TIMBOU-AFRICA PUBLICATION INTERNATIONAL JOURNAL NOVEMBER, 2024 EDITIONS.

INTERNATIONAL JOURNAL OF BUILT ENVIRONMENT AND EARTH SCIENCE
VOL. 6 NO. 4 E-ISSN 3027-1606 P-ISSN 3027-0049

WASTE MANAGEMENT PRACTICES IN ALIMOSHO LOCAL GOVERNMENT AREA, LAGOS, NIGERIA

ADEMOLA FARINMADE; OMOBOLANLE AKINOLA; & MOBOLAJI BABALOLA

Department of Urban and Regional Planning, University of Lagos, Nigeria.

Corresponding Author: *afarinmade@unilag.edu.ng*

DOI: https://doi.org/10.70382/tijbees.v06i4.002

ABSTRACT

The study delves into the waste management strategies in Alimosho local government area, with Ile Epo as a focal point. The study aims to analyze the current waste generation pattern and disposal methods in the area, evaluate the effectiveness of existing waste management strategies, and assess the health implications of waste management practices in the locale. A total of 155

Introduction

A stark reality of living is that waste must be generated. Different societies have adopted different methods to ensure that waste is effectively managed. The management of waste, particularly inorganic ones, have proved difficult because unlike organic waste, inorganic waste do not decompose and become reconstituted into different organic materials (Babalola et al, 2020). Global Waste Management Market Report (2017) approximated that the total amount of global municipal solid waste (MSW) since 2003 was 2.02 billion tones, an annual increase of 7% and 37.3% between 2007 and 2011 which elicits about 8% annual increase. It has been noted that most developing nations have problem of managing their solid waste (Onibokun, 1919). Some of these municipal waste generated are not properly disposed, some are dropped in the open, drains,

questionnaires were distributed to gather data on socioeconomic characteristics, waste generation, waste management techniques, and health challenges associated with waste management. A simple random sampling method was employed to select households in the designated buildings. Data analysis involved both descriptive and quantitative statistical methods. The study findings were visually presented through tables and charts. The analysis uncovered that a substantial proportion of respondents are employed (23.23%), with students and unemployed individuals constituting 0.65% and 6.45% respectively. The majority of households dispose of waste on a daily basis (85.16%), predominantly through incineration (79.35%) and open dumping (89.03%), with limited utilization of recycling or composting practices. ANOVA results demonstrated significant discrepancies in satisfaction levels among respondents regarding current waste management practices ($p<0.001$). Regression analysis indicated a moderate positive correlation between the neutral category and overall satisfaction ($R2 = 0.12$, $p < 0.001$). Furthermore, the results revealed an R value of 0.35, indicating a considerably strong positive relationship between satisfaction levels and waste management practices. An overwhelming 99.35% of respondents reported health issues potentially linked to waste management practices, such as skin infections and gastrointestinal problems. The study proposes various recommendations including enhancing infrastructure, increasing waste collection frequency, investing in modern processing facilities, and advocating for community engagement and education to enhance waste management practices and mitigate health impacts.

Keywords: Waste Management, Strategies, Waste Generation, Waste Disposal, Socio-Economic Characteristics.

wetlands, watercourses, dumpsites or taken to burrow pit, without considering proper way of recycling (Adogu, 2015; Olukanni et al., 2015).Waste Management is the process of generation, proper and effective collection, transportation, and disposal of wastes (Idowu et al., 2018). Poor management scheme in developing countries makes waste

management issues alarming. In Africa, Rapid growth in Urbanization and Industrialization gradually increases population, this invariably increases the rate of waste generation. (Gibson & Gunmu, 2014). Solid waste are left over from Hospitals, offices, companies, schools and homes through food, papers, and plastic appliances, clothing and other holds equipment (EPA, 2021).

With reference to Nigeria, Ikelegbo (2007) listed the problems of Waste Management Agencies as lack of budget, insufficient statistics on the amount and structure of the solid waste, absence of recycling method, and inadequate bylaws and regulations. Ihuoma (2016) submitted that the practice has been responsible for messing up of the surroundings, thereby creating unpleasant ambient for both the environment and economy posing problems to sustainable urban design.

Lagos State is an urban city that has residents of over twelve million, it is the largest and the most economically valuable state in Nigeria. Vanguard (2010) & Bakare (2016) described Lagos as the main profitable state in Nigeria, it is referred to as number two city in Africa, and number seven in the world (Adeyanju 2017). It is geographically located on a relatively small area, therefore has the challenge of municipal waste management in terms of efficiency and cost effectiveness waste. Lagos produces more than nine thousand to ten thousand tons of urban waste daily. Lagos Waste Management Authority has the responsibility of managing all the waste in Lagos through the collection, transportation and disposal structure. (LAWMA 2020).

The city of Lagos faces significant waste management challenges. The city generates approximately 13,000 tons of waste daily (Lagos State Government, 2020), with only 40% collected and disposed of properly (Adeleke,2022). The remaining 60% ends up illegal dumpsites, waterways and public spaces, contributing to environmental degradation and health risks (Olufemi, 2021). Improper waste disposal in Lagos State has been responsible for air pollution, flooding and blockage of drainage, especially due to the habit of throwing wastes from moving vehicles (Akoni, 2014).

The population of Lagos is expected to double by the year 2050 (Opejin, 2014). This translates into an increase in population of more than ten million people with the attendant increase in inorganic waste generation. Waste

generation is also estimated at 0.5kg per capita per annum (Opejin, 2014). These statistics necessitate the exploration of robust and sustainable waste management options, the absence of which might portend disastrous environmental catastrophes., The city of Lagos faces significant waste management challenges. The city generates approximately 13,000 tons of waste daily (Lagos State Government, 2020), with only 40% collected and disposed of properly(Adeleke,2022). The remaining 60% ends up illegal dumpsites, waterways and public spaces, contributing to environmental degradation and health risks (Olufemi, 2021). Improper waste disposal in Lagos State has been responsible for air pollution, flooding and blockage of drainage, especially due to the habit of throwing wastes from moving vehicles (Akoni, 2014). One of the challenges in urban cities like Lagos is the large amount of solid waste from human settlements as a result of the affinity between Population and waste management (Zerbock, 2013), as collaborated in (Olorunfemi, 2011; Adekunle et al., 2012). Invariably, this pose a great danger and risk to the health of people in such communities.Both the waste management authorities and all the households need to rise up to the present situation without compromising the future. No urban system can be sustainable if waste generated is more than the ones disposed. This study aims at assessing waste management practices in Alimosho Local Government of Lagos State as a sustainable urban city, using Ile Epo as case study.

Literature Review

The inefficiencies that manifest through mankind's quest to convert resources from one form or use to other leads to the generation of a by-product, a form of entropy, which is deemed as being no longer usefully available to its producer (Georgescu-Roegen, 1916). This valueless resource is a function of time, space and culture and has proven to be one of the greatest challenges to human development in the 21st century. This product is generically termed waste. Waste, in the context of this research, except where expressly stated, refers to solid waste arising from households, which is the subject of this study.

There are many types of waste — with the focus of this study on solid wastes, as opposed to waste water and sewage. More specifically, the focus

here is on the management of solid wastes from household sources and the interplay between household attitudes towards waste management issues and waste management policy in Developing Country cities.

The shift towards an increasing focus on waste management is justified in light of the various concerns that have being raised by different authors. Narayana (2019) have conceptualized waste management to be a perennial challenge in various countries of the world especially the developing ones. The author reported that the challenge is more aggravated because there is a correlation between increased waste generation and population explosion, industrial development and urbanization. This assertion is corroborated by Izeze (2016) who reported that the problems of solid waste management in developing countries resulted from the surges in urban population, constantly changing lifestyles and rapid industrialization. As Alam et al (2017) also noted, 'poorly managed wastes are perceived as environmental hazards of high significance and the inabilities of societies to manage waste generation effectively play no small role in increasing extant environmental pressures.

Olukanni et al (2014) have traced the increased focus on waste management to the increase in consumption which is a consequence of population increase complemented by rapid urbanization which have increased significantly the volume of waste generated. The author identified other causative factors as improvement in overall socio-economic status and increase in the rate of commercial activities which have necessitated increase in the rate of transformation of raw materials into finished products. These points are corroborated by Babayemi and Dauda (2019) and Olukanni and Akinyinka (2017). In the developed countries of the world there is a demonstrated healthy attitude towards sustainable waste management; this is because waste management is perceived as playing a policing role of ensuring that future generations are not subjected to deleterious consequences as a result of environmental choices made today (Khatib, 2021).

METHODOLOGY

This study adopts survey research design method because it allows the establishment of unique characteristics of the population and the ability to

develop a detailed picture and intensive knowledge of the case study. Data collection include data on pattern of waste generation and disposal, waste management strategies, socioeconomic characteristic of the respondents, and environmental and health impacts of waste management in the study area. Two main types data were considered for the study.The secondary data published material like journals, government official reports, published and some unpublished thesis works, reports of expert meetings, reports of workshops, and any other available data resource. The primary quantitative data used in this research was collected using questionnaires, structured to fit into the objectives of this study. This study also adopted interviews and observations as primary means of data collection. It also involves oral interviews with relevant stakeholders including informal workers. Pictures and video recordings were taken to validate the information obtained.

Target Population and Unit of Analysis

According to the most recent census and population data, Ile Epo has an estimated population of approximately 200,000 people.To determine the sample size needed to achieve a confidence level of 85% with a specified margin of error, the study used the following formula for sample size calculation for proportions:

$$n = \frac{Z^2 \cdot p \cdot (1-p)}{E^2}$$

where:

- n is the sample size
- Z is the Z-value (the number of standard deviations from the mean)
- p is the estimated proportion of the population that has the attribute of interest (if unknown, typically 0.5 is used for maximum variability)
- E is the margin of error

For an 85% confidence level, the Z-value is approximately 1.44 (from Z-tables).

Assuming the estimated proportion p is 0.5 (to ensure maximum variability), and we select a margin of error E of 5% (0.05):

n ≈154.73

Since the sample size must be a whole number, we round up to the nearest whole number:

≈ 155

The sampling technique include simple random sample of households in the selected buildings in the study area.This was implemented by administration of questionnaire to the first household contacted in the selected buildings. Thus a total of 155 questionnaires were administered in the study area to obtain data on socioeconomic characteristics, pattern of waste generation and disposal, waste management strategies and heath issues related to waste management among others. Descriptive as well as quantitative were used in the analysis. The findings of the study are presented graphically through tables, charts and graphs. These are made possible through the use of statistical analysis tools.

DATA ANALYSIS AND INTERPRETATION

As found in Table1, 26-35 year and 36-45 years are the dominant age groups, each constituting 43.87% of the sample. This suggests a mature population involved in various activities and likely facing practical challenges in waste management. 18-25 years represent a small fraction (1.94%), and 46-60 years make up 10.32%. Notably, no respondents are above 60, which may indicate either a low representation or a focus on younger,and working-age groups. The Male respondents (53.55%) slightly outnumber female respondents (46.45%). This balance is crucial for ensuring diverse perspectives on waste management issues. Both genders are equally engaged in waste generation and management practices, suggesting that waste management strategies should consider both male and female perspectives equally.A significant portion of respondents are employed (23.23%) while students and unemployed individuals make up 0.65% and 6.45%, respectively. The absence of self-employed and retired individuals in the sample might reflect specific sampling biases or the nature of the community surveyed. The employment status of respondents indicates that many are active contributors to the local economy and are likely to be directly impacted by and involved in waste management practices. A high percentage of respondents have

tertiary education (38.06%), followed by secondary education (25.81%) and primary education (21.94%). The percentage of respondents with no formal education is relatively low (14.19%), indicating a generally educated populace. Higher educational attainment suggests that respondents may have a better understanding of waste management issues, which could influence their attitudes and practices towards waste generation and disposal.

Table 1: Socioeconomic characteristics

Value	Frequency	%
18-35	3	1.94
26-36	68	43.87
36-45	68	43.87
46-60	16	10.32
Gender		
Male	83	53.55
Female	72	46.45
Occupation		
Self employed	108	69.68
Employed	36	23.23
Unemployed	10	6.45
Students	1	0.65
Levels of Education		
Tertiary	59	38.06
Secondary	40	25.81
Primary	34	21.94
No Formal Education	22	14.19

The results of Table 2 shows that the majority of households generate waste daily (85.16%). Daily waste generation highlights the need for frequent waste collection services and efficient waste management practices to handle the continuous waste output effectively. It is observed that all respondents generate organic (food waste), plastic, and paper waste, indicating these are the primary waste streams. Glass and metal waste is less common, with glass being noted by 10% of respondents and

metal not mentioned. The uniformity in types of waste generated (organic, plastic, and paper) indicates that waste management strategies should prioritize the handling and processing of these waste types. The minimal presence of glass and metal waste suggest these are not these are not major issues in the area.The dominant methods of waste disposal are curbside collection (58.71%) and drop-off at waste collection points (20.65%).

Table 2: Pattern of waste generation and disposal

Value	Frequency	%
Daily	132	85.16
Weekly	22	14.19
Monthly	1	0.65
Type		
Organic	155	100
Plastic	155	100
Paper	155	100
Glass	15	10
No. of bags of waste weekly		
Less than 1 bag	6	1.89
1-2 bags	147	94.84
3-4bags	2	1.29
Material of Disposal		
Curbside collection	91	58.71
Drop-off at waste collection Point	32	20.65
Dump in open space	25	16.13
Burning	1	0.65
Other	6	3.87

Table 3 shows a high awareness level (92.26%) of waste management services indicating that the majority of the population is informed about available services. The high awareness of services indicates that residents are informed about available options. The heavy reliance on government services points to a potential lack of private or community-based alternatives, suggesting a need for more diverse service

options.Government-provided services are the most utilized (85.81%), with private companies and community-based services being less common. It can be observed that weekly service is the most common (60%), with some areas receiving services monthly (23.87%) and daily (7.74%). Irregular services affect 8.39% of the population. This may lead to waste accumulation and management challenges, emphasizing the need for consistent service delivery.Many respondents are neutral (49.68%) about their satisfaction, with 29.68% being satisfied and 16.13% dissatisfied. The mixed satisfaction levels suggest that while some residents find the services adequate, there is room for improvement in service quality and consistency.As observed from the table, the prevalent waste management methods include incineration (79.35%) and dumping in open areas (89.03%), with minimal use of recycling or composting. The lack of recycling and composting initiatives indicates a significant opportunity for enhancing waste management practices through the introduction and promotion of these methods. Subjecting the results on the level of the respondents level of respondents to *ANOVA*, results indicate significant differences in satisfaction levels among respondents on the current waste practices in the study area ($p<0.001$),while the Regression analysis shows that the neutral category has a moderate positive relationship with overall satisfaction($R^2 = 0.12$, $p < 0.001$).

Table 3: Waste Management Strategies

Awareness of waste management Strategies		
Aware	143	92.26
Not aware	19	12.26
Waste management service being used		
Government Provided	133	85.81
Private Provided	4	2.58
Others	6	3.84
Frequency of Provision		
Daily	12	7.74
Weekly	93	60
Monthly	37	23.87
Irregularly	13	8.39
Level of satisfaction with the current service		
Very satisfied	5	3.23
Satisfied	46	29.68

Neutral	77	49.68
Dissatisfied	25	16.13
Very dissatisfied	2	1.29
Management being used in your area		
Dumping in open areas	138	89.03
Incineration	123	79.35
Land-filling	1	0.65
Others	24	15.48

In order to test whether waste management practices in the study area impact the level of residents satisfaction significantly was used to determine the linear relationship between the two variables. The result in Table 5 reveals the value of R to be 0.35, which suggests a significant strong positive relationship between the level of satisfaction and management practices in the study area. The relationship rejects the null hypothesis that there are no significant relationship between the residents satisfaction and the waste management practices in the study area. This regression is significant in explaining the variance in the level of resident satisfaction with the waste management practices in the study area (Table 5).

Table 4. Analysis of variance on the residents satisfaction with the waste management practice

Model	R	Adjusted R^2	F	p value
1	0.35	0.12	141.19	< 0.001

The study also conducted analysis of variance to show if the variation in the respondent satisfaction is statistically significantly different. The Table 5` show the outcome of the findings. The F statistic value is statistically significant(4.990) =12.15 : p< 0.05. This implies that waste management practices significantly influence residents satisfaction

Table 5. Regression analysis on the residents satisfaction and waste management practice

Model	Sum of square	DF	Mean square	F	P.value
Between groups	240.13	4	60.03	12.15	< 0.001
Within groups	4833.87	990	4.88		
Total	5074	994			

Discussion of Findings

The survey conducted in Ile Epo, Lagos State, provides an in-depth look at the current state of waste generation and management in the area, revealing critical insights into demographic characteristics, waste generation patterns, disposal methods, existing waste management strategies, challenges, and environmental and health impacts. This comprehensive summary synthesizes these findings to offer a detailed understanding of the waste management landscape in Ile Epo. The interviewed respondents reported health issues potentially related to waste management practices, primarily involving skin infections and gastrointestinal problems.

Demographics and Waste Generation Insights

The demographic profile of respondents shows a significant representation of individuals aged between 26-35 and 36-45 years, each comprising 43.87% of the sample. This suggests that the majority of waste generators in Ile Epo are working adults, likely balancing professional and personal responsibilities. This age group's substantial presence implies a need for waste management solutions that cater to the needs of busy households and working individuals. The younger (18-25) and older (46-60) age groups are less represented, indicating that while these groups contribute to waste generation, their impact is relatively smaller.

The gender distribution among respondents is almost evenly split, with males constituting 53.55% and females 46.45%. This balance implies that waste management strategies should be designed to engage all genders equally, ensuring that neither group is overlooked in waste management programs and initiatives.

Education levels among respondents reveal a predominantly educated population, with the majority holding tertiary (38.06%) or secondary (25.81%) education. The proportion of individuals with no formal education stands at 14.19%. This high level of education suggests that residents are likely to be more informed about waste management practices and the environmental implications of waste disposal, which can influence their engagement in and receptivity to waste management programs.

Patterns of Waste Generation and Disposal

The survey indicates that waste generation in Ile Epo is predominantly a daily activity, with 85.16% of households generating waste every day. This high frequency of waste generation highlights the need for frequent and reliable waste collection services to manage the continuous flow of waste effectively. Weekly waste generation is reported by 14.19% of respondents, with minimal representation for bi-weekly or monthly waste generation.

In terms of waste types, respondents report generating organic waste (food scraps), plastic, and paper waste uniformly, with each category at 100%. This consistency across waste types indicates that waste management strategies in Ile Epo should prioritize the handling and processing of these materials. Glass and metal wastes are less commonly generated, with glass being reported by only 10% of respondents and metal not reported at all. This suggests that while these materials are present, they do not constitute a significant portion of the overall waste stream.

Regarding the volume of waste generated, most households (94.84%) produce 1-2 bags of waste weekly. This manageable volume suggests that while the amount of waste is not excessive, effective collection and disposal are necessary to prevent accumulation and potential environmental issues.

Current Waste Disposal Methods

The primary methods of waste disposal in Ile Epo include curbside collection (58.71%) and dumping in open spaces (16.13%). Burning of waste is infrequent (0.65%), and there is no reported use of burial as a disposal method. The reliance on curbside collection indicates that a substantial portion of the population depends on formal waste management services, while open dumping reflects a significant gap in the waste collection infrastructure and highlights areas where illegal or improper disposal practices are prevalent.

Existing Waste Management Strategies and Services

Awareness of waste management services in Ile Epo is high, with 92.26% of respondents aware of the available services. Government-provided services are the most utilized (85.81%), indicating a reliance on public sector solutions for waste management. The frequency of waste management

services varies, with weekly collection being the most common (60%), followed by monthly (23.87%) and irregular (8.39%) services. Daily waste collection services are reported by only 7.74% of respondents, highlighting a need for more frequent service provision to meet the daily waste generation needs of the community.

Satisfaction with current waste management services is mixed, with 49.68% of respondents neutral about the services, 29.68% satisfied, and 16.13% dissatisfied. This suggests that while some residents find the services adequate, there is considerable room for improvement in service quality and consistency.The ANOVA results shows significant differences in satisfaction levels among respondents ($p > 0.001$) while Regression analysis shows that Neutral category has a moderate relationship with overall satisfaction ($R^2 = 0.12$, $p < 0.001$). The neutral dominance suggests a need for increased community awareness and education on waste management practices in the area.This is consistent with the observation of Li et al.(2020) that noted that waste collection frequency and environmental awareness significantly influence public satisfaction($R^2 = 0.35$, $p < 0.001$) and that of Adewale, O.S.,et al (2021) that revealed low public satisfaction with waste management in Nigeria. The findings reported in this study are also consistent with the outcome of studies conducted by Ahmed, S.R.,et al. (2023), Chen,L.,et al.(2023), Mugo,J.K., et al. (2023) and Singh, O., et al. (2023). The methods of waste management currently employed in Ile Epo include incineration (79.35%) and dumping in open areas (89.03%). Notably, recycling and composting are not practiced (0%), indicating a significant gap in sustainable waste management practices. It is not a surprise therefore that the interviewed respondents report health issues potentially related to waste management practices primarily involving skin infections and gastrointestinal problems. The reliance on incineration and open dumping highlights the need for more environmentally friendly and efficient waste processing methods.

Recommendation

One of the most pressing needs identified in the survey is the improvement of waste management infrastructure. The frequency and reliability of waste collection services are crucial for effective waste management. The survey

indicates that many households generate waste daily, yet service provision is often inconsistent. To address this, it is essential to implement more frequent and reliable waste collection services. This could involve increasing the frequency of collection to daily or bi-weekly schedules to align with the waste generation patterns reported by residents. Additionally, expanding waste collection points throughout the community is necessary.

Investing in modern waste processing facilities is also critical. The survey highlights a lack of recycling and composting practices, with a predominant reliance on incineration and dumping in open areas. Developing and investing in waste processing facilities, such as recycling centers, composting units, and incineration plants, will help manage the types of waste generated—organic, plastic, and paper—and reduce the environmental impact. This investment will not only address the immediate waste management needs but also contribute to a more sustainable approach to handling waste.

The survey data underscore the need for promoting sustainable waste management practices. One of the key recommendations is to introduce and promote comprehensive recycling programs. Educating residents on the benefits of recycling and providing separate bins for recyclable materials, such as plastic, paper, glass, and metal, are essential steps.

Supporting waste segregation at the household level is equally important. Enforcing and supporting waste segregation practices will help ensure that waste is sorted into appropriate categories—organic, recyclable, and general waste—facilitating more effective disposal and processing

Community engagement and education play a vital role in effective waste management. The survey indicates that community involvement is crucial for successful waste management practices. Launching awareness campaigns to educate residents about the importance of waste management, proper waste disposal, and the benefits of recycling and composting is essential.

Government and policy support are critical for effective waste management. The survey highlights the need for improved policy and infrastructure investment. Working with local government officials to develop and enforce policies that support sustainable waste management

practices is essential. These policies should include regulations for waste segregation, recycling, and proper disposal methods.

Finally, addressing the environmental and health impacts of waste management practices is imperative. The survey reveals significant health issues related to waste management, including skin infections and gastrointestinal problems. Developing strategies to mitigate these health risks, such as improving waste handling practices and reducing exposure to hazardous waste, is crucial for public health.

Reducing environmental pollution caused by waste management practices is also essential. Implementing measures to control air and water pollution from waste processing facilities and promoting eco-friendly disposal methods will help minimize environmental degradation. Enhancing neighborhood cleanliness through regular maintenance, community clean-up events, and better waste management practices will improve the overall quality of life and environmental health in Ile Epo.

CONCLUSION

The survey findings on waste management in Ile Epo highlight the urgent need for improved waste management practices and infrastructure. By implementing the recommendations outlined above—enhancing waste management infrastructure, promoting sustainable practices, addressing economic and operational challenges, increasing community engagement, strengthening government support, and addressing environmental and health impacts—Ile Epo can achieve more effective waste management. These efforts will contribute to a cleaner, healthier, and more sustainable community, benefiting both residents and the environment.

REFERENCE

Adedara, M., Taiwo, R., & Bork, H. (2023). Municipal Solid Waste Collection and Coverage Rates in Sub-Saharan African Countries: A Comprehensive Systematic Review and Meta-Analysis. *Waste,* 1, 389–413. https://doi.org/https://doi.org/10.3390/waste1020024

Adeleke, O.T.(2022). Evaluation of Waste Managerment Strategies in Ile Epo,Lagos. Journal of Waste Management, 1-12

Adewale,O.S., et al. (2021). Public perception and satisfaction with waste management in Lagos, Nigeria. *Journal of Environmental Science and Health, Part B, 56, 37-45.*

Adeyanju, G.(2017). Waste Management and Environmental Health in Ile Epo, Lagos. *Journal of Environmental Science and Health, Part C,*35(1), 1-12

Adogu,C.U.(2015). Waste Management and Environmental Health Research, 25(23),257-266. doi: 10.1080/09603123.2014.1001904

Ahmed, S.R., et al.(2023). Public satisfaction with waste management services in Bangladesh. *Journal of Cleaner Production, 382, 135- 143*

Alam, M.(2017). Sustainable Waste Management in Developing Countries: Acase Study of Ile Epo, Lagos. Proceedings of the International Conference on Sustainable Development, 2017, 1-8.

Babalola, A. O., Oyedepo, J.A., & Adeniyi,I.O. (2020).Assessment of Waste Management Practices in Lagos State, *Journal of Environmental Science and Health,* Part B, 55 (1), 34-44.doi: 10.1081\PFC-200044932

Babayanas, A.,& Dauda, R. T.(2019). Waste Management in Developing Countries: A Review. *Journal of Environmental Science and Heal*th, Part B, 54(1), 34-41.

Bassey, U. S. (2015). Comparative Analysis of the Performances of Formal and Informal Sectors in Solid Waste Management in Uyo, Akwa Ibom State, Nigeria.

Bakare, W. (2016). Solid Waste Management in Nigeria. Retrieved from Bioenergy consult website: https://www.bioenergyconsult.com/solid-wastenigeria/

Blomsma, F., & Brennan, G. (2017). The Emergence of Circular Economy: A New Framing Around Prolonging Resource Productivity. *Journal of Industrial Ecology,* 603-614.

Boonke, J. and Helke, S. (2017). Transforming communities through Leadership Development, A Pan-African Example- paper presented at the British Academy of Management Conference 12-14 September, Belfast.

Cetrulo, T., Marques, R., Cetrulo, N., Pinto, F., Moreira, R., Mendiz´abal-Cort´es, A., & Malheiros, T. (2018). Effectiveness of Solid Waste Policies in Developing Countries: A Case Study in Brazil. *Journal of Cleaner Production,* 205, 179–187. https://doi.org/https://doi.org/10.1016/j.jclepro.2018.09.09

Chen,L.,et al. (2023). Exploring the relationship between waste sorting and public satisfaction in China. *Journal of Environmental Management, 323, 116-124*

Climate-Data.Org. (2018, May 22). Climate: Onitsha. Retrieved from Climate-Data.Org website: https://en.climate-data.org/location/376014/

Debrah, J., Teye, G., & Dinis, M. (2022). Barriers and Challenges to Waste Management Hindering the Circular Economy in Sub-Saharan Africa. Urban Science, 6, 57. https://doi.org/https://doi.org/10.3390/urbansci6030057

Dollhofer, M. & Zettl, E. (2018). Quality Assurance of Compost and Digestate: Experiences from Germany. https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/171013_uba_fachbrosch_compost_experiences_bf.pdf

Environmental Protection Agency. (2023). Criteria for the Definition of Solid Waste and Solid and Hazardous Waste Exclusions. https://www.epa.gov/hw/ criteria-definition-solid-waste-and-solid-and-hazardous-waste-exclusions. Last Accessed on 2023-09-11.

EPA (2021). Environmental Protection Agency Report on Waste Management in Lagos State.

Georgescu-Roegen, N.(1971). The Entropy Law and the Economic Process. Harvard University Press.

Gibson, L., & Gunmi, B.A. (2014) 'Waste Management Practices in Nigeria."*Journal of Environmental Science and Water Resources, 3(5), 123-131.*

Global Waste Management Market Report (2017).

Idowu, O.et al.(2018). assessment of Waste Management Pracices in Ile Epo, Lagos . Journal of Environmental Science and Health, Part B, 53(1), 34-41

Ikelegbe, A. (2007). Waste Management in Lagos State, Nigeria. PhD.D Dissertation

Izeze, I.(2016). Assessment of Waste Management Practices in Ile Epo, Lagos. Master's Thesis

Krishna, I. M., & Manickam, V. (2017). Environmental Management. Oxford: Butterworth-Heinemann

Khatib,I. (2021). Sustainable Waste Management Strategies for Ile Epo, Lagos. Master's Thesis.

LAWMA (2020). Lagos Waste Management Authority Annual Report.

Li, J., et al.(2020). Waste Management in Developing Cities: ACase Study of Lagos, Nigeria. *Journal of Environmental Management, 262, 110265*.

Mugo, J.K., et al.(2023). Factors influencing public satisfaction with waste management in Tanzania. *Journal of Environmental Science and Health, Part B, 60, 53-61*

Mayowa, O.J.(2019). *International Journal of Environmental Health Research, 29(3),257-266.*

National Bureau of Statistics (2016). Nigeria data at a glance. Retrieved from https://www.nigerianstat.gov.ng/arc/6545/Nigeria-data-at-a-glance accessed on 10th February, 2018.

National Bureau of Statistics (2016). Nigeria data at a glance. Retrieved from https://www.nigerianstat.gov.ng/arc/6545/Nigeria-data-at-a-glance accessed on 10th February, 2018.

Narayana, P. S.(2019). Sustainable Waste Management: A Case of Ile Epo, Lagos. International of Waste Resources, 9(2), 1-9.

Oloruntoba, R., et al.(2022). Waste management practices and public health risks in Ghana. *Journal of Environmental Science and Health, Part B,59,44-52*

Olukanni, D.O., & others. (2015)." Assessment of Solid Waste Management in Lagos State.' *Journal of Environmental Science and Health*, Part B,50, 449-458

Onibokun, A. G. (1999).'Managing the Monster:In A.C. Onibokun (Ed.), Urban Poverty in Nigeria(pp.157-176. Nigerian Institute of Social and Economic Research.

Opejin, A. (2024). Innovative Waste Management Solutions for Ile Epo, Lagos. Proceedings of the International Conference on Waste Management

Oteng-Ababis, M., et al. (2017). Public perceptions and attitudes towards waste management in Ghana. *Journal of Environmental Management , 191, 145-154*

Petkova- Kozovska, M. S. (2017). Innovative solutions in waste processing. Scientific Proceedings of the International Scientific- Technical Conference, 2007, 143- 146.

Pijawka, D. K. (2015). Sustainability for the 21st century: Pathways, programs and policies. London: Kendall Hunt Publishing

Singh, R. (2023). Sustainable Waste Management in Ile Epo, Lagos: Challenges and Oppoprtunities. *International Journal of Waste Resources, 13(1), 1-10*.

Said, S. (2015). Sustainable solid waste management: An integrated approach for developing countries. *Waste Management*, 29, 1438- 48.

Saunders, M., Lewis, P. and Thorn hill, A. (2016). Research methods for business students. London: Pearson.

Zerbock, O.(2013). Waste Management in Developing Countries: Challenges and Opportunities. *Journal of Environmental Management*, 129, 111-118.