# ASSESSMENT OF SOLID WASTE MANAGEMENT IN KATSINA-ALA LOCAL GOVERNMENT AREA OF BENUE STATE

**KUHA, TAVERSHIMA BENJAMIN**
**Department of Public Health**
**Imo State University, Owerri**
**ICEP, Katsina-Ala Centre, Nigeria**


**&**
**IGBOKO, AONDOKIMBIR GABRIEL**
**Department of Public Health**
**Imo State University, Owerri**
**ICEP, Katsina-Ala Centre, Nigeria**

## ABSTRACT

*This study investigated solid waste management in Katsina-Ala Local Government Area of Benue State. Two research questions were raised and two hypotheses were formulated for the study. The study adopted descriptive and perceptual research design. The population was all the inhabitants in Katsina-Ala Local Government Area of Benue State among whom a sample of 300 respondents was drawn through multistage sampling technique. The instrument for data collection was a structured questionnaire titled 'Solid Waste Management Questionnaire, SWMQ'. The study found out that economic factors significantly influenced solid waste management in Katsina-Ala Local Government Area of Benue State and developmental policies significantly influenced solid waste management in Katsina-Ala Local Government Area of Benue State. Based on the findings above, it can be concluded that the presence of improperly managed solid waste across the length and breadth of Katsina-Ala Local Government Area of Benue State is as a result of many intervening variables such as economic factors as well as developmental challenges. The researchers recommended that there should be general awareness campaigns in order to influence people's behaviour there needs to be a carefully planned engagement strategy and that there should be adequate town planning and developmental policies that facilitate effective solid waste management.*

**Keywords: Assessment, Challenges, Solid Waste Management, Katsina-Ala.**

**Background of the Study**

Solid waste management is a term that refers to the storage and disposal process for solid wastes. This also provides recycled options for things that don't belong to trash or waste. As long as humans have lived in villages and rural areas, the problem has been trash or solid waste. The solid waste management used in solid, liquid, and gaseous waste disposal [Okeniyi & Anwan, 2022]. It is known as a realistic method of disposal of certain toxic waste products (such as medical organic waste). Incineration is a controversial waste disposal process, owing to concerns including gaseous pollutant pollution. The most significant justification for recycling waste is to protect the environment and the public health. Garbage and waste can pollute the air and water. It is also recognized that decaying garbage releases

poisonous gases that interact with the atmospheric air and can cause respiratory issues in people.

Solid Waste Management (SWM) has been recognized as one of the biggest challenges facing municipal authorities across the world, as a result of population growth, urbanization, and poverty. Less Economically Developing Countries (LEDCs) in general, have a higher population-growth rate of 2.4% per year compared to 0.8% in More Economically Developing Countries (MEDCs) (UNDP, 2021). Since 2017 more than half of the world's population has been living in urban centres (Toyobo Oyeleke,  & Amao, 2018) and the figure is expected to exceed 70% by 2050 (UN, 2018). Categorization and comparison of solid industrial waste based on the thermo-chemical properties. Municipal solid waste (MSW) has usually been divided into six categories. food residues, wood waste, pulp, textiles, plastics, and rubber. Products may be further divided into subgroups within each grouping. Properly regulated waste will support the society economically and socially through recycling and, where possible, reusing waste. Solid waste treatment main elements include on-site managing, processing and storing; garbage collection; waste management transfer and transport, reduction and final disposal. Solid waste involves trash, building rubble, industrial refuse, sewage or waste disposal sludge or air quality control plants, among the other recycled items (Uchendu, 2016].

The practices related to urban solid waste management from the point of generation before final disposal can be divided into the six functional components. They are generation of waste; storage of waste; collection of waste; transportation of waste; process of segregation and disposal of waste. The criterion typically used to categorize countries based on their economic status are Gross Domestic Product (GDP), Gross National Product (GNP), Gross National Income (GNI), level of industrialization, Human Development Index (HDI), level of infrastructure and general standard of living (World Bank, 2017). A number of studies have been undertaken highlighting the serious solid waste management (SWM) challenges being faced in across the globe including the work of Visvanathan and rankler (2019), Umaru, I. (2020), Salau, Sen, Osho and Adejonwo-Osho (2016), and Williams, Gerba, Maxwell and Sinclair (2021). Identified challenges from literature include increasing waste generation, inadequate waste collection, improper waste disposal, lack of legislation, lack of finance, lack of organizational leadership, perception that the service should be provided for free, and unskilled workers. Other challenges include increasing population, rapid urbanization, industrialization, economic development and lack of involvement of householders. These challenges have resulted in solid waste being managed poorly, leading to waste being dumped openly in streets, streams, and open burning, with consequent adverse health, social and environmental effects on society (Vivan, Bijim, Balasom. & Okafor, 2015). Solomon (2020) has reported on the loss of lives, spread of diseases and flooding as a consequence of poor waste management. Sha'Ato, Aboho, Oketunde,  Eneji,  Unazi and Agwa (2017) has warned that this global problem has to be handled properly otherwise it is a danger to public health and the environment. It emphasized that it is an issue related directly to the way society manufactures and consumes goods, and it concerns everyone.

The World Bank (2014) reported that Nigeria is in acute poverty, with the per capita national poverty rate placed at 33.1%. It ranked Nigeria 3rd on World Poverty Index after India and China respectively. Those who fall under the poverty line, as defined by the World Bank, earn

less than $1.25 (0.96 GBP) per day. The report also stated that 7% of 1.2 billion people living below the poverty line worldwide are Nigerians. The National Housing Policy (2006) estimated that approximately 80% of the population of Nigeria is classified as low income, and receive inadequate solid waste management services. It is estimated that 0.49 kg of waste is generated per capita per day in Nigeria with households accounting for about 90% of the municipal solid waste generated (Solomon, 2020). The increasing population of low income areas coincides with subsequent increases in municipal solid waste generation (Sambo, 2020). The total municipal solid waste generated in urban areas in Nigeria was estimated to be 40,959 tonnes per day in 2022, and by 2025 it is estimated it will rise to 101,307 tonnes per day. According to Nzeadibe and Ajaero (2020) Nigeria faces many challenges in meeting the needs of the growing urban population including provision of infrastructure, employment, as well as basic services such as health care and solid waste management. Less than 50% of solid waste is collected in Nigeria and only 5% is recycled.

Inadequate access to solid waste management contributes towards illnesses such as diarrhoea, dysentery and typhoid. Literature indicates that much attention has been given to waste management problems in Nigeria (Nwosu, Omokhudu & Ahijo, 2016), but household waste management in low income areas is one of its greatest challenges. Sambo's (2020) prediction on the global waste increases by 2025 is concerning, and with the rising population, rapid urbanization, increasing waste levels, and already limited infrastructure, countries like Nigeria face increasing challenges in managing their waste. These challenges could be found existing in Katsina-Ala Local Government Area of Benue State spurring the need for a research to determine the solid waste management practices in the area, hence, the present research.

## Statement of the Problem

Proper solid-waste management is important aspect for the protection of public health, safety, and environmental quality. Growing amounts of global consumption and waste production, combined with high density low income living environments and very little to no road access are just some of the problems facing unplanned areas in Benue State. Some studies on Solid waste management have been carried out and literature review indicates that, there is little information on the service efficiency and effectiveness of solid waste management in particular collection and transportation aspects in solid waste management in Katsina-Ala Local Government Area of Benue State. Contact with unsafe drinking or bathing water can impose serious risks (both acute and delayed) to human health. Microbe contamination of groundwater due to sewage outfalls and high concentration of nutrients in marine and coastal waters due to agricultural runoff are among the most serious threats. Although epidemiological studies have provided evidence of severe morbidity attributed to polluted water the issue has received limited attention in terms of valuation studies. Better solid waste management, with improved waste collection improves the health of all citizens, supports environmental sustainability, enhances the scenic beauty and facilitates economic development. Unfortunately, Katsina-Ala Local Government Area of Benue State seems alienated from this phenomenon described above.

Similarly, workers may be exposed to the same potential hazards as the general population, although the amount of exposure and risk may differ. The type of work varies between waste management options with some, such as landfill and incineration, being more automated than others, such as waste collection, sorting and recycling. The incidence of occupational accidents

in waste collection workers has been found to be higher than the general workforce. The work of waste collectors involves considerable heavy lifting as well as other manual handling of containers, increasing the risk of musculoskeletal problems.  It has been suggested that increased exposure to bio-aerosols and volatile compounds may lead to elevated incidence of work-related respiratory gastrointestinal and skin problems in waste collections compared to the general workforce. The researcher speculates that there could be challenges of solid waste management in Katsina-Ala Local Government Area of Benue State as the area is home to littered solid waste products. The problem of this study is thus. What are the challenges of solid waste management in Katsina-Ala Local Government Area of Benue State?

## Research Questions
The following research questions were raised for the study:
  i.   What are the economic factors acting as challenges of waste management in Katsina-Ala Local Government Area of Benue State?
  ii.  What are the development policies acting as challenges in waste management in Katsina-Ala Local Government Area of Benue State?

## Hypotheses
The following research hypotheses were formulated for the study:
  i.   Economic  does not significantly impact on solid waste management in Katsina-Ala Local Government Area of Benue State;
  ii.  There is no significant impact of development polices on solid waste management in Katsina-Ala Local Government Area of Benue State?

## Scope of the Study
The study covered the entire Katsina-Ala Local Government Area of Benue State. However, sampled rural and urban areas in the area of study were used for the study. The variables of the study include economic factors and developmental policies. The study is conducted in the rainy season which makes it easy to identify areas of solid waste disposal sites.

## METHODOLOGY
### Research Design
Descriptive survey design was adopted for this study. This research design was appropriate for this study because it enabled the researcher to get opinions or perceptions of a sample of respondents drawn from a larger population that could not be completely studied. The design also enabled the researcher to draw inference from the responses of the sampled respondents that was generalized on the entire population.

### Area of the Study
The study was conducted in the primary healthcare centres in Katsina-Ala Local Government Area of Benue State. The local government area was created in 1976 and has a land mass of 2,402km$^2$ and a population of 224,718 at the 2006 census. The major indigenes of the area are Tiv, Etulo and Nyifun with some Ibo, Hausa and Yoruba settlers. The major economic activities by the indigenes are farming and fishing.

### Population of the Study

The population of the study is made up of all the rural and urban areas in Katsina-Ala Local Government Area of Benue State. The population of the respondents consists of accessible persons in the area of study.

### Sample and Sampling

The sample for this study comprised 300 persons drawn through cluster sampling and accidental sampling techniques were employed in drawing the sampling. The researchers first and foremost sampled all the rural and urban settlements in the area. After that, the researcher visited the sampled areas and administered the instrument on whoever was found in the household at the time of the study.

### Instrumentation

One instrument was used for data collection. It was a structured questionnaire titled "Solid Waste Management Questionnaire, SWMQ. The questionnaire consisted of Parts 'I' and 'II'. Part 'I' contained a letter of introduction to the respondents. Part 'II' of the questionnaire consisted of two (2) clusters named Section A and B. The response format was Strongly Agree, Agree, Disagree and Strongly Disagree. Section A contained items are concerned with the influence of economic factors on solid waste management in Katsina-Ala Local Government Area of Benue State. Section B elicited information on the influence of development policies on solid waste management in the area of study.

### Method of Data Collection

The instruments were administered on the respondents by the researchers. A total number of 300 copies of the questionnaire were taken to the field and administered to the respondents and copies were returned.

### Method of Data Analysis

The descriptive statistics of Mean Score (x) and $\overline{w}$as used to answer the three (3) research questions. A cut-off point of 2.50 was used for decision making. The mean score of 2.50 and above was not rejected as having the desired influence while a mean score of less than 2.50 was rejected as having an influence. The Chi-Square test statistics was used to test the hypotheses at 0.05 level of significance.

### Analysis of Data

The analysis of data generated was done based on the raised research questions and hypotheses.

*Research Question 1*: What are the economic factors challenges in waste management in Katsina-Ala Local Government Area of Benue State?

Data answering the above research question are presented on Table 1.

*Table 1. Mean Scores on the Influence of Economic factors on Solid Waste Management in Katsina-Ala Local Government Area of Benue State*

| Item No | Item Description | N | SA | A | D | SD | $\bar{X}$ | Decision |
|---|---|---|---|---|---|---|---|---|
| 1 | Financial strength of environmental agencies | 300 | 199 | 22 | 16 | 8 | 3.94 | Agree |
| 2 | Waste management agencies are not involved in budgetary allocations | 300 | 112 | 94 | 11 | 32 | 3.86 | Agree |
| 3 | Waste management departments are overlooked and underfunded | 300 | 221 | 14 | 23 | 11 | 3.62 | Agree |
| 4 | People are not used to paying for municipal waste management | 300 | 242 | 32 | 9 | 4 | 2.72 | Agree |
| | Cluster | | | | | | 3.24 | |

.

Table 1 shows the Mean Score of respondents' opinions on the influence of economic determinants in solid waste management in Katsina-Ala Local Government Area of Benue State. The result from the data analysis shows that all items had a mean score above 2.50 indicating that respondents agreed with all the items as the influence of economic determinants on solid waste management in Katsina-Ala Local Government Area of Benue State.

**Hypothesis 1**: There is no significant impact of economic factors on solid waste management in Katsina-Ala Local Government Area of Benue State.

*Table 2. Chi-square Analysis on the Influence of Economic Factors on Solid Waste Management in Katsina-Ala Local Government Area of Benue State*

| Opinions | Observed N | Expected N | Residual | Level of Sig. | df | $\chi^2$-cal | P-value | Decision | Nature of Influence |
|---|---|---|---|---|---|---|---|---|---|
| SD | 25 | 75 | -50 | .05 | 3 | 472.91 | .00 | Significant | Positive |
| D | 13 | 75 | -62 | | | | | Ho rejected | |
| A | 78 | 75 | 3 | | | | | | |
| SA | 194 | 75 | 119 | | | | | | |

(P-value=0.00; P=0.00>0.05; Ho rejected; Positive Influence).

Table 2 shows Chi-square ($\chi^2$) value of (3df) = 472.91 P<0.05 and Ho rejected. This result shows that the null hypothesis which states that there is no significant impact of economic factors on solid waste management in Katsina-Ala Local Government Area of Benue State was rejected. This implies that economic factors cumulatively have a significant effect on solid waste management in Katsina-Ala Local Government Area of Benue State.

Research Question 3. What are the developmental issues acting as challenges to solid waste management in Katsina-Ala Local Government Area of Benue State?

*Table 3. Mean Scores on the Influence of Developmental Policies on Solid Waste Management in Katsina-Ala Local Government Area of Benue State*

| No | Item Description | N | SA | A | D | SD | $\bar{X}$ | σ | Decision |
|---|---|---|---|---|---|---|---|---|---|
| 5 | There is unplanned nature of municipalities | 300 | 144 | 129 | 16 | 18 | 2.62 | .93 | Agree |
| 6 | The increasing waste generation due to population increase | 300 | 139 | 181 | 10 | 42 | 3.49 | .82 | Agree |
| 7 | The rapid urbanization has resulted to poor solid waste management | 300 | 102 | 154 | 34 | 7 | 2.51 | .94 | Agree |
| 8 | The rapid industrialization is responsible for poor solid waste management | 300 | 139 | 128 | 12 | 58 | 3.75 | .61 | Agree |
| | Cluster | | | | | | 2.81 | 0.75 | Agree |

Table 3 shows the Mean Score of respondents' opinions on the influence of Developmental Policies on solid waste management in Katsina-Ala Local Government Area of Benue State. The result from the data collected and analyzed shows that all items had a mean score above the cutoff point. This indicates that respondents agreed with all items as the developmental policies influencing solid waste management in Katsina-Ala Local Government Area of Benue State.

*Hypothesis 2.* There is no significant impact of developmental factors on solid waste management in Katsina-Ala Local Government Area of Benue State.

*Table 4. Chi-square Analysis on the Influence Development Factors on Solid Waste Management in Katsina-Ala Local Government Area of Benue State*

| Opinions | Observed N | Expected N | Residual | Level of Sig. | df | $\chi^2$-cal | P-value | Decision | Nature of Influence |
|---|---|---|---|---|---|---|---|---|---|
| SD | 11 | 75 | -64 | .05 | 3 | 512.72 | .00 | Significant | Negative |
| D | 28 | 75 | -47 | | | | | Ho rejected | |
| A | 79 | 75 | 4 | | | | | | |
| SA | 182 | 75 | 107 | | | | | | |

(P-value=0.00; P=0.00>0.05; Ho rejected; Positive Influence)

Table 4 shows Chi-square ($\chi^2$) value of (3df) = 512.72, p<0.05 and Ho rejected. The results show that the null hypothesis which states that there is no significant impact of developmental factors on solid waste management in Katsina-Ala Local Government Area of Benue State was rejected. This result shows that developmental policies negatively influenced solid waste management in Katsina-Ala Local Government Area of Benue State leading to rapid social economic development of the region.

## 11. Discussion of Findings

The first finding of this study was that, null hypothesis which states that economic factors significantly impact on solid waste management in Katsina-Ala Local Government Area of Benue State in Katsina-Ala Local Government Area of Benue State was rejected. This implies that economic factors have influence on solid waste management in Katsina-Ala Local Government Area of Benue State. Enwerekowe (2021) also found out that the negative waste disposal habit of most people in Lagos is fuelled by severe economic factors.

The second finding of the research shows that the null hypothesis which states that there is no significant impact of development policies on solid waste management in Katsina-Ala Local Government Area of Benue State was rejected. The implication of this finding is that solid waste management is influenced by development policies in the area of study. This result corroborates previous findings by Ogwueleka (2020) who found out that environmental agencies are not involved in town planning and housing management which result in poor development policies that exacerbate solid waste generation.

## Conclusion

Based on the findings above, it can be concluded that the presence of improperly managed solid waste across the length and breadth of Katsina-Ala Local Government Area of Benue State is as a result of many intervening variables such as economic factors as well as developmental challenges.

## Recommendations

- ➲ There should be general awareness campaigns in order to influence people's behaviour there needs to be a carefully planned engagement strategy.
- ➲ There should be adequate town planning and developmental policies that facilitate effective solid waste management.

## REFERENCES

Enwerekowe, E.O. (2021). An appraisal of waste management system systems for informal settlement within Katsina-Ala urban areas in Nigeria. Journal of Sciences and Multidisciplinary Research, 3

Gall, S.C. & Thompson, R.C. (2015). The impact of debris on marine life. Marine Pollution Bulletin, 92 (1–2), pp. 170-179.

Kogers, S.M. Schettler, T. & Weiss, B. (2018). Environmental Toxicants and developmental disabilities. A challenge for psychologists. American Psychologist.60(3), pp. 243 –255.

Longe, E.O. & Balogun M.R. (2020). Groundwater Quality Assessment near a Municipal Landfill, Lagos, Nigeria. Research Journal of Applied Sciences, Engineering and Technology. 2(1), pp. 39-44.

Nwosu, C. Omokhudu, G. & Ahijo, T. (2016). An Assessment of Open Dumps and Landfill Management in the Federal Capital Territory, Nigeria- Using Scotland as a Case Study for Structural Development. Journal of Environment and Earth Science. 6 (7), pp. 78-91.

Nzeadibe, T.C & Ajaero, C.K. (2020). Assessment of socio-economic characteristics and quality of life expectations of rural communities in Enugu State, Nigeria. Applied Research in Quality of Life. 5 (4), pp. 353-371.

Okeniyi, J. O. & Anwan, E.U. (2022). Solid Wastes Generation in Covenant University, Ota, Nigeria. Characterisation and Implication for Sustainable Waste Management. Journal Material Environmental Science. 3 (2), pp. 419-424.

Salau, O. Sen, L. Osho, S. Adejonwo-Osho, O. (2016). Empirical Investigation of Formal and Informal Sectors in Waste Recycling of the Municipal Waste Management System of Developing Countries. The Case Study of Lagos State.Journal of Environment and Ecology. 7, (2), pp. 21-33.

Sambo, A. S. (2020). Renewable Energy Development in Nigeria. http://www.worldfuturecouncil.org/fileadmin/user_upload/PDF/PkfAE._BalaNigerian_Energy_Commission_Renewal_Energy_Development_In_Nigeria.pdf.

Sha'Ato, R. Aboho, S.Y. Oketunde, F.O. Eneji, I.S. Unazi, G. & Agwa, S. (2017). Survey of solid waste generation and composition in a rapidly growing urban area in central Nigeria. Waste management. 27(3), pp. 352-358.

Solomon, U.U. (2020). The state of solid waste management in Nigeria. Waste Management. 29, pp. 2787-2790.

Toyobo, A.E. Oyeleke, O.J. & Amao, F.L. (2018). Sachet water Hawking and Environmental effects in Ikeja, Lagos. International Journal of Physical and Human Geography. 1(1), pp. 18-25.

Umaru, I. (2020). Recycling of solid waste and the "Yan Bola" Underground Economy. A survey of Environmental Entrepreneurs in Central Nigeria. Journal of Human Ecology. 30 (1), pp. 45-54.

Visvanathan, C. & Trankler, J. (2019). Municipal solid waste management in Asia- a comparative analysis. Workshop on Sustainable Landfill Management 3–5 December, 2019; Chennai, India, pp. 3-15.

Vivan, E.L. Bijim, C.K. Balasom, M.K. & Okafor, J.C. (2015). The development of non-town planning legislations/policies to the development and practice of town planning in Nigeria. 3 (11), pp. 52-58.

World Bank. (2017). Nigeria - Private sector participation in solid waste management activities in Ibadan. Washington, D.C. World Bank Group. http://documents.worldbank.org/curated/en/221251487249039986/Nigeria-Privatesector-participation-in-solid-waste-management-activities-in-Ibadan.