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# Trending Spatial Pattern of Solid Waste Disposal and Health Risks Associated with it in the Rural Areas: An Example from Kuje Area Council, Nigeria

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## ABSTRACT

*In recent time, wastes management has remained a major concern to both government and larger society. This emanates from anthropogenic activities and continuous population growth with its health attendant problems. Rural areas of most developing countries are faced with health associated with it with its attendant health problems. The study adopts random sampling method; the data were subjected to correlation analysis. A total of 396 respondents were randomly sampled across all the randomly selected wards in the study area with the tools of questionnaire and in-depth interview (IDI). Data collected were subjected to correlation analysis. With the p-value of .182 > 0.05 level of significance at a correlation level of 0.343 at 22 df, there is a weak relationship between spatial pattern of waste disposal and health risks in the rural areas of Kuje Area Council of FCT, Nigeria. In the light of this, the study recommends among others that, inculcation of relevant environmental education, introduction of necessary legislation and the need for attitudinal change towards waste disposal on the part of rural populace.*

**Keywords:** *Wastes, Rural, Health, Environmental education.*

## INTRODUCTION

Rural areas remain the epitome of development in many developing countries of the world; it remains source of raw materials for the industrial sector, and majority of residents are gainfully employed. Despite these beauties of the rural areas, Africa rural is faced with myriads of challenges, among which is waste management (UNEP, 2018). One of these challenges is waste management, which is an important component of the environmental pressure.

Globally, The World Bank (2019) submitted that, in 2016, the worlds' cities generated 2.01 billion tonnes of solid waste, amounting to a footprint of 0.74 kilograms per person per day. Department of Environmental Affairs (2012) reported that, Africa generated 108 million metric tonnes of waste; of 108 million tonnes a horrifying 98 million tonnes of waste went straight into landfill out of which mere 10% are recycled. Similarly, Emenike (2013) posited that, with dense population at 9.12, 8, 4.4 and 3.1 millions in Cairo, Lagos, Johannesburg and Nairobi, respectively, organic/putrescible/bio-degradable waste generated is approximately 60% of the total waste stream.

The Sub-Saharan Africa region is the fastest growing region with waste expected to nearly triple by 2050 according to the World Bank (2019). In the same vein, Chinedu, Ezeibe, Anijiofor and Daud (2018) agreed that, 52 % of wastes generated in Nigeria are organic wastes which create additional disposal problems. Similarly, Bakare (2019) affirmed that, Nigeria generates more than 32 million tons of solid waste annually, out of which only 20-30% is collected. Of this amount, Lagos generates per capita waste of 0.5 kg per day, thus the city generates more than 10,000 tons of urban waste every day.

Solid waste management in Nigeria is characterized by inefficient collection methods, insufficient coverage of the collection system and improper disposal. Furthermore, waste disposal in most Nigeria cities include, disposal of hazardous and municipal waste in open, unlined dumps, open burning of municipal solid wastes, dumping on water bodies and in other unauthorized places.

## STATEMENT OF THE RESEARCH PROBLEM

Waste management has been a major challenge in the world; Kaza, Yao, Bhada-Tata, and Van Woerden, (2018) submitted that, by 2050, the world is expected to generate 3.40 billion tons of waste annually. The waste disposal scene according to a report by Mail and Guardian (2018) on Africa associated the scourge in waste generation to rapid population growth and urbanization, which is expected to increase from 70% in 2016 levels to 3.40 billion tonnes in 2050. Similarly, Kadafa (2017) concluded that, improperly disposed solid waste has become an environmental and health hazard in areas like the suburbs of Abuja, the Federal Capital of Nigeria.

This scenario has been associated to a number of factors; Taherzadeh and Rajendran (2015) associated this to lack of governmental policy and finance, difficulty in political issues and long-term planning in waste management, social behavior, and resistance to change. Furthermore, separation of wastes at source, regular waste collection services, poor waste management infrastructure, low quality of waste management services, lack of funds, poor environmental awareness, among others have identified as some of the challenges of waste management. In addition, lack of transparency, bad governance and prevalence of corruption in most African countries are major problems militating against efficient MSW management.

Importation of substandard products and non-operational laws and policies has also contributed to rapid increase in waste generation (Bello, Ismail, Kabbashi, 2016).

The volume of waste has increased of late and this according to Widyaningsih et al (2015) is as result of change in household consumption pattern with its attendant challenges. WHO (2018) affirmed that, 90% of the rural wastes are deposited openly in most developing countries of the world. This line has been towed by Enebeche and Ani (2017) who averred that, rural inhabitants in Nigeria, manage their wastes through uncontrolled burning, indiscriminate dumping on the ground and in the river. Abdel-Shafy and Monsour (2018) affirmed that, solid waste is a stengent and widespread problem in both urban and rural areas in several developing countries. The effects of these have resulted in contaminating the world's oceans, clogging drains and causing flooding, transmitting diseases, increasing respiratory problems from burning, harming animals that consume waste unknowingly, and affecting economic development, such as tourism (WHO, 2018).

Yiougo et al (2013) submit further that, developing countries are faced with waste management challenges in terms of quality and quantity, leading to uncontrolled waste dump and by extension, diverse of diseases and health problems. The dump is historically the basic and most convenient option in the waste management treatment used by human settlements across the globe along with ocean and river dumping practices (Mihai and Taherzadeh, 2017).This practice has been linked to lack of waste and sanitation facilities. Indeed, Okeke (2017) concluded that, solid waste management has posed a threat to the environment and health of several people in Nigeria.

This scenario has also reared its head in the rural areas; yet Akanbi (2019) affirmed that rural areas have remained the citadel of challenges, including waste management. Despite these challenges, study has shown that, over 49.1% of Nigerians live in the rural areas (*www. worldmeter.info*). However, it is important for generation of employment, provision of food and place of abode for many (IFAD, 2014; Ippmedia, 2017). Ogunniran (2019) opined that, wastes if not properly managed can expose human health to great risk, and make life unbearable to dwellers in such environments. Additionally, Akanbi (2019) submitted that, FCT-Nigeria is not an island when it comes to health challenges, and these may be adduced to invasion by waste disposal system and its attendant problems. Kadafa (2017) sconcurred that, in Abuja, there are large populated areas which don't have any solid waste collection services available to them, and the informal collection system existing consists of individuals whom collect solid waste from residents and dispose of it improperly. In all known rural areas of the study area, there are no dump sites, thus people dispose off their waste indiscriminately without thinking about its health implications.

In the light of the foregoing, the present study is conceived and this is achieved through the following objectives: examine the spatial status of waste management in relation to health risks associated with it in Kuje Area Council of Federal Capital Territory, Nigeria.

## HYPOTHESIS

**Ho:** There is no significant relationship between spatial pattern of disposal waste and health risks in the rural areas of Kuje Area Council of in FCT, Nigeria.

## The Study Area

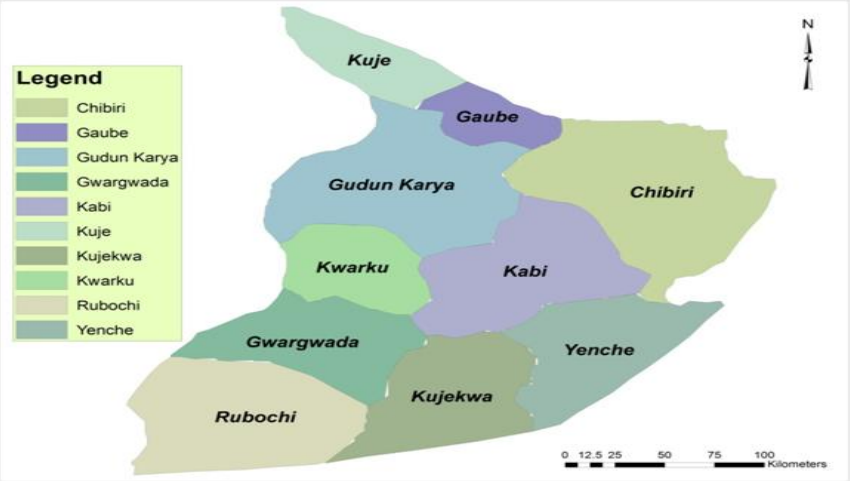


**Figure1.** *Administrative Map of Kuje, FCT-Nigeria*

Kuje Area Council is a rural council. It is one of the Local Area Councils in Federal Capital Territory (FCT) of Nigeria. It has a land area of about 2,086Km$^2$ and it is located between latitude $6^0$25' and $7^0$45'N and longitude $8^0$25' and$9^0$3'E of the Greenwich. It is bounded in the West by Gwagwalada and Kwali Area Councils and in the East by Nassarawa State.

It shares boundary with Abuja Municipal Area Council in the North –East and Abaji Area Council to the South-West (Figures 1). Kuje Area Council has a population of about 97,233 people (Federal Government of Nigeria Official Gazette, 2007).

It is made up three major people with Gwaris constituting about 60.0% while Gede and Bassa constitute about 30.0% and 7.0% in that order. The remaining 3.0% is made up of the immigrants. Suffice to add that, Kuje Area Council is a rural area council, with over 98% of it exhibiting rural criteria in terms of size, function and form.

## SOCIO-ECONOMIC CHARACTERISTICS OF RESPONDENTS

This part of the study explains the socio-economic characteristics of the respondents in relation to sex, marital status, occupation, educational attainment, religion and income.

**Table1.** *Distribution of Respondents by Socio-Economic Characteristics*

| | Frequency | Percentage |
|---|---|---|
| Sex | Male (87) | Male (22) |
| | Female (309) | Female (78) |
| Marital Status | Married (297) | Married (75) |
| | Spinster (99) | Spinster (25) |
| Occupation | Artisans (1297) | Artisans (75) |
| | Unemployed(99) | Unemployed (25) |
| Education | Non-Formal (218) | Non-Formal (55) |
| | Formal (59) | Formal (15) |
| | None (119) | None (30) |
| Religion | Christianity (214) | Christianity (54) |
| | Muslim (115) | Muslim (29) |
| | ATR (67) | ATR (17)<br>Income |

**Source:** *Field Survey, 2018.*

A cursory look at the profile of respondents in Table 1 shows that, 22.0% are male, while the remaining 78.0% are female. In Africa society, discussions that has to with family lies with heads, who are mostly men. This is further confirmed in an interview by a resource person, who submitted that:

*"It is not part of culture for men (no matter her socio-economic status to dispose of waste, it's duty of women to clean and manage all the wastes in the house '' (AIDI, Area One Camp, 2018).*

This assertion was shared by Poswa (2004) who posited that, women form the larger proportion of society worldwide and constitute the most vulnerable population groups to inappropriate service system designs in particular, solid waste collection systems.

This assertion affirms the role of women in waste disposal and management and thus in the best position to answer related to the subject matter. One of the shortcomings of the current solid waste collection systems is their male bias, regardless of the fact that women constitute the majority of the service recipients. Furthermore, 75.0% of the respondents are married, while 25.0% are spinsters. The married are largely involved generation and management of wastes is thus able to give adequate information on the subject matter. In the same vein, majority of the respondents are artisans as they constitute 75.0% of the respondents, while the unemployed are 25.0%. A respondent averred in an interview that:

*"Population is a major source of waste in the human society; many whose primary Occupation is farming find it difficult to practice it because of scarcity of arable land. Few are among us that are artisans rarely got job. This explains our state of poverty'' (IDI, Chibiri Ward, 2018).*

Similarly, 55.0 % of the respondents have non-formal education, 15% have formal education and 30.0 % do not have any form of either formal or non-formal education. Bearing in mind the relevance of education, what the above trend portend in the face of high percentage of the respondents with non-formal education, is non performance of policies. Lastly, 54.0% and 29.0% of respondents are Christians and Muslims respectively, while African Traditional Religion is 17.0%. Cancin and Adekoya (2016) posited that, religion plays important in the development of Nigeria, and by extension waste management. For instance, no religion aligns to dirty environment.

## METHOD AND MATERIALS

The data used in this study were obtained from primary and secondary sources. The secondary source included publications and maps while the primary sources involved were questionnaire and interview. In obtaining relevant data for the study, random sampling technique was adopted. Random sampling was adopted, because all the members of the population in the study area stand the chance of being selected.

The population of the wards was estimated using National Population Commission (1991) at annual growth rate of 2.83%; the use of 1991 census data is informed by the fact that, there is no current population data that disaggregate into localities. In order to have manageable sampled size, 0.5% of the estimated population of the randomly sampled wards was sampled (Table1). This also to have equal representation of all the wards, because of variation in the population of the sampled wards.

**Table2.** *Estimated Population of Gwaris in Kuje Area Council per Ward*

| S/N | Ward | 1991 Population Figure | Estimated Population | Percentage (%) |
|---|---|---|---|---|
| 1 | Chibiri | 4526 | 8,083 | 40 |
| 2 | Kuje Central | 5791 | 10,342 | 52 |
| 3 | Gaube | 2553 | 4,559 | 23 |
| 4 | Kabi | 2314 | 4,133 | 21 |
| 5 | Kwaku | 9142 | 16,327 | 82 |
| 6 | Yenche | 3191 | 5,699 | 29 |
| 7 | Gudun-Karya | 2102 | 3,754 | 19 |
| 8 | Robochi Central | 9485 | 16,939 | 85 |
| 9 | Kujepa | 3161 | 5,645 | 28 |
| 10 | Gwargwada | 2073 | 3,702 | 19 |
| TOTAL | | 44,338 | 79,184 | 396 |

**Sources:** *Column 3--National Population Commission, 1991; Column 4--Author's Calculation at annual growth of 2.83%*

## RESULT

In carrying out the analysis of data collected, correlation analysis was used; it has the advantage of enabling you to examine relationships within the data that might not be readily apparent when analyzing total survey responses (Socialcop, 2016).

**Table3.** *The Result of Correlation Analysis on IDPs and Health of Child in FCT, Nigeria.*

| | | |
|---|---|---|
| IDPs | Pearson Correlation | .182 |
| | Sig. (2-tailed) | .343 |
| | Df | 22 |

The correlation co-efficient in table 3 revealed that, there is a weak relationship between spatial pattern of waste disposal and health risks in the rural areas of Kuje Area Council of FCT, Nigeria. The p-value of .182 > 0.05 level of significance at a correlation level of 0.343 at 22 df.

The Null Hypothesis states that, there is no significant relationship between spatial waste disposal and health risks in the rural areas of Kuje Area Council of in FCT, Nigeria is being rejected.

### Sources of Waste in the Study Area

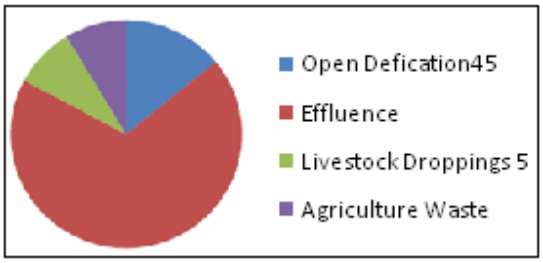


**Figure2.** *Sources of Waste in Kuje Area Council.*

**Source:** *Author's Survey, 2018.*

Studies have shown that, most of the wastes in the rural are organic in nature (Chinedu, Ezeibe, Anijiofor and Daud (2018). From figure 2, open defecation constitute about 45.0% of the waste deposit in the rural areas of the study area. In an interview, a respondent opined that:

*"Open defecation is not considered a bad practice among the rural populace; for one, we have vast unoccupied land, thus, digging latrine is considered to be waste of money''.* (IDI, Kwakwu, Kwakwu Ward, 2018)

This is closely followed by effluence from bathrooms and kitchen which is made up of 40.0%, while wastes from livestock dropping, domestics and agricultural are 5.0% each.

### Factors of Solid Waste Disposal

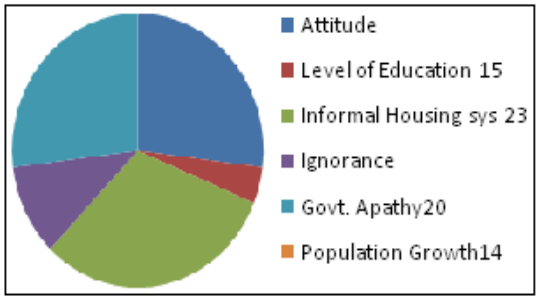


**Figure3.** *Factors of Solid Waste in the Study Area.*

**Source:** *Author's Survey, 2018.*

A look at figure 2 shows that, 23.0% of the respondents are of the view that, informal housing system. Studies have shown that, most rural areas in the developing countries are not planned, thus, no place is reserved place for waste deposit.

A respondent averred that:

*''A look at the pattern of our buildings show that, buildings are not planned, thus the idea of creating a dump site is not considered important. We dump our wastes anywhere, but do not see anything bad at that''* (IDI, Gudun-Karya, 2018).

Similarly, attitude, which 20.0% of the respondents affirmed is a major factor in waste disposal in the study area, has to do with general way of life of a people. It is confirmed general upkeep of the environment is given priority by most rural dwellers. Furthermore, 20.0% of the respondents agreed that, government apathy in coming up with waste disposal polices for the rural areas has led to widespread of waste in the rural areas of the study area. Lastly, 14.0% of the respondents agreed that, uncontrolled population in the rural has also been identified as a factor of waste in the study area. This stand is similar to the observation by Mail and Guardian (2018) who established the relationship population growth and waste generation/ disposal scene.

## CONCLUSION AND RECOMMENDATIONS

From the foregoing, indiscriminate waste disposal is anti thermal to the general development of human society. Apart from the destruction of aesthetics of the environment, human beings are also allergic to diseases. The new trend in waste disposal in the rural areas is worrisome; bulk of the wastes in the rural areas is organic and is disposed of openly. The need therefore arises for adequate management of wastes; the benefit lies in improved health status of the people and by extension high productive outputs.

In the light of this, the study recommends the inculcation of relevant environmental education. The idea is that, with adequate environmental education, environment will be considered as ours. Secondly, government can come up with necessary legislation that will spell out awards and punishments for any irresponsible disposer. Wastes generated in most rural areas are openly deposited, and this has remained inadequate.

Lastly, the need for attitudinal change towards waste disposal is a necessity; improper disposal of waste can negatively affect the health of the population living nearby the polluted area.

## REFERENCES


[1] Abdel-Shafy, H.I. and Monsour, M.S.M. (2018) Solid Waste Issue: Sources, Composition, Disposal, Recycling, and Valorization. Egyptian Journal of Petroleum, 27(4): 1275-1290

[2] Akanbi, O.A. (2019) Malnutrition and Its Impacts on the Rural Infants: An Example from Kuje Area Council, Federal Capital Territory-Nigeria. Social Science Learning Education Journal, 4(4).

[3] Enebeche, J.C and Ani, N.R (2017) Solid Waste Disposal Methods Practiced by Inhabitants of a Typical Nigerian Rural Community. International Journal of Advanced Research (Ijar)

[4] Bakare, W (2019) Solid Waste Management in Nigeria. Retrieved on 22/12/19 from https://www.bioenergyconsult.com/solid-waste-nigeria/

[5] Bello, I.A, Ismail, MN..B, Kabbashi, N.A. (2016) Solid Waste Management in Africa: A Review. Int J Waste Resource, 6: 216. D

[6] Cancin, H. and Adekoya, O.A. (2016) Ethnic and Religious Crises in Nigeria: A specific Analysis upon identities (1999-2013).Retrieved from https://www.accord.org.za/ajcr-issues/ethnic-religious-crises-nigeria/

[7] Chinedu, Ezeibe, Anijiofor and Daud (2018) Solid Waste Management in Nigeria: Problems, Prospects, and Policies. Journal of Solid Waste Technology and Management, 44(2):163-172.

[8] Emenike, C.U, Iruriaga, E, Agamuthu,PE and Fauiziha, SH (2013) Waste Generation in Africa: An Invitation to Wealth Generation. Proceedings of the International Conference on Waste Management and Environment, 2013, ICWME, University of Malaya, Kuala Lumpur, Malaysia, 26 – 27th August, 2013.

[9] Department of Environmental Affairs (2012) National Waste Information Baseline Report.

[10] Department of Environmental Affairs, Pretoria, South Africa.

[11] IFAD (2014). Rural Poverty in Nigeria. IFAD. Retrieved from. http://www.ruralpovertyportal.org/web/Rural-povertyportal/country/home/tags/Nigeria.

[12] Ippmedia (2017) Importance of Agricultural Sector in a Country's Economy. Retrieved from www. Ippmedia.com

[13] Kadafa, A.A. (2017) Solid Waste Management Practice of Residents in Abuja Municipalities (Nigeria). Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT) 11, (Issue 2) Ver. I: 87-106.

[14] Kaza, S, Yao, L.P, Bhada-Tata, P, and Van Woerden, F. (2018) What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050.Retrieved from https://openknowledge.worldbank.org/handle/10986/30317.

[15] Kristiansen, T (2018) Massive Waste in African Megacities Calls for Sustainable Waste-to-Energy Facilities .Retrieved on 22/12/2019 from https://www.cowi.com/insights/massive-waste-in-african-megacities-calls-for-sustainable-waste -to-energy-facilities

[16] Mail and Guardian (2018). The Future of Waste Management in Africa. Special Report: Retrieved 0n 22/12/19 from https://mg.co.za/article/2018-04-20-00-the-future-of-waste-management-in-africa.

[17] Mihai, F and Taherzadeh, M.J. (2017) Rural Waste Management Issues at Global Level. Retrieved from https://www.intechopen.com/books/solid-waste- management-in-rural- areas/introductory-chapter-rural-waste-management-issues-at-global- level

[18] Ogunniran, (2019) Harmful Effects and Management of Indiscriminate Solid Waste Disposal on Human and its Environment in Nigeria: A Review .Glob J Res Rev Vol.6 No.1:1.

[19] Okeke, C.C. (2017) Nigeria: Addressing Menace of Poor Waste Management in Nigeria. Retrieved from https://allafrica.com/stories/201708300587.html

[20] Poswa, T.T. (2004) The Importance of gender in waste management planning: A Challenge for Solid Waste Managers on 8th World Congress Environment Health, https://www.academia.edu/6889691/Importance_of_Gender_in_Waste_Management_A_Challenge_for_Solid_Waste_Managers, 2004).

[21] Taherzadeh MJ, Rajendran K. (2015) Factors Affecting the Development of Waste Management. Experiences from Different Cultures. In Ekström K.M. (ed) Waste Management and Sustainable Consumption: Reflections on Consumer Waste. Routledge, Earthscan: 67-88.

[22] UNEP (2018) Africa Waste Management Outlook. United Nations Environment Programme, Nairobi, Kenya.

[23] Yiougo, LSA, Oyedotun, TDT, Some, CYC and Da, ECD (2013) Urban Cities and Waste Generation in Developing Countries: A GIS Evaluation of Two Cities in Burkina Faso. Journal of Urban and Environmental Engineering, 7 (2): 280-285.

[24] The World Bank (2019) Solid Waste Management. Retrieved from https://www.worldbank.org/en/topic/urbandevelopment/brief/solid-waste-management.

[25] WHO (2018) What a Waste: An Updated Look into the Future of Solid Waste Management. Retrieved from https://www.worldbank.org/en/news/immersive-story/2018/09/20/what-a-waste - an-updated-look-into-the-future-of-solid-waste-management

[26] Widyaningsih, Tjiptpherijanto, R.Widanarko, S and Seda, F. (2015) Linkage Model between Sustainable Consumption and Household Management. Procedia Environ, Sci, 28: 195-203

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