

Socio-Economic Influences and Geographical Differences in Waste Production and Management Methods among Economically Disadvantaged Households in Rivers State, Nigeria

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Abstract

This research explored the social and economic factors as well as the geographical differences in the generation and handling of household waste among urban low-income households in Rivers State, Nigeria. A cross-sectional survey method was utilized, with a sample size of 400 participants calculated using Taro Yamane's formula, based on an estimated urban poor population of 3,080,000. Data was gathered through structured questionnaires and analyzed using descriptive statistics, the Kruskal–Walli's test, and Spearman's rank correlation. The results indicated that 57.0% of the participants were female, while 65% belonged to the economically active age range of 21–50 years. Most participants were married (50.0%) and participated in informal economic roles such as trading (33.0%). The income distribution revealed that 48.3% of participants fell within the lowest income bracket. Household sizes were mainly moderate, with 51.5% consisting of 4–6 members. The study identified that the primary waste generated in the area was organic (Mean = 4.03) and plastic (Mean = 3.94), accompanied by poor waste segregation practices (Mean = 4.13). There were significant variations in waste generation across different senatorial districts ($H = 18.742$, $p = 0.002$), highlighting geographical disparities in waste management. Socio-economic elements were found to have a substantial effect on waste management practices (Grand Mean = 3.53), with poverty contributing to informal disposal methods like open dumping, burning, and burial. Nevertheless, some adaptive methods such as reuse (Mean = 3.85) and recycling for income (Mean = 3.78) were also noted. The study concludes that waste management practices among low-income households tend to be unsustainable due to financial limitations, insufficient infrastructure, and lack of awareness. It suggests the need for enhanced waste management systems, environmental education, and economic empowerment initiatives to encourage sustainable waste practices in urban settings.

Keywords: Socio-Economic, Influences, Geographic, Differences, Waste, Production, Management & Methods

INTRODUCTION

The accelerated population growth around the world has given rise to increase in waste generation in rural and urban communities (Girish & Asmitam, 2024). While astounding cities promise employment and opportunities, they do not seem to be able to keep up with the magnifying concern

of waste management (Mobosi, 2025). The United Nations predicts that by 2050 nearly 68% of the world's population will live in urban centers (Girish & Asmitam, 2024). However, such growth raises a crucial question: how to manage waste increase day by day in overpopulated urban areas. The case of rural communities is not radically different from urban areas given the location of industries and the exploration of natural resources and the inability of low-income residents to adopt sustainable waste management practices. Ineffective management of waste has turned out to be one of the most protruding environmental and public health challenges affecting millions. The case of many metropolitan cities has revealed cases of overfilled garbage containers, unapproved waste dumps and littering in streets and neighborhood.

This situation not only undermines the beauty of our urban formations but also creates serious threats to public health and to the environment (Aluko et al., 2023). In most of these countries, the challenge is focused on effective waste collection and improving waste treatment systems to reduce greenhouse gas (GHG) emissions. In contrast, high-income countries can improve waste recovery through reuse and recycling and promote upstream interventions to prevent waste at the source. Mobosi (2025) argued that the most vulnerable segment that is exposed to hazardous waste in urban and rural areas are low-income residents without the financial wherewithal to afford sustainable waste management practices. But Jambeck et al. (2015) posited that the low-income earners are equally the major contributors to the problem due to the attitude and methods adopted for waste management.

Globally, waste management has elicited interventions from government and private organizations (Edward et al., 2017). Globalization has been identified as playing a negative role in solid waste management in African cities. But the sustainable methods adopted to manage waste in developed countries have not been adopted in developing countries where waste is still a major environmental problem. The disparity in the attitude and methods of waste management in developed and developing countries has been adduced to purchasing power. Edward et al. (2017) argued that purchasing power is a major predictor of methods adopted to manage waste. In African countries where the private sector is involved in waste collection and management, the cost incurred to dispose waste is difficult for low-income residents in urban areas. The implication is that alternatives and cheaper methods are adopted by the rural and urban poor to manage waste which is not environmentally friendly.

Municipal solid waste management constitutes one of the most crucial health and environmental problems facing governments of African cities. This is because even though these cities are using 20-50 percent of their budget in solid waste management, only 20-80 percent of the waste is collected. The uncollected or illegally dumped waste constitutes a disaster for human health and environmental degradation. But developed countries have made significant progression towards cyclical movement of waste from the cradle to the cradle. High per capita income in developed countries has been reported to influence sustainable waste management practices but the case of developing countries such as Nigeria is different. High level of poverty and weak per capita income is a predictor of waste management methods. This is because the public infrastructure to collect and manage waste is not adequate. In many urban areas in Nigeria waste evacuation is conducted by private organizations with cost that is beyond the purchasing powers of low-income earners. The implication is that the low-income earners resort to other methods that are not sustainable to dispose of and manage waste which is to the detriment of public health and safety. The present waste management situation in River state reveals that rural and urban areas are littered due to indiscriminate waste disposal. Rapid population growth and the proliferation of plastic is also

problematic. The cost of waste disposal by government and private firms in the state is beyond the reach of many low-income earners, and this has manifested in practices that are not sustainable. Despite the studies conducted on waste disposal and management in Rivers State (Dimkpa et al., 2023; Okoro & Ogboeli, 2025), the impact of purchasing power has not been properly situated to find out if income status could influence waste management practices. Thus, this study sought the influence of purchasing power on waste management methods adopted in River State.

METHODOLOGY

This section focuses on research design, population of the study, sources of data and types of data, methods of data collection as well as the statistical techniques that were used for the analysis of data. The survey research design was adopted for this study. The survey method requires the researcher to elicit information directly from respondents, using appropriate data collection instruments and sampling techniques that are suitable for the intended study. Thus, the survey research design is a cross-sectional survey which entails the collection of data about a given population at one point in time and the results used for generalization to the entire population. Researchers have preference for a sample size that is representative of the population to engender generalizable outcomes. The survey research design is employed for this study because it encompasses the use of quantitative data collection instruments and analytical techniques. Primary and secondary data were collected for the study. Primary data collected directly from the field through the administration of questionnaires and personal observation of waste management practices in River State. Kothari and Garg (2014) described primary data as raw data or original data collected specifically for a specific purpose. Questionnaire is commonly used in social environmental investigations; it is not without flaws. Close ended questions tend to limit the responses of respondents and do not fully capture or reflect the true feelings of respondents about major environmental problems. Thus, open ended questions and semi structured questions will be included in the questionnaire. Personal observation was conducted in the core, intermediate and peripheral parts of urban areas in River State. The purpose of personal observation is to examine the current state of the environment and the waste management methods adopted by low-income residents in the state. Secondary data shall be sourced from existing literature such as published scholarly articles, textbooks, bulletins, magazines in related areas, student's research works etc. The population of the study includes the low-income earners in the study area (see table 3.1) and the officers in related agencies of government. Selection of population size would be designed to eliminate bias in gender, and to accommodate the different age groups in the study area. The low-income earners were selected from the corporate and informal sector in the economy, the segment of the population that is unemployed and under employed in the study area.

Table 1: Target population of urban poor in Rivers State

Region (Senatorial District)	Major Urban Centres	Estimated Urban Poor Population	Percentage of State Urban Poor
Rivers East	Port Harcourt, Obio-Akpor, Okrika, Eleme, Ogu-Bolo	1,540,000	50%
Rivers West	Ahoada, Omoku, Abonnema, Degema	920,000	30%
Rivers South East	Bori, Bonny, Opobo, Andoni	620,000	20%

Total Urban Poor Population	—	3,080,000	100%
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Source: Researchers Computation, 2026

Determination of Sample Size

According to the national population commission the population of River State is estimated at 9, 898,470. However, the urban poor is approximately 3,080, 000 (see Table 3.1). To determine the sample size for questionnaire administration, the Taro Yamane's (1967) sample determination formula shall be employed. The formula is stated as follows:

$S = \frac{N}{1+N(e)^2}$, Where: S = Sample size, e = Margin of error assumed (0.05), 1= Theoretical constant

N = No of population, $S = \frac{3,080,000..}{1+3,080,000..(0.05)^2}$, $S = \frac{3,080,000.}{1+3,080,000..(0.0025)}$, $S = \frac{3,080,000}{7,700.0025}$, S= 400

The sample size for the study is 400. A total of 400 questionnaires were administered To distribute the data accordingly the proportional equation was deployed see table 2

Table 2: Taro Yamane sample size distribution in the study area

Region (Senatorial District)	Major Urban Centres	Estimated Urban Poor Population	Taro Yamane Sample
Rivers East	Port Harcourt, Obio-Akpor, Okrika, Eleme, Ogu-Bolo	1,540,000	200
Rivers West	Ahoada, Omoku, Abonnema, Degema	920,000	119
Rivers South East	Bori, Bonny, Opobo, Andoni	620,000	81
Total Urban Poor Population	—	3,080,000	400

Source: Researchers Computation, 2026

Table 3 Senatorial Districts, Major Urban Towns and Study Communities in Rivers State.

S/N	Region (Senatorial District)	Major Urban Centres	Study Communities
1	Rivers East	Port Harcourt, Obio-Akpor, Okrika, Eleme, Ogu-Bolo	Diobu, Abuloma, Rumuodomaya, Rumuokwuta, Rumuolumini, Ogoloma, Onne, Alesa, Wakama, Bolo town
2	Rivers West	Ahoada, Omoku, Abonnema, Degema	Akinima, Mbiama, Omoku, Mgbede, Abonnema, Bakana
3	Rivers South East	Bori, Bonny, Opobo, Andoni	Nkoro town, Opobo, Ngo, Ikuru, Bonny, Finima, Gwara, Beri

Data for this study was obtained primarily from primary sources through the administration of structured questionnaires and complementary field interviews. The questionnaire served as the principal instrument for gathering quantitative information from the selected respondents across the study locations in Rivers State. The questionnaires were administered directly to respondents by the researcher and trained research assistants using a face-to-face approach. This method was adopted to ensure clarity of questions, improve response accuracy, and enhance the overall response rate. To minimize the risk of non-response or loss of research instruments, the questionnaires were retrieved immediately after completion. In practice, the researcher and research assistants remained at the point of administration and did not leave the location until the questionnaires were properly completed and collected from the respondents. The questionnaire contained both closed end and a few open-ended questions designed to obtain information on respondents' socio-economic characteristics, income status, and the waste management practices adopted by households in the selected urban communities. Where respondents encounter difficulties in understanding certain questions, the researcher or assistants provided clarification without influencing the responses. Apart from this questionnaire survey method, a few interviews were carried out among this target group, and more information will be gathered with regard to the waste management habits of the low-income earners as well as the factors that influence their behaviour during the waste disposal process. Considering the linguistic diversity of this target group, the interview as well as the explanations provided during this questionnaire survey method will be conducted in their local language, i.e., Nigerian Pidgin English and Standard English. This ensured that this target group, with different educational qualifications, understands the study well and responds appropriately during this interview session. All interactions during this interview session are noted with their consent and used to interpret the results obtained during this questionnaire survey method. The combination of structured questionnaires and field interviews is expected to enhance the reliability, completeness, and contextual richness of the data collected, thereby providing a comprehensive understanding of waste management practices among low-income earners in urban areas of Rivers State. The instrument for this study was a well-structured questionnaire, divided into seven sections, A to G, designed to capture information relevant to the objectives of the research. Section A will obtain the socio-economic characteristics of the respondents such as age, gender, level of education, occupation, household size, and monthly income. This section helped to establish the status of low-income earners in the study area. Section B focused on the housing and neighbourhood characteristics of respondents, including type of residence, tenure status, and access to basic services such as waste collection facilities. Information from this section provided additional insight into the living conditions of the respondents and how these conditions may influence waste generation and disposal practices. Section C examined the waste management methods adopted by low-income earners, including waste storage practices, sorting, recycling, reuse, burning, burying, and dumping. A multistage sampling technique was adopted for the study to ensure adequate representation of low-income residents across the senatorial districts of Rivers State. In the first stage, the three senatorial districts in the state were purposively selected as the major regional strata of the study. These include Rivers East Senatorial District, Rivers West Senatorial District, and Rivers Southeast Senatorial District. The use of the senatorial districts provides a broad spatial representation of urban centres across the state. In the second stage, major urban centres within each district will be identified and selected. For Rivers East, the selected urban centres include Port Harcourt, Obio-Akpor, Okrika, Eleme, and Ogu-Bolo. In Rivers West, the selected centres include Ahoada, Omoku, Abonnema, and Degema. For Rivers

South East, the selected centres include Bori, Bonny, Opobo, and Andoni. From each of the regional strata communities known to be urban towns were selected, see Table 3.3 above. In the third stage, the sample size for the study was distributed across the three senatorial districts using the Taro Yamane sample size determination method, which yields a total of 400 respondents. The sample was proportionately allocated according to the population representation of each district. As a result, Rivers East had 200 respondents, Rivers West had 119 respondents, while Rivers Southeast had 81 respondents. In the final stage, a systematic sampling approach was used to select households within low-income neighbourhoods in the identified urban centres. Streets and housing clusters was identified, after which households were selected at regular intervals. Where more than one eligible respondent is present in a household, one adult resident was selected using simple random selection. This approach ensured that the selected respondents adequately represent low-income earners across the major urban centres of Rivers State and provide reliable data for analysing waste management practices in the study area. The research instrument such as the questionnaire and interview guide was submitted to the supervisor for vetting and correction. The corrections were affected by the students and re-submitted for approval. To examine the reliability of the research, instrument the test-retest method was adopted. The test-retest method was used to administer 50 questionnaires in selected communities in the study area to find out if the instrument can achieve the intended objectives of the study. A total of 10 people were also interviewed to examine the utility of the interview guide that is approved for the study. The questionnaires were coded using SPSS version 26. Coding is carried out to convert the responses of the residents to numerical formats for statistical interpretation of public perception. Descriptive statistics help to organize raw data, reduce margin of error and prepare data for more sophisticated inferential computation to expose complex relationships, patterns and spatial variability. Thus, the data collected for this study would be presented in tables to show frequency distribution, mean and standard deviation and simple percentages. To provide a different dimension and outlook of the data, pie and bar charts would be applied to present the data. The hypothesis which states ‘There is no significant difference in waste management methods adopted among urban poor in the study area’ was tested using Krukal wallis. The second hypothesis which states that ‘there is no significant relationship between income status and waste management practices’ was tested using the spearman’s rank correlation. The intention of this test is to find out if the purchasing power of low-income residents in the state influences waste management method

RESULTS

Research Question One: What are the demographic characteristics of respondents in the study area?

Table 4: Summary of Demographic Characteristics of Respondents (N = 400)

Variable	Category	Frequency	Percent (%)	Valid (%)	Percent Cumulative (%)	Percent
Gender	Female	228	57.0	57.0	57.0	
	Male	172	43.0	43.0	100.0	
	Total	400	100.0	100.0	—	
Age (Years)	<20	48	12.0	12.0	12.0	
	21–35	152	38.0	38.0	50.0	
	36–50	108	27.0	27.0	77.0	
	51–65	64	16.0	16.0	93.0	
	66+	28	7.0	7.0	100.0	
	Total	400	100.0	100.0	—	
Marital Status	Divorced	24	6.0	6.0	6.0	
	Married	200	50.0	50.0	56.0	
	Separated	8	2.0	2.0	58.0	
	Single	140	35.0	35.0	93.0	
	Widowed	28	7.0	7.0	100.0	
	Total	400	100.0	100.0	—	
Occupation	Artisan	64	16.0	16.0	16.0	
	Civil Servant	96	24.0	24.0	40.0	
	Farming	48	12.0	12.0	52.0	
	Student	44	11.0	11.0	67.0	
	Trading/Business	132	33.0	33.0	100.0	
	Others	16	4.0	4.0	56.0*	
	Total	400	100.0	100.0	—	
Education	Primary	64	16.0	16.0	82.0	
	SSCE	72	18.0	18.0	100.0	
	OND/Diploma	57	14.2	14.2	48.8	
	HND	70	17.5	17.5	34.5	
	BSc	68	17.0	17.0	17.0	
	Postgraduate	69	17.3	17.3	66.0	
	Total	400	100.0	100.0	—	
Senatorial District	Rivers East	200	50.0	50.0	50.0	
	Rivers West	119	29.8	29.8	79.8	

Variable	Category	Frequency	Percent (%)	Valid (%)	Percent Cumulative (%)	Percent
	Rivers South-East	81	20.3	20.3	100.0	
	Total	400	100.0	100.0	—	
Work Experience	1–5 years	90	22.5	22.5	22.5	
	6–10 years	65	16.3	16.3	82.0	
	11–15 years	78	19.5	19.5	42.0	
	16–20 years	95	23.8	23.8	65.8	
	Above 20 years	72	18.0	18.0	100.0	
	Total	400	100.0	100.0	—	
Monthly Income	₦30,000 range	193	48.3	48.3	71.5	
	₦61,000 range	114	28.5	28.5	100.0	
	₦101,000 range	93	23.3	23.3	23.3	
	Total	400	100.0	100.0	—	
Household Size	1–3 persons	193	48.3	48.3	48.3	
	4–6 persons	206	51.5	51.5	99.8	
	7–9 persons	1	0.3	0.3	100.0	
	Total	400	100.0	100.0	—	

Research Question Two: What are the types and quantities of household waste generated by low-income earners in the selected urban communities?

Table 5: Descriptive Statistics of Types and Quantities of Household Waste Generated by Low-Income Earners in the Study Area (N = 400)

S/N	Statement	SA (5)	A (4)	N (3)	D (2)	SD (1)	Total	Mean	SD	RM
1	Household waste in the area is mainly organic (food remains, vegetable waste)	160 (40%)	140 (35%)	50 (12.5%)	30 (7.5%)	20 (5%)	400	4.03	1.02	Agree
2	Plastic waste is commonly generated in large quantities in low-income households	150 (37.5%)	145 (36.3%)	55 (13.8%)	30 (7.5%)	20 (5%)	400	3.94	1.03	Agree
3	The quantity of paper waste generated daily is relatively low in the study area	120 (30%)	130 (32.5%)	80 (20%)	45 (11.3%)	25 (6.3%)	400	3.69	1.11	Agree

S/N	Statement	SA (5)	A (4)	N (3)	D (2)	SD (1)	Total	Mean	SD	RM
4	Household waste generation increases during weekends and festive periods (42.5%)	170 (42.5%)	150 (37.5%)	40 (10%)	25 (6.3%)	15 (3.8%)	400	4.09	0.98	Agree
5	Hazardous household waste (batteries, chemical containers) is rarely generated (27.5%)	110 (27.5%)	120 (30%)	90 (22.5%)	55 (13.8%)	25 (6.3%)	400	3.59	1.12	Agree
6	Waste segregation practices are not commonly practiced in low-income households (45%)	180 (45%)	140 (35%)	45 (11.3%)	20 (5%)	15 (3.8%)	400	4.13	0.95	Agree

The results presented in Table 5 reveal that participants largely concurred that individuals with low income in the identified urban neighborhoods primarily produce organic and plastic waste, with average ratings between 3.59 and 4.13. The sixth item achieved the top mean score of 4.13, suggesting that practices for separating waste are largely nonexistent in households with low income. The fifth item obtained the lowest mean of 3.59, indicating that the creation of hazardous waste is less common, though it does occur. In summary, the findings suggest that the generation of household waste within the research area is marked by a high production of organic waste, considerable amount of plastic waste, Minimal practices for recycling or waste separation and Variations in waste volume according to the season. The overall response trend indicates a strong consensus across all measures, demonstrating uniformity in the understanding of types and quantities of waste among the participants.

Research Question Three: What are the Socio-economic features influencing household waste management practices in Rivers State, Nigeria

Table 6: Descriptive Statistics on Respondent's Response on the socio-economic features influencing household Waste Management practices in rivers state (n = 400)

S/N	Statement	Always	Often	Sometimes	Rarely	Never	Total	Mean	SD	RM
1	Poverty level makes me burn waste to reduce disposal cost	120 (30.0%)	110 (27.5%)	70 (17.5%)	60 (15.0%)	40 (10.0%)	400	3.53	1.29	AG
2	Inadequate income forces me to dump waste in open spaces or drains	90 (22.5%)	100 (25.0%)	80 (20.0%)	70 (17.5%)	60 (15.0%)	400	3.27	1.31	AG
3	Household poverty influences me to bury waste instead of paying for disposal	80 (20.0%)	110 (27.5%)	90 (22.5%)	70 (17.5%)	50 (12.5%)	400	3.25	1.25	AG
4	Low income encourages me to reuse or repurpose waste materials	150 (37.5%)	120 (30.0%)	70 (17.5%)	40 (10.0%)	20 (5.0%)	400	3.85	1.12	AG

S/N	Statement	Always	Often	Sometimes	Rarely	Never	Total	Mean	SD	RM
5	Poverty motivates me to compost organic waste to reduce household cost	60 (15.0%)	80 (20.0%)	90 (22.5%)	90 (22.5%)	80 (20.0%)	400	2.88	1.31	AG
6	Economic hardship makes me collect recyclable materials for income generation	140 (35.0%)	130 (32.5%)	60 (15.0%)	40 (10.0%)	30 (7.5%)	400	3.78	1.17	AG
7	Poverty affects my ability to properly separate wet and dry waste	70 (17.5%)	90 (22.5%)	80 (20.0%)	80 (20.0%)	80 (20.0%)	400	2.97	1.30	AG
8	Low income limits my access to formal waste disposal services, so I cover waste instead	130 (32.5%)	120 (30.0%)	70 (17.5%)	50 (12.5%)	30 (7.5%)	400	3.80	1.18	AG
9	Household poverty influences collective family participation in waste management	160 (40.0%)	130 (32.5%)	60 (15.0%)	30 (7.5%)	20 (5.0%)	400	3.95	1.06	AG
10	Low income determines reliance on simple tools for waste management	180 (45.0%)	120 (30.0%)	60 (15.0%)	25 (6.3%)	15 (3.7%)	400	4.06	1.00	AG
Grand Mean								3.53	1.20	AG

Table 6 outlines the socio-economic factors that affect household waste management behaviors in Rivers State, Nigeria, emphasizing poverty as a key factor. The results, derived from a 5-point Likert scale, show that there is an overall significant agreement among the participants (Grand Mean = 3.53, SD = 1.20), indicating that socio-economic factors largely influence household waste management practices. The data indicates that poverty has a substantial impact on informal waste disposal methods, especially in terms of burning waste (Mean = 3.53) and disposing of it in open areas or drainage systems (Mean = 3.27). These methods are often utilized by families who lack the financial means to utilize formal waste management options, implying that economic struggle directly leads to environmentally harmful disposal techniques. Similarly, the practice of burying waste (Mean = 3.25) also highlights cost-related coping mechanisms among poorer families. While this technique reduces the visual clutter of waste, it is unmonitored and does not align with established waste management practices.

On the other hand, some positive socio-economic behaviors were observed. The practice of reusing and repurposing wasted materials achieved a relatively high average score (Mean = 3.85), signifying that families experiencing economic strain attempt to make the most of their resources. In addition, the collection of recyclable materials for financial benefit (Mean = 3.78) illustrates the growth of informal, waste-related economic activities, where poverty transforms waste into a source of income. Participation of households and changes in behavior were also significant. The engagement of family members in managing waste (Mean = 3.95) and the use of basic tools (Mean = 4.06) indicate that low income encourages shared efforts and cost-effective waste management techniques. However, sustainable practices such as composting (Mean = 2.88) and effective waste sorting (Mean = 2.97) scored relatively low, reflecting a lack of awareness, necessary infrastructure, and ability for organized waste management. The results illustrate that poverty, low earnings, and economic hardship are the primary socio-economic influences on household waste

management practices in Rivers State. While some adaptive actions, like reusing and recycling, are present, they tend to stem more from survival needs than environmental considerations. The prevalence of informal and hazardous waste disposal methods emphasizes the requirement for enhanced income support systems, better public waste facilities, and environmental education to foster sustainable household waste management practices.

Test of Hypothesis

H₀₁: There is no significant variation in the types and quantities of household waste generated by low-income earners in the selected urban communities.

Table 7: Kruskal–Wallis Test for Difference in the Types and Quantities of Household Waste Generated by Low-Income Earners in the Selected Urban Communities (N = 400)

Senatorial District	N	Mean Rank
Rivers East	200	215.36
Rivers West	119	182.47
Rivers South East	81	176.92
Total	400	
Test Statistics		Value
Chi-Square (H)		18.742
Degrees of Freedom (df)		2
Asymp. Sig. (p-value)		0.002
Level of Significance		0.05

The results in Table 7 is from the Kruskal-Wallis test indicate a Chi-square (H) value of 18.742 with 2 degrees of freedom and a p-value of 0.002. Given that the p-value falls below the threshold of 0.05, we reject the null hypothesis. This indicates that there is a notable statistical difference in the types and volumes of household waste produced by low-income individuals in the chosen urban areas (Rivers East, Rivers West, and Rivers South East). In practical terms, this suggests that patterns of household waste generation vary across the senatorial districts, implying distinctions in consumer behavior, population density, and waste management approaches within these communities.

Discussion of Results

Socio-Demographic Characteristics

Table 4. illustrates the distribution of genders among the respondents, indicating that female participants slightly outnumber male participants, comprising 57.0% of the sample, while male respondents make up 43.0%. This observation aligns with known findings that women are generally easier to reach and more inclined to engage in surveys related to society and community. Similar trends have emerged in broader research beyond the Nigeria Demographic and Health Survey. For example, studies conducted by the Pew Research Center in 2015 and the OECD in 2019 have shown that women tend to be more active in civic matters and are often more willing to partake in surveys, especially regarding health, family, and community issues. Additionally, the United Nations Development Programme (2016) highlights the significant roles women play in caregiving and social networks, which typically boosts their participation and visibility in research. This slight imbalance suggests that the findings may reflect gender-based perspectives on health and socio-economic topics more prominently.

Table 4 indicates that the age distribution among respondents' skews towards younger, economically active individuals, particularly those between 21 and 35 years old. This observation is consistent with global demographic trends indicating that sub-Saharan Africa, Nigeria included, features a significant youth population. The Population Reference Bureau in (2020) and United Nations DESA (2019) confirm that a large segment of the populace in developing nations is comprised of younger individuals. Additionally, the African Development Bank in (2019) highlights that this youthful demographic contributes to workforce engagement and economic activity. The prevalence of younger respondents enhances the significance of this study, as this cohort is often actively involved in economic and societal decision-making, whereas the lesser representation of older individuals illustrates typical limitations in participating in surveys.

Table 6 indicates that the majority of respondents are married, with singles making up the next largest group, while there are relatively few respondents who are widowed, divorced, or separated. This result reflects the typical social norms found in several developing nations, where marriage is a principal institution. To corroborate this, the World Marriage Data from the United Nations (2019) and findings from the DHS Program consistently report high marriage rates among adults of working age. Studies from the International Institute for Population Sciences(2017) further indicate that marital status plays a crucial role in influencing decisions within households and economic obligations. The significant representation of married individuals in this research implies that many participants function within familial systems that likely affect their responses concerning economic, social, and health-related matters.

Table 4 demonstrates that a notable number of participants are involved in business and commercial pursuits, followed by those in government jobs, while smaller proportions are made up of artisans, farmers, and students. This employment trend mirrors the labor market dynamics seen in developing nations where activities in the informal sector are prevalent. Research findings from the World Bank (2019) and the Brookings Institution (2019) support the notion that a large portion of employment in sub-Saharan Africa is focused on informal trading and small businesses. Moreover, the United Nations Economic Commission for Africa (2020) highlights the significance of informal jobs as a central means of livelihood. The presence of both formal and informal sector employees within the sample offers a thorough view of the economic conditions and enhances the analytical scope of the research.

Table 4 reveals a relatively equitable spread of educational qualifications among respondents, with a significant number attaining secondary and higher education. This pattern aligns with overall advancements in educational access across developing nations. The World Bank (2018) points out notable worldwide strides in educational achievements, especially at levels beyond primary education, while UNICEF (2020) mentions rising enrollment and graduation rates in Nigeria. Likewise, the Global Partnership for Education (2021) observes improved access to quality education in developing areas. This educational distribution suggests that the research gains valuable insights from individuals with varied educational backgrounds, thus improving the validity and inclusivity of the outcomes.

Table 4 indicates a greater proportion of respondents from the Rivers East Senatorial District, with fewer individuals coming from Rivers West and Rivers South-East. This uneven representation highlights typical issues related to geographic sampling, where factors like accessibility and population density affect participation rates. Supporting this observation, the World Bank (2015) and UN-Habitat (2020) note that urbanized and more accessible areas generally produce higher response rates in surveys. In a similar vein, IFPRI (2017) points out the existence of spatial bias in

data collection efforts. While including all senatorial districts enhances geographic representation, the predominance of Rivers East implies that the results may better reflect the socio-economic realities of that specific region.

Table 4 illustrates the distribution of participants based on their work experience, revealing a fairly even arrangement, with a significant number having more than ten years in the workforce. This reflects the diverse makeup of the labor pool in developing economies. Insights from the OECD (2018) and the World Economic Forum (2020) indicate that labor markets generally include both seasoned professionals and younger workforce entrants. Furthermore, McKinsey & Company (2016) emphasizes the variety of experience levels present within the workforce across African economies. This blend of experienced and novice individuals contributes to the study's strength by integrating both practical knowledge and fresh viewpoints.

The result indicates that a considerable number of participants are situated in the lower income range, suggesting a widespread issue of financial limitations. This observation aligns with both global and regional economic reviews. The Oxford Poverty and Human Development Initiative (2020) along with the International Monetary Fund (2021) both identify the existence of low-income communities in developing nations such as Nigeria. Likewise, the Brookings Institution (2018) underscores the ongoing challenges of poverty and income disparity throughout Africa. The high number of low-income participants offers crucial context for understanding the findings, as socioeconomic status greatly affects access to services, spending habits, and overall living standards.

Lastly, Table 4 indicates that most participants come from households with between one and six members, and there are fewer individuals from households with more than six. This trend illustrates the gradual shift toward smaller family groups, especially in urban and semi-urban areas. The United Nations (2017) notes a worldwide reduction in household size, attributed to urbanization and financial demands. Additionally, the World Bank (2020) correlates smaller family units with evolving economic circumstances, while the Population Council (2018) observes similar patterns in developing regions. The commonality of moderate household sizes implies achievable dependency ratios, which may impact the distribution of resources and the socio-economic behaviors of participants.

Types and Quantities of Household Waste Generated by Low-Income Earners in the Selected Urban Communities

The results presented in Table 5 indicates that individuals from low-income backgrounds in the chosen urban areas primarily produce organic materials (such as leftover food and plant matter) and plastic waste, with notable average values (4.03 and 3.94 respectively). This suggests that the waste generated by households in the research area is mainly composed of both biodegradable materials and plastic that cannot decompose. The results additionally reveal that the practice of waste separation is poorly executed (mean = 4.13), while the generation of hazardous waste remains relatively low (mean = 3.59). This points to a lack of environmental consciousness and insufficient waste management practices among those in low-income households. Overall, the outcomes highlight that the production of household waste is primarily shaped by consumption habits, minimal recycling efforts, and a growing reliance on packaged products. These results align with the findings of Abdel-Shafy and Mansour (2018), who noted that in developing nations, household waste is chiefly made up of organic and plastic materials due to consumer behavior and inadequate waste segregation strategies. Similarly, Ferronato and Torretta (2019) reported that

urban areas with low-income populations tend to generate a greater amount of organic waste because of insufficient preservation and storage options.

Furthermore, UNEP (2015) observed that emerging urban regions often show ineffective waste separation systems, resulting in mixed waste collection and poor recycling results. This corresponds with the current finding that practices for waste separation are largely missing in the area under study. The results from the Kruskal–Wallis test ($H = 18.742$, $df = 2$, $p = 0.002$) show a significant difference in the types and amounts of household waste produced in Rivers East, Rivers West, and Rivers South East. This suggests that patterns of household waste generation are not consistent across the different senatorial districts. The disparities can be linked to variations in population density, income distribution, consumer habits, and practices for environmental sanitation across the different regions. The differences seen among communities are reinforced by Wilson et al. (2015), who indicated that urban waste composition greatly varies between neighborhoods due to differing socioeconomic statuses and urban infrastructure.

Likewise, Guerrero et al. (2013) established that waste production patterns vary widely among urban districts, particularly in low-income areas where waste management systems are unreliable and informal disposal methods are prevalent. These findings lend support to the observation that waste generation is unevenly distributed across urban communities.

Waste Management Methods Adopted by Low-Income Earners in Urban Areas in Rivers State, Nigeria

Concerning Table 3 on the waste management techniques utilized by low-income individuals in urban regions of Rivers State, Nigeria, the results reveal that waste disposal methods are predominantly informal, driven by basic survival needs and hindered by economic constraints. The high occurrence of open dumping and burning noted in this research aligns with global findings that indicate such practices are common in urban areas with low-income populations where formal waste management solutions are either insufficient or unavailable (World Bank, 2022; African Development Bank, 2022). These methods, which may be convenient for households, are consistently linked to environmental harm and considerable public health dangers, including illnesses related to respiratory issues and pollution (World Health Organization, 2021).

In addition, the significant participation in recycling and reuse activities among the participants validates existing research that highlights the essential function of informal waste economies in developing nations. Evidence has shown that households with low income often rely on recovering materials and recycling as alternative ways to earn a living, converting waste into financial opportunities (United Nations Development Programme, 2022; Global Alliance for Incinerator Alternatives, 2021). This aligns with the current findings, where participants are actively involved in gathering and repurposing recyclable items. Moreover, the participation of family members in managing waste and utilizing simple tools showcases adaptive coping strategies at the household level, which have been recognized in urban sustainability evaluations as common reactions to inadequate infrastructure (UN-Habitat, 2020).

Nevertheless, the scarce adoption of structured waste management techniques like composting and waste sorting observed in this research further reinforces existing empirical studies indicating that such practices demand a certain level of awareness, institutional backing, and infrastructural support that is frequently absent in low-income settings. Studies suggest that without effective policy measures and community awareness efforts, the implementation of sustainable waste management techniques remains limited (International Solid Waste Association, 2022). Similarly,

data from Nigeria at the national level shows that organized waste management systems are still in their infancy, reinforcing dependence on informal and less effective disposal practices (National Bureau of Statistics Nigeria, 2021). The outcomes of this investigation align closely with modern global and regional studies, highlighting how poverty, informality, and infrastructure deficiencies shape waste management behaviors in urban settings characterized by low income. By offering local empirical evidence from Rivers State, this research adds to the expanding knowledge base that illustrates how socio-economic barriers are fundamental factors influencing both environmental practices and living conditions for low-income communities.

CONCLUSION

This study examined the demographic characteristics, types and quantities of household waste generated, and the socio-economic factors influencing waste management practices among low-income earners in urban communities of Rivers State, Nigeria. Findings from Objective One revealed that the study population is largely composed of economically active individuals, with a slight dominance of female respondents (57.0%) and a concentration within the 21–50 years age group. The respondents are predominantly married, engaged in informal and semi-formal occupations, and fall largely within the low-income bracket. This demographic structure suggests that waste management behaviours in the study area are strongly influenced by household responsibilities, income limitations, and active participation in economic activities. In line with Objective Two, the study established that household waste generated in the study area is predominantly organic and plastic in nature, with mean values of 4.03 and 3.94 respectively. Waste generation was also found to increase during weekends and festive periods (Mean = 4.09), while waste segregation practices remain largely inadequate (Mean = 4.13). The Kruskal–Wallis test ($H = 18.742$, $p = 0.002$) confirmed significant spatial variations in waste generation across senatorial districts, indicating that waste patterns differ based on geographical and socio-economic conditions. With respect to Objective Three, the study revealed that socio-economic factors, particularly poverty and low income, significantly influence waste management practices (Grand Mean = 3.53). The findings show that low-income households predominantly adopt informal waste disposal methods such as burning, open dumping, and burying due to financial constraints. However, adaptive strategies such as reuse (Mean = 3.85) and recycling for income generation (Mean = 3.78) were also observed. Sustainable practices such as composting and waste sorting were poorly practiced, reflecting limited awareness and infrastructural support. The study concludes that waste management practices among low-income urban households in Rivers State are largely shaped by economic hardship, limited access to formal waste services, and inadequate environmental awareness. These factors collectively result in unsustainable waste disposal behaviours despite the presence of some adaptive coping mechanisms.

RECOMMENDATIONS

1. Authorities and associated environmental organizations need to enhance the availability of cost-effective and efficient waste management solutions in communities with low incomes. This should involve supplying waste collection bins, implementing regular waste removal, and creating subsidized disposal methods to deter informal waste practices like burning and uncontrolled dumping.
2. Efforts to raise public consciousness and educational programs focused on the environment must be boosted to encourage sustainable waste management methods such as sorting waste,

- composting, and recycling. These initiatives ought to be rooted in the community and presented in local languages to guarantee inclusivity and efficiency.
3. Initiatives aimed at economic empowerment should be launched to assist households with low incomes, incorporating the establishment of organized recycling systems and programs that convert waste into wealth. This will turn waste management into a sustainable economic opportunity while mitigating harm to the environment.

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