

Informal Sector Solid Waste Management and Community Poverty Reduction in Gwagwalada and Kuje Area Councils of Federal Capital Territory, Abuja, Nigeria

Bamaiyi Garba¹ and Ezekiel Haruna²

Bamaiyi Garba Directorate of Research, National Institute for Policy and Strategic Studies Kuru, Nigeria.
Ezekiel Haruna Kaduna State University Kaduna, Kaduna State, Nigeria

doi: <https://doi.org/10.37745/ijssber.2013/vol12n3118>

Published June 11, 2024

Citation: Garba B. and Haruna E. (2024) Informal Sector Solid Waste Management and Community Poverty Reduction in Gwagwalada and Kuje Area Councils of Federal Capital Territory, Abuja, Nigeria, *International Journal of Small Business and Entrepreneurship Research*, Vol.12, No.3, pp.,1-18

ABSTRACT: *Informal sector solid waste management have been a contributed factor to aid poverty among the poor. The aims of this study are to examine the contribution of informal solid waste management to support communities in reduction of poverty. To achieve these, data was of Primary sources. Questionnaires were used as instrument of data collection administer through stratified random/systematic techniques. The population of the study were residential areas, market areas and industrial areas in the two area councils. Structural in-depth interview to selected informal solid waste operators were used as sources of data in which additional information were collected. Slovin's formula was used to determine the Sample size. Descriptive and inferential statistics were used to analyze data. Findings from the study reveal that: Solid waste management reduce dependency ratio of some people by about 3.860 times which is statistically significant ($p < 0.05$). Based on the findings the study concludes that proper management of solid waste will create clean environment and alleviates extreme poverty by improving community livelihood, and reduce family dependency in the two area councils. The study recommends among others that government should develop household solid waste management and trade recycling to encourage community participation in solid waste management this will create income and employment in Gwagwalada and Kuje Area Councils.*

KEY WORDS: Informal Solid Waste Management, Community Poverty Reduction

INTRODUCTION

Developing countries experienced rapid rate of urbanization, high rate of poverty, low income and low skilled labour have to depend on the informal ways of generating income. Ukoje (2012) observed that these developments have generated advocacy by scholars and policy makers for adoption of informal solid waste management for poverty alleviation in urban areas and the

integration of informal with the formal solid waste management system. Rapid development, population increase and changes in consumption pattern have either directly or indirectly resulted in the generation of enormous amount of solid waste in the Federal capital territory. Consequently, lack of adequate solid waste management collection by the constituted authority gives an opportunity for informal solid waste sectors to be engage in such activities. This creates large need for informal waste collectors and offers more income among the poor which helps to alleviate extreme poverty. Gwagwalada and Kuje area councils of the Federal Capital Territory (FCT), Abuja, can be said to be the best planned and structured urban settlement in Nigeria. Unfortunately, the government has not made reasonable effort on solid waste management collection that is why informal waste sector have to key into the system.

Research Question

The following research questions were formulated to guide the study;

- i. Does Solid Waste Management Aid Poverty Reduction in Gwagwalada and Kuje area Councils of FCT?

Objectives of the Study

The main objective of the study is to examine impact of solid waste management on community poverty reduction in Gwagwalada and Kuje Area Council of the FCT.

The specific objective is

- i. Examine the Impact of Solid Waste Management on Poverty Reduction in Gwagwalada and Kuje Area Councils of FCT.

Research Hypothesis

The Study Seeks to Investigate Solid Waste Management on Community Poverty Reduction in Gwagwalada and Kuje Area Councils of FCT. The following hypotheses is derived

HO₁; There is no Significant Effect of Solid Waste Management on Poverty Reduction in Gwagwalada and Kuje Area Council of FCT

Scope and Limitations of the Study

The first limitation encounter was the attitude of respondents during the course of data collection; some gave attention and some responded to question with unreserved, while others had not shown interest to give attention thinking that is a waste of time. And, also the data are being generated from two area councils of Federal capital territory which are Gwagwalada and Kuje and so the findings are limited to the two area councils.

LITERATURE REVIEW

Conceptual Clarification

Solid Waste Momodu, Dimuna and Dimuna (as cited in Edward, Peter & Gbenger, 2017) defined solid wastes to comprise all the wastes arising from human and animal activities that are normally solid, discarded as useless or unwanted. The Ecological solid waste management Act of The Republic of Philippines (2000) defines solid waste as all discarded household, commercial waste, non-hazardous institutional and industrial waste, street sweepings, construction debris, agricultural waste and other non-hazardous/non-toxic waste. Most solid waste generation in Gwagwalada and Kuje area councils are from Residential or household waste from dwelling, apartments or settlements of people etc. which consists of food waste, paper, cardboard, plastics, yard waste, wood, glass, metals, ashes and ashes residues. Also, commercial wastes arise from stores, offices, hotels, market, restaurants, auto repair shops etc. which consist of packaging materials, cartons, paper, typewriter, ribbons, glasses, medical facilities.

Solid Waste Management refers to the collection, transportation, processing, recycling or disposal of waste material (Mukisa, 2009, as cited in Thomas Peng, Lezhong, Yaoliang, Emmanuel & wang, 2017). The Ecological Solid Waste Management Act 2000 of the Philippines considers solid waste management as a discipline associated with the control of generation, storage, collection, transfer and transport, processing, and disposal of solid wastes in manner that is in accord with the best principles of public health, economics engineering, conservation, aesthetics, and other environmental considerations and that is also responsive to public attitudes.

The recognized methods of solid waste management are Sanitary landfill that confining the waste, compacting and finally capping (covering with soil). It not only prevents burning of garbage but also helps in reclamation of land for valuable use (Centre for Environment and development, 2003). Land disposal is the common strategy for solid waste management. Refuse can be safely deposited in a sanitary landfill, a disposal site that is carefully selected, designed, constructed, and operated to protect the environment and public health. One of the most important factors relating to land filling is that the buried waste cannot be in contact with surface water or groundwater. FCT, Abuja has no sanitary landfill for waste disposal. Most of the wastes collected were transported to a single dumpsite at Mpape. Another is disposal of waste in a landfill involves burying the waste and this remains a common practice in most countries. Landfills were often established in abandoned or unused quarries, mining voids or borrow pits. A properly designed and well managed landfill can be a hygienic and relatively in expensive method of disposing of waste materials. Older, poorly designed or poorly managed landfills and open dumps can create a number of adverse environmental impacts such as a wind-blown litter, attraction of vermin, and generation of liquid leachate.

Another common product of landfills is gas (mostly composed of ethane and carbon dioxide), which is produced from anaerobic breakdown of organic waste. This gas can create odor problems, kill surface vegetation and is a greenhouse gas. FCT, Abuja has three Landfills which have been operating under the management of Abuja Environmental Protection Board; Mpape Landfill, Gosa landfill and Ajata landfill. Only Gosa and Ajata landfills are currently in operation while Mpape landfill was closed in 2015 using soil cover, grasses were planted to reduce runoff and infiltration. The reason was that due to the exhaustion of space, fire outbreaks and complaints from the surrounding residents who live continuous seepage of leachate from the buried waste that flow to the surface especially during the raining season, which produces more leachate due to infiltration's (Kadafa, Latifah, Abdullah & Sulaiman, 2013).

Another method is recycling which is resource recovery practice that refers to the collection and reuse of waste materials such as empty beverage containers. According to Momoh and Oladebeye (2010) recycling has been viewed as an important tool in minimizing the amount of household solid waste that enter the dump sites and provides the needed raw materials for industries. The materials from which the items are made can be reprocessed into new products. Material for recycling may be collected separately from general waste using dedicated bins and collection vehicles. In some communities the owner of the waste is required to separate the materials into various different bins e.g. for paper, plastics, metals before collection. Recycling turns materials that would otherwise become waste into valuable resources yielding environment, financial, and social returns in natural resource conservation, energy conservation, pollution prevention and economic expansion and competitiveness (United States Environmental Protection Agency, 1999).

Role of Formal and Informal Sector Solid Waste Management

Adebola (2006) carries out studies on the role of informal private sector in an integrated solid waste management in Lagos state and specified the role of each such as:

The cart pushers: this group involved in the house-to-house waste collection at a fee, using specially built carts and transports the waste to transfer bins strategically placed by government Agency. They were collecting over 70% of the total waste generated in the state. They also involved in waste recovery by sort and recover reusable and recyclable materials from waste before disposing the residue. He also said that no accurate data/record of their activities within waste management industry but they cart away hundred tons of waste per day and make an average of two thousand six hundred naira (US \$20.00) per day.

The Cart builders: This group invests their money in the construction of the carts being used by the cart pushers. They put the cart for lease/hire to the cart pushers ranging from 5 to 50 depending on the financial capacity of each individual involved in the business. The cost of renting each cart is between N150.00 and N250 per day, whereas the cost of constructing a standard cart is put to between N15,000 and N20,000 respectively.

The Scavengers: This group involved in both on-site and off-site waste/ resource recovery, they recover re-usable and recyclables materials like plastics, Aluminum, glass, paper, scraps metal, animals like horn, bones etc. Some of them go from door to door to recover re-usable and recyclable materials, while majority limit their operation to the waste brought to the disposal sites. In some cases, scavengers also process some of the recovered waste before selling either to the resource merchants or directly to the recycling industries. Adebola, Olugbenga (2006) find out that several million-naira worth's of materials are recovered yearly by over four thousand scavengers within informal sector in integrated solid waste management in Lagos.

The Resource Merchants: This group is made up of traders (merchants) involved in the purchase of all recovered recyclable and re-usable materials from scavengers. Some members of this group are retired scavengers who cannot scout for materials on the site again due to either age or advancement in financial capability. They are so wealthy that some of them are involved in the exportation of some of the recovered resources to other countries thereby earning foreign exchange; they are also influential that they get local purchasing orders (LPOs) from companies to supply recovered materials.

The Recyclers: This group of informal sectors include both micro and the small-scale recycling companies, they convert recovered waste materials like paper, aluminum, animal by products, plastics scrap metals etc., to valuable materials and raw materials for the consumption of the industrial sector. The recycling sector is a multi- million-naira investment, where some specialized equipment and machines are used for the conversion of the recovered items to finished products or raw materials that are also used in several other applications. Some of the recycled products and raw materials are exportable products through which foreign exchange is obtained. Adebola Olugbenga O. said these industries provide more than two thousand job opportunities for different cadre of work force.

THEORETICAL FRAMEWORK

Theory of Recycling

Recycling is a method of materials management in which discarded materials are separated from waste and processed to acceptable standards to re-enter the economy as usable products (Bisio & Boots, 1996). The balance theory for Recycling of construction and demolition waste advocated by Wong and Yip (cited in Advance in Building Technology,2002) state that the number of wastes generated from a construction project, and sent for recycling process must be equivalent to the amount of the recycled construction and demolition products imported and used as construction materials for that project. The maturity of Balance theory requires gradual establishment of recycling facilities which is capable to accept and handle not only inert materials but also other C&D waste like wood and wood products, cardboard, metal and plastics. Thus, the waste materials are put to reuse through recycling, which would otherwise go as waste. The degree of recycling as

an economic alternative to other disposal methods vary between Gwagwalada and Kuje area councils due to factors like nature of dwelling, cost of alternative disposal methods and market conditions for the recycled materials. Both in Gwagwalada and Kuje area councils the rag pickers and itinerant buyers collect wastes from households and garbage dumps for recycling. Their activity reduces the burden of municipal system and provides employment and income to a large number of people especially in Gwako community in Gwagwalada area council of FCT where a local recycling plant was established. Some of the household normally collect recyclable solid waste and pickers roam the streets looking for discards that has an intrinsic value to them. They also collect recyclable materials at the disposal site. The itinerant buyers like resource merchants' purchase from waste collectors and supply to industries for manufactory.

Empirical Review

Empirical Review from the Rest of the World

Mehe, Chamhuri and Ara (2016) carried out research on the achieving sustainable livelihood through solid waste management in Dhaka City. The aims of the research were to estimate poverty reduction and sustainable livelihood by proper solid waste management. Two hypotheses were tested; first was Health hazards factor has significant and direct effects on sustainable livelihood, second was source separation has significant and direct effects on sustainable livelihood. Data were collected using structural questionnaires, face to face interview. A total of 436 respondents were sample from two urban areas namely Dhaka North City and South City. Data were analyses by using Confirmatory factor analysis (CFA) which used to examined if the measurements of a construct are consistent with researcher's comprehension of the construct's nature, and Structural Equation Modeling (SEM) which is a second-generation statistical method widely employed to analyzed the inter-relationships among variables simultaneously in a model. Maximum likelihood was utilized to estimate the model and the parameters. Result shows that there is positive relationship between source separation and health hazards in achieving sustainable livelihood. It also found that regression coefficient of source separation, health hazards on sustainable livelihood are significantly different from zero (P value 000 and 0.003) respectively. The research concluded that the planned, monitored and supported waste picking activities can be a viable option for reducing poverty among the urban poor. Also organizing and training informal recyclers in municipal solid waste enterprises was a very effective way to upgrade their ability and add value to materials collected.

Empirical Review from Africa

Godfrey (2002) carried out research on urban poverty reduction through municipal Solid Waste management in Maseru and Maputsoe. The aims of the study were to examined the socio-economic benefit of urban municipal solid waste management through job creation opportunities (mainly informal) in Lesotho. Data and information were gathering on the existing policies and regulatory framework concerning waste management. The population of the study targeted the cities of

Maseru and Maputoes. The result shown that paper was the most commonly generated waste in all categories, plastic second followed by organic waste and beverage cans. Also revealed that the weighted average household generation rate was 0.13 kg per capital day and contributed the overall waste generation ranked second to commercial establishment. It also revealed that informal sector solid waste management generated an estimated profit of M0.7 million per annum from waste recycling related activities and created about 282 jobs. Finally revealed that combustible organic waste was highly sources of energy for cooking and heating. The study concluded that the socio-economics benefit of solid waste management creates employment and people were willing to pay for the service of waste pickers. Also concluded that environmental related regulatory instrument and polices in Lesotho was inadequate and inappropriate.

Empirical review from Nigeria

On studies relating to Nigeria, Maganu, Maishanu and Balkisu (2017) carried out a study on the waste disposal and its perception among Residents of Sokoto metropolis, north-West Nigeria. Specifically, to examined the pattern of waste disposal and regularity of sanitation from residents of five local government area. Structural questionnaires were used for data collection. Descriptive statistics such as means and standard errors were used to analyzed. Also, analysis of variance (ANOVA) was used to analyze the data obtained. Result of the waste composition from the collected samples within the metropolis revealed that lead (pb) concentration >chromium (Cr)> zinc (Zn), with highest values of 9.15g/kg, 20.01g/kg and 0.73g/kg respectively. Also, the result revealed that 20% of the 20-30 age group dumped their waste in the house while 2% dumped waste outside the house. Furthermore, on monthly disposal of waste about 22% of age 20-30, 12% of age 31-40, 6% of age 41-50 and 2% of age 51-60. Finally, 40% reported that malaria was associated with waste dump, 2% associated with cholera. They concluded that Sokoto metropolis needed to be sanitize weekly because of the indiscriminate dump of waste all over the metropolis

Obadina Fisher and Sohail (2014) in their study on the Socio- economic of Waste workers on Lagos dumpsites: Analysis of gender differences. The study examined the socioeconomic activities of solid waste workers at five dump sites in Lagos. It adopted observation, questionnaire surveys and interviews as method, 305 questionnaires were completed which provided information about characteristics of these workers; scavengers cart pushers, waste buyers, waste merchants, and PSP operators (i.e. private sector operator. Data were analyzed using Mann-Whitney and Kruskal- Walli's test to reveal the effect of the different parameters of gender on income. The result shown that age, marital status, religion, ethnic origin, working hours and income were form to differ by gender among waste workers. Also on their earning capacity, the average mean income of all the workers was greater than the minimum waste at the time of study. They concluded that activities of waste workers in the informal waste sector offered economic benefit as they made their livelihood from solid waste due to unemployment and income were differentiated by gender, hours worked daily, ethnic group and marital status.

Ukoje (2012) carried out research on the Informal Solid Waste Management and Livelihood Diversification in Zaria, Nigeria. His study, specially to examined the contributions of informal solid waste management to livelihoods of the Urban poor in Zaria. Data used was based on the available literature on the study area and took a random sampling of 320 people. Primary data was obtained by use of Questionnaire. The questionnaires were distributed as followed; 224 to scavengers, 64 to junkshop/middlemen, and 32 to reuse and recycling. Data was analyzed by used of descriptive statistics (frequencies and percentage). The result shown that operator was able to make substantial amount of income from their activities in which revealed that all the waste pickers earn less than N7000 monthly, while intermediate dealers and recyclers earned about N7,000 and N11,000 monthly respectively. The conclusion was that government, NGOs, Civil society should need to enhance the productivity of waste operators by providing training opportunities to enhance their employment, organized cooperative and provided access to credit facilities.

METHODOLOGY

Research Design

Cross sectional research design was used in the study. It enables data collection at a single point time without repetitions from a sample selected to represent some large population. Structural questionnaires were used for data collection. The questionnaire was divided into two parts. The first is the general characteristics of the respondent. The second consist of the research objectives and questions. The questionnaire design is on liker scale questions type. The liker scale questions are designed to keep the questionnaires to a reasonable length to avoid misinterpretation. It permits easy tabulation and interpretation by the researcher.

Study Area

Abuja is the capital city of Nigeria established by degree number 6 of 1976. The degree name Abuja as the new Federal capital territory of Nigeria. It was established due to the over congestion of Lagos in terms of population, administration, traffic, infrastructure and other urbanization issues.

The Federal Capital Territory was carved out of former Nasarawa, Niger and Kogi states. Abuja is located in the middle of Nigeria, falling within latitude 7 degrees, 25' north and 9 degrees, 20' north of the equator and longitude 5 degrees 45' and 7 degrees 39'. It has a land area of 8,000 square kilometers, which is two and half times the size of Lagos. It is bounded on the north by Kaduna state, on the West by Niger state, on the East and South-East by Nasarawa State, and on the South-west by Kogi state respectively.

Administratively, the Federal Capital Territory is structured into six Area Councils. It is essentially a civil service city with lots of social amenities, private and public hospitals and institutions. The natives of FCT are predominantly farmers.

The Gwagwalada and Kuje area council are amount of the six area councils of Federal Capital Territory. Gwagwalada has an area of 1,043 square kilometers (Ministry of FCT, 1999) and a population of 378000 (NBS, 2019 projection). It comprises of ten wards viz Gwagwalada centers, Dobi, Gwako, Ibwa, Ikwa, Paiko, Kutunku, Tunga Maje, Zuba and Quarters (phases 1,2 and 3). While Kuje has an area of 1644 kilometer square (Ministry of FCT, 1999) and a population of 318218 (NBS, 2019 projection). It comprises of ten wards viz; Chibiri, Gaube, Gudun Karya, Gwargwada, Kabi, Kuje central, Kujekwa, Kwaku, Yenche and Rubochi.

Population of the study

The study population consisted of the selected markets areas, selected Industrial areas, residential areas and visible Informal solid waste operators (cart pusher, resource merchant and scavengers) in Gwagwalada and Kuje area councils of Federal Capital Territory

Sample Size

Sample size determination is based on a proportion with approximation 95% confidence level Slovin's formula is used to calculate the sample size. It's used to calculate the sample size (n) given the population size (N) and a margin of error (e). It is a random sample technique formula to estimate sample size. It is computed as $n = N / (1 + N \times e^2)$

n = no. of sample

N= Total population

e = margin error (degree of prediction)

To calculate sample size for this study is $N = \text{Population of Gwagwalada} = 378000$ (NBS 2019 projection) + population of Kuje = 318,218 (NBS 2019 projection) therefore, total population is 696128

Margin error = $\pm 5\% = 0.05$

$$n = 696128 / 1 + 696128 \times 0.05^2$$

$n = 696128 / 1740 = 400.0736$ approximately 400 sample size was used.

To determine the sample size of each area council is: percentage (%) of each area council multiply by sample size of 400

% of Gwagwalada is $37800 / 696128 \times 100 = 54\% \times 400 = 216$

% of Kuje is $318218 / 696128 \times 100 = 46\% \times 400 = 184$

Nature and Sources of Data

Primary source of data was used for the study with the help of two volunteers research assistants, students from University of Abuja. Primary data such as questionnaires administer through stratified random/systematic techniques. 216 administered questionnaires to Gwagwalada and 184 administered questionnaires to Kuje which was distributed to residential areas, market areas and

industrial areas in the two area councils. Interview was conducted with some of the officials of Environmental protection board/Area council waste management Agency and structural in-depth interview/questionnaire to selected informal solid waste operators were used as sources of data in which additional information were collected.

Model Specification

This study utilized the logistic regression to estimate the model with binary dependent variables. The binary regression was used to develop the predictive model to measure the proportion of solid waste management attributed to poverty reduction in the study area. The model is to produce results that can be easily interpreted and the method is simple to analyze in SPSS (2018) application package. The justification is that binary logistic regression model is binary respond model which the variables are qualitative in nature which is based on perceptions.

The Model Specification is;

$$\Pr (\text{Solid waste management}) = 1, X_1, X_2 \dots X_4) = \beta_0 + \beta_1 \sum X_i + \mu_i \dots \dots \dots (1)$$

$$\ln (1/1-p) = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \mu_i \dots \dots \dots (2)$$

$$\text{The equation can be rewritten as in } (1/1-p) = \beta_0 + \beta_1 \ln X_1 + \mu_i \dots \dots \dots (3)$$

To achieve objective; examine the impact of solid waste management on poverty reduction in Gwagwalada and Kuje are council of FCT.

Model 1

$$Y = \ln (1/1-p) = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \mu_i$$

Y = Probability of poverty reduction is a binary number, if pr = 1, otherwise= 0

X1 = Out of poverty: 1 if effective solid waste management is aids out of poverty and 0 if not

X2 = Living standard: 1 if effective solid waste management Improve standard of living and 0 if not

X3 = Dependency: 1 if effective solid waste management Reduce dependency ratio of people and 0 if not

β_0 = Constant

β_i = Regression Coefficient

μ_i = Error Term

Method of Data Analysis

This study used both descriptive and inferential statistics. Statistics in form of tabulation, frequency distribution, liker scale rating and simple percentage.

The Binomial (Binary) Logistic Regression was applied for predictive model and to achieve the stated objectives and hypothesis. It is a form of regression which is used when the dependent variable is a dichotomy and the independent variable is of any type. The method applied maximum likelihood estimation after transforming the dependent into a logit variable (the natural log of the odds of the dependent occurring or not). In this way, Longlisting Regression estimate the probability of a certain event occurring.

DATA PRESENTATION, ANALYSIS AND DISCUSSIONS OF FINDINGS**Data presentation and Analysis****Table 4.1.1 Questionnaire distribution to and returned from the selected sample**

Area councils	Distributed	Returned	Not Returned
Gwagwalada	216	205 (95%)	11 (5%)
Kuje	184	182 (99%)	2 (1%)
Total	400	387 (97%)	13 (3%)

Source: Field survey 2023

The study covers two area councils of FCT, Abuja as stated in table 4.1.1 above. Total of 400 questionnaires were distributed of which 216 to Gwagwalada but 205 of the questionnaires representing 95% were returned while 11 of the questionnaires representing 5% were unreturned and 184 to Kuje, but 182 of the questionnaires representing 99% were returned while 2 representing only 1% were not returned from the area councils respectively. Only the Percentage of returned questionnaires was used for analysis in the study.

General Characteristics of respondents by study area**Table 4.1.2 Sex of respondents by study area**

Gender	Gwagwalada Frequency	Percentage	Kuje Frequency	Percentage
Male	90	43.9%	68	37.4%
Female	115	56.1%	114	62.6%
Total	205	100%	182	100%

Source: Field survey 2023

Table 4.1.2 above shows the sex of the respondents of which 90 representing 43.9% were male while 115 representing 56.1% were female in Gwagwalada and 68 representing 37.4% were male while 114 representing 62.6% were female in Kuje area councils respectively.

Table 4.1.3 Age of respondents by study area

Age	Gwagwalada Frequency	Percentage	Kuje Frequency	Percentage
18-35	93	45.4%	103	56.6%
36-60	109	53.1%	78	42.9%
61 & above	3	1.5%	1	0.5%
Total	205	100%	182	100%

Source: Field survey 2023

Table 4.1.3 above shows the age of the respondents of which 93 representing 45.4% were between the age of 18-35 while 109 representing 53.1% were between the age of 36-60 and 3 representing 1.5% were above 60 years in Gwagwalada and also, 103 of the respondents representing 56.6% were between the age of 18-35 while 78 representing 42.9% were between the age of 36-60 and 1 representing 0.5% were above 60 years in Kuje area councils respectively.

Table 4.1.4 Educational Attainment of respondents by study area

Educational level	Gwagwalada Frequency	Percentage	Kuje Frequency	Percentage
Primary	26	12.7%	48	26.4%
Secondary	103	50.2%	125	68.7%
Tertiary	62	30.2%	5	2.7%
Non-Formal	14	6.9%	4	2.2%
Total	205	100%	182	100%

Source: Field survey 2023

Table 4.1.4 above shows the educational attainment of the respondents of which 26 representing 12.7% were primary school holders while 103 representing 50.2% were secondary school certificate holders, 62 representing 30.2% attempted tertiary institution and 14 representing 6.9% had non-formal education in Gwagwalada and also, 48 of the respondents representing 26.4% were primary school holders while 125 representing 68.7% were secondary school certificate holders, 5 representing 2.7% attempted tertiary institution and 4 representing 2.2% had non-formal education in Kuje area councils respectively.

Table 4.1.5 Marital Status of respondents by study area

Marital status	Gwagwalada Frequency	Percentage	Kuje Frequency	Percentage
Single	84	41%	85	46.7%
Married	121	59%	97	53.3%
	205	100%	182	100%

Source: Field survey 2023

Table 4.1.5 above shows the marital status of the respondents of which 84 representing 41% were single while 121 representing 59% were married in Gwagwalada and 85 representing 46.7% were single while 97 representing 53.3% were married in Kuje area councils respectively.

Responses to the Objectives: Examine the Impact of Solid Waste Management on Poverty Reduction in Gwagwalada and Kuje Area Councils of FCT.

Table 4.1.5a Effective Solid waste management is an aid out of poverty

Area council	Agree		Disagree		Un-decided	Total
	Agree	Strongly agree	Disagree	Strongly disagree		
Gwagwalada	77	37	24	44	23	205
Kuje	88	52	8	23	11	182
Total/ percentage	254(65.6%)		99(25.6%)		34(8.8%)	

Source: Field survey 2023

Table 4.1.5a above shows that 254 of the respondents representing 65.6% agreed that effective solid waste management is an aid out of poverty while 99 representing 25.6% disagreed that is not an aid out of poverty in both area councils. Also, 34 representing 8.8% were undecided in both Gwagwalada and Kuje area councils.

Table 4.1.5b Effective solid waste management can improve people standard of living

Area council	Agree		Disagree		Un-decided	Total
	Agree	Strongly agree	Disagree	Strongly disagree		
Gwagwalada	72	43	32	31	27	205
Kuje	36	107	8	14	17	182
Total/ percentage	258(66.7%)		85(22%)		44(11.3%)	

Source: Field survey 2023

Table 4.1.5b above shows that 258 of the respondents representing 66.7% agreed that effective solid waste management can improve people living standard while 85 representing 22% disagreed that it cannot in both area councils. Also, 44 representing 11.3% were undecided in both Gwagwalada and Kuje area councils.

Table 4.1.5c Effective solid waste management can reduce dependency ratio of people

Area council	Agree		Disagree		Un-decided	Total
	Agree	Strongly agree	Disagree	Strongly disagree		
Gwagwalada	71	49	12	57	16	205
Kuje	100	40	6	21	15	182
Total/ percentage	260(67.2%)		96(24.8%)		31(8%)	

Source: Field survey 2023

Table 4.1.5c above shows that 260 of the respondents representing 67.2% agreed that effective solid waste management can reduce dependency ratio of people while 96 representing 24.8% disagreed that it cannot reduce dependency ratio of people in both area councils. Also, 31 representing 8% were undecided in both Gwagwalada and Kuje area councils.

Test of Hypothesis

HO₁; There is no significant effect of solid waste management on poverty reduction in Gwagwalada and Kuje area council of FCT.

Table 4.2.6 Logit Regression Result

Coefficient	Estimate	S.E.	p-value	Odd Ratio	95% C.I.for EXP(B)	
					Lower	Upper
X ₁ (1)	-.158	.229	.490	.854	.545	1.337
X ₂ (1)	-1.233	.743	.097	.291	.068	1.251
X ₃ (1)	1.351	.759	.015	3.860	.872	17.081
Constant	1.800	.155	.000	2.226		

Estimation of Logit Regression Result

The estimation of the logistics regression model for the predictor factors of variable Y under consideration as shown in table 4.2.6 below. X₁, X₂, X₃ were used as the predictor variables. The table below displays the coefficient, standard error, p-value, and Odd Ratio (OR) of the predictor variables; it was observed from the table that the constant with estimated coefficient 1.800 is positively significant at (p<0.05) suggesting that the constant will be included in the model, X₁, X₂, and X₃ have and estimated coefficient of -0.158, -1.233, and 1.351 respectively. This means that, one unit increase in X₁, X₂, and X₃ will change the log of the odd by the respective coefficient

values. The odd ratio which measures the rate at which event occurs was greater than one for the X_3 predictors. The odd ratio 3.860 for the predictor X_3 variable indicates that the odd Y been affected by X_3 increase by 3.860. This implies that X_3 is a significant predictor for Y. the parameter of this X_3 shows a statistically significant ($p < 0.05$), to the dependent variable Y and also have high odd ratio.

From the logit result (4.2.2) shows that every one unit increase of effective solid waste management, the likelihood of helping out of poverty increases by 0.854 times or 85.4% in both area councils. Also, for every one unit of increase of effective solid waste management, the likelihood of improving people standard of living when the environment is clean increases by 0.291 times or 29.1% in both area councils. And for every one unit of increase of effective solid waste management, the likelihood of reduction of people dependency ratio increases by 3.860 times or 86.0% in both area councils which is statistically significant ($p < 0.05$)

Discussion of Findings

The following findings were made in the course of data analysis.

From objective of this study majority of the respondents (65.6%) agreed that proper, effective and efficient solid waste management can reduce extreme poverty, improve standard of living and reduce some people dependency ratio in Gwagwalada and Kuje area councils. Binary regression result shows that solid waste management have impact on poverty reduction in Gwagwalada and Kuje area councils as prove from the result of estimation table of hypothesis which indicates that the rate of family dependency reduce by about 3.860 times of 86%. Which is statistically significant ($p < 0.05$).

Summary of Findings, Conclusions and Recommendations

Summary of Findings

This study tried to address the issue of extreme poverty alleviation by improving community livelihood in Gwagwalada and Kuje area councils. Furthermore, majority of the respondents agreed that if government can embark a policy to make solid waste management effective and efficient it will reduce extreme poverty, improve people living standard, when the environment is clean and reduce family dependency in the two area councils. The study established empirically that;

There is significant relationship between solid waste management and poverty reduction in the two area councils and reduce dependency ratio of some people by about 3.860 times which is statistically significant ($p < 0.05$).

Conclusion

The study shows that Solid waste management is seen to provide an important means of livelihood for the Urban socially excluded. If government can proper handle solid waste sector and make it effective and efficient it would reduce the level of dependency and also create clean and conducive environment in the two area councils. Therefore, government should enact policy that will encourage people participation in solid waste management in order to reduce the rate of unemployment this would reduce poverty among the urban poor in Federal capital territory.

Recommendations

Based on the findings of the study the following recommendations were made;

There is need for government to create formal jobs for solid waste collectors and sorters in Gwagwalada and Kuje area councils

There should be legitimization and recognition of the activities of informal solid waste collectors by the government of Gwagwalada and Kuje area councils.

Government should develop household solid waste management and trade recycling to encourage community participation in solid waste management this will create income and employment in Gwagwalada and Kuje area councils.

References

- Adebola, O. O. (2006). The roles of informal private sector in integrated solid waste management in the achievement of the Millennium Development Goals (MDGs) in Lagos, Nigeria (Paper presentation).
- Advance in Building Technology. (2002). *Proceedings of the International conference on Advances in Building Technology*. 2, 1431-1438
- Anyanwu, N. C., & Adefila, J. O. (2014). Nature and management of solid waste in Karu Nasarawa State, Nigeria. *American International Journal of Contemporary Research*. 4(11), 149-159.
- Bisio, A. & Boots, S. (1996). *The Wiley encyclopedia of energy and environment*. New York: John Wiley and Sons incorporation. 2.
- Centre for Environment and Development. (2003). *Study of the attitude and perception of Community towards Solid Waste Management*. A case study of Thiruvananthapuram City-phase 11. Submitted to Kerala Research Programme on Local level Development.
- Damodar, N. Gujarati (2009). *Basic Econometrics*, 5th Ed, African edition, pp551- 599. McGraw Hill Education
- Edward, O. E., Peter C. A., & Benger A. A. (2017). Financial and Economic Implications of Solid waste Management in Nigeria, *Journal of Research in National Development*, 15(1), 330- 340.
- Enobong, U. & Uduak, E. (2015). Employment generation for a small economy: The Nigerian Case. *International Journal of Interdisciplinary Studies*, 2(10), 93- 103.
- Environment and Growth economics, Defra (2011). The Economics of waste and waste Policy. www.defra.gov.uk

- Environmental Careers Organization (ECO) Canada (2010). Solid waste management. *Labour Market Research Study*, 24.
- Gbadamosi, A. L. (2010). Pattern of solid waste management in Wuse and Nyanya district of Abuja Municipal Area Councils of federal capital territory [master dissertation ABU, Zaria]
- George, G., & Aya, O. (2001). The economic impact of waste disposal and diversion in California. (A report). California Integrated Waste Management Board
- Gimba, V.K., & Peter, A. (2014). *Applied statistics for social sciences*. (Primer Text using Elements of SPSS). Kabod limited
- Godfrey, G. K. M. (2002). Urban poverty reduction through municipal solid waste management: A Caste study of Maseru and Maputsoein Lesotho [A Doctoral Thesis, University of Durban- Westville, South Africa]
- Kadafa, A. A., Latifah, A. M., Abdullah, H. S., & Sulaiman, N. A. (2013). Current status of municipal solid waste management practice in FCT Abuja. *Research Journal of Environmental and Earth sciences* 5(6), 295-304.
- Karanja, S. N., Mwangi, S.W., Kibet, N., & Njeru, M. K. (2013). Influence of informal solid waste management on livelihoods of urban solid waste collectors: a case Study of Nakuru Municipality, Kenya. *International Journal of humanities and Social Science*, 3(13), 95-107.
- Mehe, Z. R., Chamhuri, S., & Ara, B. (2017). Achieving sustainable livelihood through solid waste management in Dhaka City. *International Journal of Geomate*, 12(30), 19-27
- Ministry for the Environment. (2010). *The New Zealand waste strategy*. Publication, 321.
- Ministry of FCT (1999). Appraisal of physical planning and Development Issues in the Federal Capital Territory (Report of the ministerial committee). Volume 1; 10- 90.
- Momoh, J. J., & Oladebeye, D. H. (2010). Assessment of awareness of attitude and willingness of people to participate in household solid waste recycling programme in Ado-Ekiti, Nigeria. *Journal of Applied Sciences in Environmental Sanitation*. 2, 22-34. Jakarta, Indonesia.
- Muhammad, M.N. & Manu, H. I. (2013). Gender roles in informal solid waste management in cities of Northern Nigeria: A case study of Kaduna Metropolis. *Academic Research International*, 4(5), 142-153.
- National Bureau of Statistics. (2019). Population projection. [Http://www.nigerianstat.gov.ng](http://www.nigerianstat.gov.ng)
- Obadina, A., Fisher, J. & Sohail, M. (2014). Socio-economics demography of waste workers on Lagos dumpsites: analysis of gender differences. IN: Shaw, R.J., Anh, N.V. and Dang, T.H. (eds). Sustainable water and sanitation services for all in a fast-changing world: Proceeding of the 37th WEDC International conference. 15-19 September. Loughborough University. 7pp.
- Oluwaleye, M. O. (2012). Proposal for new waste management system in Nigeria (Lagos state) [Thesis abstract, degree programme, University of Applied Science, Seinajoki].
- Thomas S., Peng W., Lezhong X., Yaoliang S., Emmanuel, A., & Wang, Y. (2017). Challenges and Prospects of Solid Waste Management in Ghana. *International Journal of Environmental Monitoring and Analysis*, 5(4), 96- 102.
- Ukoje, J. E. (2012). Informal solid waste management and livelihood diversification in Zaria, Nigeria. *The Zaria Geographer*, 19(1), 101- 110.
- United Nations (1987). Report of the world commission on environment. General Assembly resolution 42/187, 11 December 1987.

Publication of the European Centre for Research Training and Development-UK

United Nations Environmental Programme (UNEP) (2009). Development integrated solid waste management plan training manual, vol.2, assessment of current Waste Management Systems and Gaps Therein Osaka/Shiga, Japan

World Population Prospects (2019 Revision) United Nations population estimation and projections. <https://population.un.org/wpp>

Younes, B. Z., Nidwalden B. C., Pascal N. & Mohamed B. M. (2018). Waste management Policy and employment: the case of France. *Environmental Economics*, 9(1), 38-46.