeria, wastes are disposed of by dumping in open areas, which produces health and pollution problems by encouraging the growth of organisms that can transmit diseases to people living around that vicinity. Sometimes in order to reduce the volume of waste and conserve space, these waste or refuse in open dumps are burnt which in turn produces a form of air pollution. As countries become richer and more urbanized their waste composition changes (Freeman 1979 and Lietman 1995.) A negative side of greater influence is that it brings with it more waste of higher volume (making waste more expensive to collect). It is noteworthy that waste management is a labour and capital-intensive function that often consumes 20 to 50 percent of municipal operating budget (Oyinlola 1998 and Thomas 2000). Financing waste management is a major problem for municipalities that are faced with chronic resource shortages and competing demands. As a consequence, waste management in many cities fail to meet minimum acceptable standards with grave adverse effects on the urban environment, public health, quality of life for large city

dwellers especially poorer people and also affects the value of properties.

## CONCEPTS OF WASTES AND MANAGEMENT

Waste can be defined as any substance or article which requires to be disposed of as being broken, worn out, contaminated or otherwise spoilt and reduction, recycling and waste transformation are methods widely used to manage such solid waste. However, in all these methods there is always a residual matter to be disposed of even after the recovery process. The technique of getting rid of these wastes in an economic and environmentally friendly approach is called “sanitary landfilling” (Tchobanoglas and Kreith, 2002).

## REVIEW OF RELATED LITERATURES

In this section selected literatures as related to the study were reviewed and presented. According to Howard and Irwin (1978) cited in Anifowose et al., (2011), an ideal waste disposal site is one that is located reasonably close to the source of the waste, has convenient transportation access, not situated in a low-lying area or floodplain, and underlain by geologically stable, strong and competent rock material. It is therefore imperative that many factors must be incorporated into sanitary landfill siting decisions. In this regard, Oulun (2002), in an attempt to construct a new agenda for waste management, ascertained the importance of the definition of waste and its impact on waste management, and the role of ownership in waste management recognizing that present legal definitions are ambiguous and do not really give insight into the concept of waste. Facts show that there is no theory of management when there are numerous practices as how to deal with a particular type of waste.

Graiser (2007) specifically embarked on a study where he referred solid waste as a solid material which is discarded while Rogdgers (2011) and Chukwuemeka et al (2012) contend that waste management is a systematic control of generation, storage, collection, transportation, separation, processing, recovery and disposal of wastes. This refers to the technique for the collection, treatment, and disposal of the solid wastes of a community and the development and operation of these systems is often referred to as solid waste management. Improper disposal of municipal solid waste can create unsanitary conditions, and these conditions in turn can lead to pollution of the environment and to outbreaks of vector-borne disease—that is, diseases spread by rodents and insects. The tasks of solid-waste management present complex technical challenges. They also pose a wide variety of administrative, economic, and social problems that must be managed and solved.

In a more recent study, Nabegu (2010) examined the result of municipal solid waste analysis undertaken in Kano metropolis done through the collection of secondary data from the government agency i.e. REMASAB (Refuse Management and solution Board) responsible for the management of solid waste, interviews with stakeholders and field surveys specifically to address the apparent gap that is crucial for successful management. Field surveys were carried out in three residential zones that were representative samples of the city to understand its practice and identify the lacunae. In carrying out these, results showed that the household sector in Kano metropolis produced the largest amount of waste in the city accounting for 62.5% and waste generated by various institutions accounts for only 5.8% while industries located within residential areas only contributed 2.9%. It was also estimated that Kano metropolis generates about 3085 tonnes of solid waste per day.

Findings however showed that the solid waste generated in Kano metropolis consisted to a large extent of organic and other biodegradable matter (43%) and constitutes 68.26% by weight of solid waste generated in the study area.

Implications such as the emission of dangerous gases into the atmosphere and recovery of bacteria isolates such as coliform bacterias; (E.Coli, Klebsielle sp). It recommended that the government should put in place facilities and opportunities to enhance proper management of solid waste and promote recycling and reuse of waste and should also embark on environmental awareness campaigns to sensitize the citizens to develop the right attitude about disposal.

Akaninyere and Atser (2001) studied the typology, characteristics and future trends of solid waste but not the effect of domestic waste. The major components of waste are degradable materials (food remnants, paper, and rags) and non-biodegradable plastics, tins, metals, bottles, glass, and bones. Food remnants contributes substantially more than other components, this could be explained by the fact that most activities which affect the environment stem from the need for food; its production, processing and preparation. Moreover, the high proportion of food remnants could be viewed from the fact that this component of waste embraces all forms of food waste from both domestic and commercial sources. Above all the prevalent traditional use of vegetable and fruits on a large scale is another cause. Although, the trends of solid waste have been examined, the author failed to examine the effect of improper waste disposal on property values; hence the need for this paper.

## **RESEARCH METHODS**

### **Introduction**

The study population, sample frame, sample size, and sampling techniques used are discussed alongside the various techniques of data analysis. The location of the study is Abuja Nigeria.

### **RESEARCH DESIGN**

In this study, the survey method was applicable through the use of self-administered questionnaires. This was found to be appropriate for this study because the survey of respondents namely, registered firms of Estate Surveyors and Valuers practicing in Abuja and residents (tenants/landlords) of residential properties in the study areas were considered suitable in determining the impact (positive or negative) of refuse dumpsites close to residential properties in the study area.

### **STUDY POPULATION**

The Study population in this study included firms of Estate Surveyors and Valuers in Abuja and residents of residential properties in the study area. As shown in the NIESV Directory (2009), there were 29 firms of Estate Surveyors and Valuers in Abuja while according to the 2006 population census of Nigeria, estimated population of residents in Utako District to be 776,298.

### **SAMPLE FRAME**

The Sample frame for the purpose of this research was drawn from the 2009 edition of the NIESV directory which was used to determine the population of registered firms of Estate Surveyors and Valuers practicing in Abuja. From the directory, a total number of 29 firms were sampled, while the population of residents in streets located within 500m radius in concentric rings from the refuse dumpsite in Utako District, Abuja was estimated based on total population of Abuja, i.e. 776,298 according to the 2006 national population census.

However, the sample frame for the residents to be adopted for this study was calculated as 1 percent of the total

population i.e.  $776,298 \times 1\% = 7,763$  residents. This is in line with the recommendation of Nwana (1981) who stated that; if a population is in several of thousands, a 5% sample of the population or less would represent a good sample.

## SAMPLE SIZE

Sample size comprises the total number of population elements of sample units that are selected for investigation in a research study. It involves one of the four inter-related features of a study design that can influence the detection of significant differences, relationships or interactions (Peers, 1996).

## SAMPLING TECHNIQUES

Random sampling technique was adopted in choosing the sample units for the residents in the study area. Sampling was clearly unnecessary for all the twenty-nine (29) registered firms of Estate Surveyors and Valuers as they are not too large for study. This method of sampling was adopted because it considers the heterogeneous nature of a study population.

## DATA COLLECTION INSTRUMENT AND SOURCES OF DATA

Questionnaires were used in this study. Questionnaires were self - administered to the residents and firms of Estate Surveyors and Valuers towards resolving the research questions, attaining the aim and objectives with the primary purpose of generating reliable data. The questionnaires complimented with interviews assured uniformity and large numbers of respondents were covered within the limited time at the disposal of the researcher. In this regard, two different sets of questionnaires were drawn for both registered firms of Estate Surveyors and Valuers and Residents of residential properties in the study area.

## DATA ANALYSIS

In this research, two techniques were employed in analyzing data. These data are the concentric rings model and the linear regression model. The data collected from various sources were analyzed, evaluated and presented using SPSS (Statistical Programs for the Social Science),

## DISTRIBUTION OF QUESTIONNAIRES

For the purpose of this study, twenty nine (29) questionnaires were distributed to registered firms of Estate Surveyors and Valuers practicing in Abuja as shown in Table 1;

**Table 1: Rate of Questionnaires Administration (Estate Surveyors and Valuers)**

Questionnaires	Frequency (F)	Percentage (%)
Returned	18	62
Not Returned	11	38
<b>Total</b>	<b>29</b>	<b>100</b>

Source: Author's Field Survey, 2013

**Table 2: Rate of Questionnaires Administration (Residents of Residential Properties)**

Questionnaires	Frequency (F)	Percentage (%)
Returned	240	65
Not Returned	127	35
<b>Total</b>	<b>367</b>	<b>100</b>

Source: Author's Field Survey, 2013

Considering the response rate in relation to sample size of the study groups, the response rate from Estate Surveyors and Valuers was 62% while 65% of the residents of residential properties responded to the survey as detailed in Table 3

**Table 3: Questionnaires Administered on Respondents**

S/N	Respondents	Number Administered	Number of Questionnaires Returned	Response Rate
1	Estate Surveyors and Valuers	29	18	62%
2	Residents of residential properties	367	240	65%

Source: Author’s Field Survey, 2013

The rate of response shows that out of a total number of twenty nine (29) questionnaires distributed to firms of Estate Surveyors and Valuers, the researcher was able to retrieve eighteen (18) which constituted 62% response rate and this was used to undertake the required analysis for this research and two hundred and forty (240) questionnaires distributed to residents of residential properties which constituted 65% response rate was also used for the study. The questions were structured in such a way that the respondents responded to the questions relating to their bio-data, qualifications and work experience as well as stated objectives of this research. From Table 3, it can be deduced that the response rate of the respondent – Estate Surveyors and Valuers was low because many of the firms were away for the Christmas and end of year break. The needed assistance was however obtained from Abuja state branch of the Nigerian Institution of Estate Surveyors and Valuers (NIESV).

**Table 4: Length of Residency in the Study Area (Residents of Residential Properties)**

Years	Frequency (F)	Percentage (%)
Less than 5 years	147	61.3
6 - 10 years	85	35.4
11 – 20 Years	5	2.1
Above 20 years	3	1.3
<b>Total</b>	<b>240</b>	<b>100</b>

Source: Author’s Field Survey, 2013

A Good glance at Table 4 reveals the respondent’s length of residency status in their present property in the study area.

It indicates that, out of two hundred and forty respondents, one hundred and forty-seven (147) representing 61.3% had been residing in their properties in the study area for less than 5 years. Eighty-five (85) of them representing 35.4% had been residing in the study area for a period between 6 – 10 years; five (5) representing 2.1% had been residing in the study area for a period between 11 – 20 years while three (3) representing 1.3% had been residing in their properties in the study area for more than 20 years as shown in the Table 5. This implies that a vast majority of the respondents had been living in the study area long enough to give substantial responses especially those in the category of 6 – 10 years.

**Table 5: Residents Occupancy Status**

Respondents	Frequency (F)	Percentage (%)
Landlord	27	11.3
Tenant	213	88.8
<b>Total</b>	<b>240</b>	<b>100</b>

Source: Author’s Field Survey, 2013

The Table reveals the occupancy status of the residents in the study area in the property they presently occupy. Out of two hundred and forty (240) respondents, two hundred and thirteen (213) representing 88.8% were tenants while twenty seven (27) representing 11.3% live in their own personal houses as shown in Table 6 above.

It can be seen that the high percentage of tenants in the study area provided reliable and sufficient rental information on the type of property they reside in. This will further enhance the quality of this research study.

**Table 6: Types of Residential Properties in Abuja (Residents' View)**

Property Types	Frequency (F)	Percentage (%)
Duplex	13	5.4
Bungalow	24	10.0
Detached houses	41	17.1
Semi-detached	37	15.4
Terrace	25	10.4
Tenement	14	5.8
Block of flats	86	35.8
<b>Total</b>	<b>240</b>	<b>100</b>

Source: Author's Field Survey, 2013

Table 6 gives a vivid picture of the respondents who were asked to determine the types and most demanded of residential properties in the study area. From the data collected and analyzed, various types of residential property exist within the study area which ranges from Duplexes, bungalows, detached and semi-detached, terraced, tenements and block of flats. All these different residential property types are readily available in various neighbourhoods of the study area. Out of two hundred and forty (240) residents that returned the questionnaires, thirteen (13) representing only 5.4% live in duplexes, twenty - four (24) representing 10.0% live in bungalows, forty-one (41) representing 17.1% live in detached houses, thirty-seven (37) representing only 15.4% live in semi-detached houses, twenty-five (25) representing only 10.4% live in terraced apartments, fourteen (14) representing 5.8% live in tenement buildings while eighty-six (86) of them representing 35.8% live in block of flats which acts as a dominant type of residential property mostly demanded for in the study area.

**Table 7: Factors that Influence Changes in Rental Values of Residential Properties in Close Proximity to Refuse Dumpsite in the Study Area**

S/N	Factors	Strongly Agree (5)	Agree (4)	Indifferent (3)	Disagree (2)	Strongly Disagree(1)	Mean	Rank
1	Location of the property	11	6	1	0	0	4.56	1 <sup>st</sup>
2	Proximity to Dumpsite	7	6	3	1	1	3.94	7 <sup>th</sup>
3	Accessibility	10	7	0	1	0	4.44	2 <sup>nd</sup>
4	Environmental Zoning	5	6	7	0	0	3.89	8 <sup>th</sup>
5	Road Traffic and Noise	7	7	4	0	0	4.17	6 <sup>th</sup>
6	Security to life and properties	9	6	1	2	0	4.22	5 <sup>th</sup>
7	Building Age, property Size	7	9	2	0	0	4.28	4 <sup>th</sup>

8	Quality of Neighbourhoods	9	8	0	1	0	4.39	3 <sup>rd</sup>
9	Increase in Cost of Construction	5	6	2	5	0	3.61	9 <sup>th</sup>
10	Increase in population	3	6	4	4	1	3.33	11 <sup>th</sup>
11	Institutional factors e.g. rent control edict	2	6	3	6	1	3.11	12 <sup>th</sup>
12	Structural Characteristics	2	9	4	3	0	3.56	10 <sup>rd</sup>
13	Availability of Infrastructure	5	9	2	1	1	3.89	8 <sup>th</sup>

Source: Author’s Field Survey, 2013

The analysis above illustrates the various factors that influence changes in rental values of residential properties in close proximity to the refuse dumpsite location in the study area. From the analysis above, it can be seen that majority of the residents in the study area selected Location of the property as the major factor that can influence such changes in rental values of their properties ranking it as the highest among all other factors while institutional factors such as rent control edict was ranked as the least factor towards changes in rental values.

**Table 8: Cross – Tabulation of Mean Property Values and Distances of Properties around the Dumpsite Location**

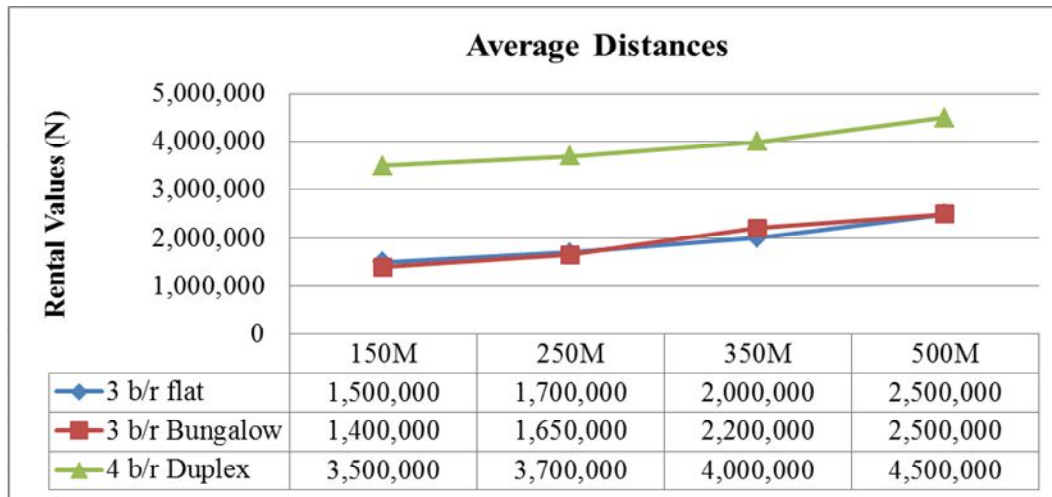
Distance in Meters	RESIDENTIAL PROPERTY TYPES (₦ Million)													
	3b/r Flat		3b/r Bungalow		4b/r Duplexes		4b/r Terraced		Tenement House		Detached		Semi - Detached	
	F	P.V	F	P.V	F	P.V	F	P.V	F	P.V	F	P.V	F	P.V
<150M	49	1.5	10	1.4	2	3.5	8	3.0	7	90	14	3.5	6	3.0
151M–250M	13	1.7	7	1.65	5	3.7	13	3.5	5	135	26	3.7	21	3.2
251M-350M	13	2.0	4	2.2	1	4.0	2	4.0	2	175	0	-	4	3.5
351M-500M	11	2.5	3	2.5	5	4.5	2	4.5	0	-	1	4.0	6	4.3
<b>Total (240)</b>	<b>86</b>	<b>7.7</b>	<b>24</b>	<b>7.75</b>	<b>13</b>	<b>15.7</b>	<b>25</b>	<b>15.0</b>	<b>14</b>	<b>400</b>	<b>41</b>	<b>11.2</b>	<b>37</b>	<b>14.0</b>
<b>% of Total (100)</b>	<b>36</b>		<b>10</b>		<b>5.4</b>		<b>10.4</b>		<b>5.8</b>		<b>17.1</b>		<b>15.4</b>	

Source: Field Analysis, 2013

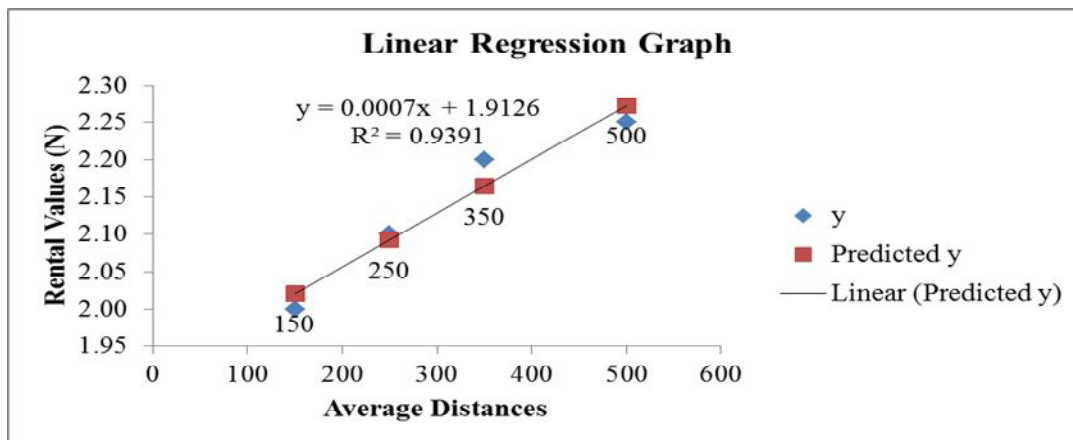
In establishing the relationship between distances away from dumpsite and residential property values measured in a distance of 500M radius away from the dumpsite location based on interval of 150M up to 500M in concentric rings, frequency interval (F) and percentages (%) for each category of residential property around the dumpsite were applied. However, data obtained are as shown above in Table 9

The analysis above shows that property values increases as the distances away from the dumpsite location increases outwardly. The analysis in the table showed that 36% of flats, 10% of bungalows, 5.4% of duplexes, 10.4% of terraced, 5.8% of tenement houses, 17.1% of detached and 15.4% of semi – detached houses were located within the 500M radius away from the dumpsite location in concentric rings. However, it can be seen that Flats is highly dominated by most

of the residents as a result of their minimum household size as well as their income level. It can therefore be concluded that property values vary with distances away from the dumpsite and people tend to pay more for the same property provided the impact of dumpsite is reduced.



Graph 1: Rental Values – Average Distances of Residential Properties



Source: Statistical Tool Analysis (Excel), 2013

Graph 2: Average Rental Values – Distance Regression Relationship

Graph 1 clearly illustrates the pattern of Residential property distribution within the concentric rings of 500M radius which indicates that property values increase with distances away from the dumpsite location while graph 2 shows that a model derived for predicting rental values (y) as average distances (x) increase is  $Y = 0.0007x + 1.9126$  while the regression line can be considered an acceptable estimation of the true relationship between mean rental values and distances. The  $R^2$  value is 0.9391 indicating that there is a very high probability that the prediction of rental values in the study area is attainable and will be reliable. However, it can be concluded that the relationship between the mean property rental values and distances away from the dumpsite location is a statistically significant relationship indicating that rental values of the various property types increases as distance to the dumpsite location increases in the study area increases.



**Table 9: Predictive Models of Residential Property Values within the Dumpsite Location in Utako District, Abuja**

S/N	Residential Property Types	Predictive Model	R <sup>2</sup> Value
1	1 Bedroom Flat	$Y = 125000x + 225000$	0.9470
2	2 Bedroom Flat	$Y = 260000x + 380000$	0.9494
3	3 Bedroom Flat	$Y = 245000x + 775000$	0.9971
4	2 Bedroom Bungalow	$Y = 220000x + 590000$	0.9878
5	3 Bedroom Bungalow	$Y = 310000x + 850000$	0.9727
6	3 Bedroom Duplex	$Y = 450000x + 1E + 06$	0.9925
7	4 Bedroom Duplex	$Y = 500000x + 2E + 06$	1.0000
8	2 Bedroom Terrace	$Y = 230000x + 610000$	0.9796
9	3 Bedroom Terrace	$Y = 370000x + 1E + 06$	0.9695
10	4 Bedroom Terrace	$Y = 360000x + 2E + 06$	0.9878

Source: Field Analysis, 2013

The Table above clearly shows the different predictive linear models i.e. regression equations that are applicable to each of the different property types in the study area. The R<sup>2</sup> values indicated that the predicted values of the residential property types using these models have up to  $\geq 95\%$  probability to be realized. However, the predictive models with the presence of an exponential function “E” were represented as  $1 \times 10^6$  for the projection calculation. From the table above, the projection for the rental values of residential property types for the year 2014 - 2017 using the formula  $Y = A + Bx$  will be as presented.

## CONCLUSIONS

In conclusion, the study having examined the impact of refuse dumpsite on rental value of residential properties, recommends that:

- The Estate Surveyor and Valuer should advise their clients and dangers of living or locating their properties close to any dumpsite location
- The Government should create awareness programmes for residents in these areas on its health implications of such locations and possibly relocate the dumpsite or the residents.

## REFERENCES

1. Akaninyere, M. & Atzer, J. (2001). Solid Waste Characterization and Management Issues in Uyo Municipalities, Nigeria. Libro-Gem Lagos Nigeria.
2. Anifowose Y.B., O. K. (2011). Waste Disposal Site Selection using Remote Sensing and GIS: A study of Akure and its Environs, Southwest-Nigeria. *Proceedings of the Environmental Management Conference, Federal University of Agriculture*. Abeokuta.
3. Bartlett, J. E., Kotlik, J. W., & Higgins, C. C. (2001). Organizational Research: Determining Appropriate Sample Size in Survey Research. *Information Technology, Learning and Performance Journal*, Vol. 19, No 1, spring 2001, 43 - 50.
4. Chukwuemeka E., Osisioma B., Onwuka E., Ugwu J. (2012). The challenges of waste management to Nigeria sustainable development: A study of Enugu State. *International Journal of Research Studies in Management*, 1(2):

79-87.

5. Freeman, III, A. M. (1979). *The Benefits of Environment Improvement. Baltimore: Resources for the Future.* John Hopkins Press
6. Graiser, S. (2007). The Best way to manage solid waste in development nations. *International Journal of Environ., 4 (3), 39 - 40.*
7. Howard, A. D., & Irwin, R. (1978). *Geology in environmental Planning.* (p. 478p). McGraw Hill Books.
8. Lietman. J. (1995). *Urban Environmental Issues.* . The Agricultural and Forestry Systems Division (AGRAF) The World Bank.
9. Nabegu, A. B. (2010). An ANalysis of MUnicipal Solid Waste in Kano Metropolis, NIGERIA's Hum Ecol. Vol. 31(2):. 111 - 119.
10. Nwana, O. C. (1981). *Introduction to Educational Research for Student - Teachers.* Ibadan: Heinemann Educational books.
11. Oulun, Y. O. (2002). Re-Defining the Concepts of Waste and Waste Management evolving the theory of Waste Management.
12. Oyinlola., A. K. (1998). Waste Reuse and Recycling. *Petroleum (Special) Trust Fund Stakeholders Technical workshop.* Abuja.
13. Peers, I. (1996). *Statistical analysis for education and psychology researchers.* Bristol, PA: Falmer Press. Salkind, N. J. (1997). *Exploring research* (3rd ed.).
14. Rogdgers, M. (2011). *Foundamentals of Development Administration.* London: S.K. Publishers.
15. Tchobanoglas, & Kreith. (2002). Wate Disposal Site Selection using Remote Sensing and GIS: A study of Akure and its Environs, Southwest-Nigeria. *Proceedings of the Environmental Management Conference, Federal University of Agriculture, Abeokuta, Nigeria, 2011* (p. 248). New York: McGraw Hill Books.
16. The Nigerian Institution of Estate Surveyors and Valuers (NIESV) . (2009). *The Directory of Members and Registered Firms, Seventh Edition.* Abuja.
17. Thomas, L. (2000). *Brief History of Solid Waste Management written for The California Department of Health Services.*