

Public Policy Implementation and Solid Waste Management Practices in Nigeria: A Study of Akwa Ibom State

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Abstract

The study assessed the impact of public policy on solid waste management in Nigeria. This was actualized through examining the effect of public policies on solid waste management practices in Akwa Ibom State. The study adopted policy process model as developed by Lasswell (1956) as its theoretical guide. The study adopted survey research design, and employed multistage sampling technique with a population of 3,920,208, the sample size of 384 was decided by applying Krejcie and Morgan (1970) formula. Likert 4-points scale designed questionnaire was used to obtain primary data. Tables and frequencies were used in representing the demographic characteristics of respondents while chi-square test was employed to test the hypothesis at 0.05 level of significance. The study revealed among others that the effect of public policies affects solid waste management practices in Akwa Ibom State. The study therefore recommends among others that, government should strengthen existing policies and develop new ones to promote sustainable solid waste management practices in Akwa Ibom State.

Keywords: *Environment, Health, Management, Sustainable, Waste*

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Background to the Study

Solid waste is an important issue in Nigeria. Piles of wastes are often found by roads, rivers, in the gutters close to surface water and in unapproved dumpsites which adversely affects plants, animals, humans as well as the environment (Imam, Mohammed, Wilson, and Cheeseman, 2008). The ensuing refuse generated has assumed a scale of a major environmental challenge, and constitutes an embarrassment to Nigerians. Improper disposal of solid waste has severe consequences on human health and the environment. For example, landfills can contaminate underground water sources with chemicals and hazardous waste, and emit methane gas, which contributes to climate change. Incineration can release toxic substances into the air, which can cause respiratory problems.

The primary goal of solid waste management is reducing and eliminating adverse impacts of waste materials on human health and environment to support economic development and superior quality of life (LeBlanc, 2017). Proper solid waste management is an integral part of environmental conservation that should be observed by individuals and states nationally (Wonah, 2017). This necessitated the establishment of NESREA Act 2007 and National Solid Waste Management Policy, 2018 aimed at a healthy and cleaner environment for Nigerians. The objective of National Solid Waste Management Policy is said to include ensuring the protection of the environment and conserving natural resources towards sustainable development. The Akwa Ibom State government keyed into this idea by setting up the Akwa Ibom State Environmental Protection and Waste Management Agency (AKSEPWMA) CAP 47, 2000 to promote, conserve, sustain and champion environmental protection and waste management in the state.

Effective solid waste management practices is a potent instrument to maintaining a healthy environment in the country. Proper solid waste management is essential for protecting human health and the environment. It requires collective efforts from individuals, businesses, and government agencies to reduce the amount of waste generated and dispose of it responsibly. By adopting sustainable waste management practices, we can reduce our impact on the environment and preserve our natural resources for future generations.

It is expected that with the policies that was implemented from various introduced environmental policies and programmes of government, solid waste management policies will be effective in the sustainability of the environment. Yet there are poor economic incentives, political barriers, lack of developed infrastructure, limited public participation, awareness (Ogboi and Kperegbe, 2009), poor implementation of policies and lack of proper sensitization of the public and a top-down policy with little public participation by affected populations (Olukanni and Nwafor, 2019). More so, there are no designated engineered landfill sites in the country. It is in view of the aforementioned problems that this study intends to assess the impact of public policy on solid waste management in Akwa Ibom State. The study looked at the following specific objectives:

- i. To examine the effect of public policies on solid waste management practices in Akwa Ibom State.

- ii. To evaluate the level of awareness and attitude of the citizens towards solid waste management in Akwa Ibom State.
- iii. To examine the effect of improper solid waste management on environmental and health hazards in Akwa Ibom State.

Theoretical Framework

This study adopted policy process model by Lasswell (1956). Policy process model refers to the different phases of the policy-making process. Policy-making process emphasizes an initiative to solve problems and may take the form of programmes, projects, and policies. This model helps this study to explain the sequence of policy making processes as functional activities of government. It presents the following interfaces of policy process: agenda setting, policy formulation and adoption, policy implementation and evaluation and termination.

In order to create solid waste policies, government attention has to be focused on pressing environmental problem requiring legislation. Agenda setting, the first phase of the policy process model, is crucial in solid waste policy as it determines which issues gain attention from policy makers, while others are neglected. During this issue-sorting stage, thousands of solid waste-related concerns, such as waste reduction, recycling infrastructure, landfill management, plastic bag bans, waste-to-energy technologies, and public education, compete for attention, but only a handful, like curbside recycling, landfill tipping fees, and composting initiatives, actually receive significant consideration. The agenda setting process is influenced by factors like public opinion, media coverage, lobbying efforts, political priorities, and funding availability, which shape policy priorities and decisions impacting waste management practices, ultimately determining which issues will be addressed and which will be overlooked.

Policy formulation under solid waste refers to the development of specific policy options by government agencies, where infeasible solutions like technologically unviable waste treatment methods, economically unaffordable strategies, and environmentally unsound disposal practices are excluded, and efforts are made by various actors, including environmental groups, waste management companies, community organizations, and government departments and agencies, to have their favored solutions, such as extended producer responsibility, increased recycling targets, waste-to-energy technologies, and enhanced landfill gas capture, ranked highly among the remaining options, which are then evaluated and refined through stakeholder engagement, cost-benefit analysis, technical feasibility studies, and environmental impact assessments to create an effective, sustainable, and implementable solid waste policy. Policy adoption under solid waste occurs when government actors officially endorse a specific course of action, making it a legally binding policy, which happens when legislation is passed, such as the National Solid Waste Management Policy 2021, regulations are finalized, like the Akwa Ibom State Environmental Protection and Waste Management Regulation, 2020, or a court decision is made, such as a ruling on waste disposal facilities' environmental impact, thereby adopting a policy that outlines a framework for solid waste management practices, including waste reduction, recycling, composting, or landfill management, and is enforced by relevant authorities.

During the implementation phase of solid waste policies, governments deploy a range of administrative strategies to bring their decisions to life, balancing the interests of diverse stakeholders, including local communities, waste management professionals, environmental advocates, and public health experts, to achieve sustainable waste management outcomes that reduce environmental harm and promote eco-friendly practices through effective regulation, education, infrastructure, funding, and collaboration. For instance, in Akwa Ibom State, the Akwa Ibom State Environmental Protection and Waste Management Agency (AKSEPWMA) is solely responsible for implementing solid waste management policies and regulations in Akwa Ibom State, aiming to promote a clean and healthy environment. The evaluation of solid waste policies entails a comprehensive assessment of their success in achieving intended objectives, tracking programme performance, gauging the impact on communities and waste management stakeholders, pinpointing areas for enhancement, and recommending adjustments, with a collaborative review by government and non-government entities to learn from experience, reassess policy issues and solutions, and fine-tune strategies to tackle solid waste challenges more effectively, thereby initiating a new cycle of policy refinement.

Methodology

The study adopted survey research design. The population of the study was 3,920,208; a sample size of 384 was determined for the study, using Krejcie and Morgan (1970) formula. Multi-stage sampling technique was adopted for this study, the sample size was divided into three villages from the four clans in Uyo LGA, and thirty-two (32) respondents were randomly selected from each village to respond to the questionnaire. Likert 4-points scale designed questionnaire with structured questions were used to obtain primary data. Tables and frequencies were also employed in representing the demographic characteristics of respondents while chi-square test was also employed to analyze the research questions and test the hypothesis at 0.05 level of significance.

Data Presentation and Analysis

Questionnaire Distribution

A total of 384 questionnaires were administered, out of which 333 (86.72%) were successfully retrieved and 51 (13.28%) were not retrieved (Table 1). This implies that data obtained from 333 retrieved instruments were used for statistical analysis.

Table 1: Questionnaire Distribution Information

No. of questionnaires distributed	No. of questionnaires returned	No. of questionnaires lost
384	333	51
Percentage (%)	86.72%	13.28%

Source: Field Survey, 2024

Interpretation of Respondents Socioeconomic Information

Table 2 shows the demographic information of respondents. The table shows that out of 333

respondents, 180 respondents which represents 54.05% were males, while 153 which representing 45.95% were females. This implies that there were more males in the study than females. Table 2 also shows the age bracket of respondents 20-30 was 61 respondents (18.32%), 31-40 was 76 respondents (22.82%), 41-50 was 96 respondents (28.83%), 51 and above was 100 respondents (30.03%). This reveals that respondents from age bracket 51 and above were more in the study. The table also shows the marital status of respondents in the study which includes single 93 respondents (27.93%), married 196 respondents (58.86%), divorced 30 respondents (9.01%), widow/widower 14 respondents (4.20%). This implies that there were more married respondents in the study. In respect of religion, table 2 shows that 176 respondents (51.65%) were Christians, 59 respondents (17.72%) were Muslims while 102 respondents (30.63%) were of other religious beliefs. This reveals that there were more Christian respondents in the study. Table 2 also shows the academic qualification of respondents which includes SSCE: 89 respondents (26.73%), OND/HND: 98 respondents (29.43%), BSc: 127 respondents (38.14%), others: 19 respondents (5.71%). This reveals that, there were more people with BSc qualification in the study. Table 2 also indicated the occupation of respondents in the study which includes: civil/public servants: 78 respondents (23.42%), students: 55 respondents (16.52%), traders: 63 respondents (18.92%), farmers: 75 respondents (22.52%), others: 62 respondents (18.62%).

Table 2: Demographic Information of Respondents

S/N	Characteristics	Frequency	Percentage (%)
1.	Sex		
	Male	180	54.05%
	Female	153	45.95%
	Total	333	100%
2.	Age		
	20-30	61	18.32%
	31-40	76	22.82%
	41-50	96	28.83%
	51 and above	100	30.03%
	Total	333	100%
3.	Marital Status		
	Single	93	27.93%
	Married	196	58.86%
	Divorced	30	9.01%
	Widow/Widower	14	4.20%
	Total	333	100%
4.	Religion		
	Christianity	172	51.65%
	Islam	59	17.72%
	Others	102	30.63%
	Total	333	100%
5.	Academic Qualification		
	SSCE	89	26.73%
	OND/HND	98	29.43%
	BSc	127	38.14%
	Others	19	5.71%
	Total	333	100%
6.	Occupation		
	Civil/Public Servants	78	23.42%
	Students	55	16.52%
	Traders	63	18.92%
	Farmers	75	22.52%
	Others	62	18.62%
	Total	333	100%

Source: Field Survey, 2024

Test of Hypotheses

The Effect of Public Policies on Solid Waste Management Practices in Akwa Ibom State

Table 3 indicates responses of statements 1, 2, 3, 4 and 5 which are relevant to objective 1 by way of analysis, each column represents responses of questionnaire items 1-5. The first column represents Strongly Agreed 417; the second column represent Agreed 337; the third column represent Disagreed 472; and the fourth column represent Strongly Disagreed 439. The first numbers in each cell represent the observed frequencies i.e., the number of

respondents to questionnaire items while the second numbers represent the expected frequencies.

Table 3: The Chi square (X^2) Table

STATEMENTS	SA	A	D	SD	TOTAL
1	105 (83.4)	93 (67.4)	75 (94.4)	60 (87.8)	333
2	98 (83.4)	54 (67.4)	83 (94.4)	98 (87.8)	333
3	72 (83.4)	84 (67.4)	69 (94.4)	108 (87.8)	333
4	99 (83.4)	91 (67.4)	43 (94.4)	100 (87.8)	333
5	43 (83.4)	15 (67.4)	202 (94.4)	73 (87.8)	333
Total	417	337	472	439	1665
Percentage (%)	25.05%	20.24%	28.35%	26.36%	100%

Source: Field Survey, 2024

Table 4: Chi square (X^2) Calculation

R-C	FO	FE	FO-FE	(FO-FE) ²	$\frac{(FO-FE)^2}{FE}$
1-1	105	83.4	21.6	466.56	5.59
1-2	93	67.4	25.6	655.36	9.72
1-3	75	94.4	-19.4	376.36	3.99
1-4	60	87.8	-27.8	772.84	8.80
2-1	93	83.4	9.6	92.16	1.11
2-2	54	67.4	-13.4	179.56	2.66
2-3	83	94.4	-11.4	129.96	1.38
2-4	98	87.8	10.2	104.04	1.18
3-1	72	83.4	-11.4	129.96	1.56
3-2	84	67.4	16.6	275.56	4.09
3-3	69	94.4	-25.4	645.16	6.83
3-4	108	87.4	20.6	424.36	4.86
4-1	99	83.4	15.6	243.36	2.92
4-2	91	67.4	23.6	556.96	8.26
4-3	43	94.4	-51.4	2641.96	27.99
4-4	100	87.4	12.6	158.76	1.82
5-1	43	83.4	-40.4	1632.16	19.57
5-2	15	67.4	-52.4	2745.76	40.74
5-3	202	94.4	107.6	11577.76	122.65
5-4	73	87.7	-14.7	216.09	2.46
					278.18

Calculated value (x^2) = 278.18

Degree of freedom = $(5 - 1)(4 - 1) = 4 \times 3 = 12$

Level of significance = 0.05

Table value = 21.026

Decision: Since the calculated value (278.18) is greater than the table value (21.026) null hypothesis (H_0) is rejected while the alternative hypothesis (H_1) is accepted. This shows that the effect of public policies affects solid waste management practices in Akwa Ibom State.

The Level of Awareness and Attitude of the Citizens Towards Solid Waste Management in Akwa Ibom State

Table 5 indicates responses of statements 6, 7, 8, 9 and 10 which are relevant to objective 2 by way of analysis, each column represents responses of questionnaire items 6-10. The first column represents Strongly Agreed 426; the second column represent Agreed 465; the third column represent Disagreed 335; and the fourth column represent Strongly Disagreed 439. The first numbers in each cell represent the observed frequencies i.e., the number of respondents to questionnaire items while the second numbers represent the expected frequencies.

Table 5: The Chi square (X^2) Table

STATEMENTS	SA	A	D	SD	TOTAL
1	126 (85.2)	88 (93)	24 (67.2)	95 (87.8)	333
2	12 (85.2)	33 (93)	121 (67.2)	167 (87.8)	333
3	79 (85.2)	161 (93)	82 (67.2)	11 (87.8)	333
4	98 (85.2)	100 (93)	60 (67.2)	75 (87.8)	333
5	111 (85.2)	83 (93)	48 (67.2)	91 (87.8)	333
Total	426	465	335	439	1,665
Percentage %	25.59%	27.93%	20.11%	26.37%	100%

Source: Field Survey, 2024

Table 6: Chi square (X^2) Calculation

R-C	FO	FE	FO-FE	(FO-FE) ²	$\frac{(FO-FE)^2}{FE}$
1-1	126	85.2	40.8	1664.64	19.54
1-2	88	93	-5	25	0.27
1-3	24	67.2	-43.2	1866.24	27.77
1-4	95	87.8	7.2	51.84	0.59
2-1	12	85.2	-73.2	5358.24	62.89
2-2	33	93	-60	3600	38.71
2-3	121	67.2	53.8	2894.44	43.07
2-4	167	87.2	79.8	6368.04	73.03
3-1	79	85.2	-6.2	38.44	0.45
3-2	161	93	68	4624	49.72
3-3	82	67.2	14.8	219.04	3.26
3-4	11	87.2	-76.2	5806.44	66.59
4-1	98	85.2	12.8	163.84	1.92
4-2	100	93	7	49	0.53
4-3	60	67.2	-7.2	51.84	0.77
4-4	75	87.2	-12.2	148.84	1.71
5-1	111	85.2	25.8	665.64	7.81
5-2	83	93	-10	100	1.08
5-3	48	67.2	-19.2	368.64	5.49
5-4	91	87.2	3.8	14.44	0.17
					405.37

Calculated value (x^2) = 405.37

Degree of freedom = $(5 - 1)(4 - 1) = 4 \times 3 = 12$

Level of significance = 0.05

Table value = 21.026

Decision: Since the calculated value (405.37) is greater than the table value (21.026) null hypothesis (H_0) is rejected while the alternative hypothesis (H_1) is accepted. This implies that the level of citizens' awareness and attitudes affect solid waste management practices in Akwa Ibom State.

The Effect of Improper Solid Waste Management on Environment and Health in Akwa Ibom State

Table 7 indicates responses of statements 11, 12, 13, 14 and 15 which are relevant to objective 3 by way of analysis, each column represents responses of questionnaire items 11-15. The first column represents Strongly Agreed 370; the second column represent Agreed 473; the third column represent Disagreed 289; and the fourth column represent Strongly Disagreed 533. The first numbers in each cell represent the observed frequencies i.e., the number of respondents to questionnaire items while the second numbers represent the expected frequencies.

Table 7: The Chi square (X^2) Table

STATEMENTS	SA	A	D	SD	TOTAL
11	48 (74)	88 (94.6)	21 (57.8)	176 (106.6)	333
12	44 (74)	75 (94.6)	96 (57.8)	118 (106.6)	333
13	77 (74)	103 (94.6)	69 (57.8)	84 (106.6)	333
14	96 (74)	112 (94.6)	50 (57.8)	75 (106.6)	333
15	105 (74)	95 (94.6)	53 (57.8)	80 (106.6)	333
Total	370	473	289	533	1665
Percentage	22.22%	28.41%	17.36%	32.01%	100%

Source: Field Survey, 2024

Table 8: Chi square (X^2) Calculation

R-C	FO	FE	FO-FE	(FO-FE) ²	$\frac{(FO-FE)^2}{FE}$
1-1	48	74	-26	676	9.14
1-2	88	94.6	-6.6	43.56	0.46
1-3	21	57.8	-36.8	1354.24	23.43
1-4	176	106.6	69.4	4816.36	45.18
2-1	44	74	-30	900	12.16
2-2	75	94.6	-19.6	384.16	4.06
2-3	96	57.8	38.2	1459.24	25.25
2-4	118	106.6	11.4	129.96	1.22
3-1	77	74	3	9	0.12
3-2	103	94.6	8.4	70.56	0.75
3-3	69	57.8	11.2	125.44	2.17
3-4	84	106.6	-22.6	510.76	4.79
4-1	96	74	22	484	6.54
4-2	112	94.6	17.4	302.76	3.20
4-3	50	57.8	-7.8	60.84	1.05
4-4	75	106.6	-31.6	998.56	9.37
5-1	105	74	31	961	12.99
5-2	95	94.6	0.4	0.16	0.00
5-3	53	57.8	-4.8	23.04	0.40
5-4	80	106.6	-26.6	707.56	6.64
					168.92

Calculated value (x^2) = 168.92

Degree of freedom = $(5 - 1)(4 - 1) = 4 \times 3 = 12$

Level of significance = 0.05

Table value = 21.026

Decision: Since the calculated value (168.92) is greater than the table value (21.026) null hypothesis (H_0) is rejected while the alternative hypothesis (H_1) is accepted. This shows that improper solid waste management practices have negative impact on environment and health in Akwa Ibom State.

Findings

The main objective of this study was to assess the impact of public policy on solid waste management in Nigeria. This was carried out through three specific objectives. To this end, the findings will be presented in line with the specific objectives. The study observed through the research questions that respondents moderately agree that the effect of public policies affect solid waste management practices in Akwa Ibom State. While the hypothesis tested also revealed that public policies affect solid waste management practices in Akwa Ibom State. The study also revealed respondents' assessment of the level of citizens' awareness and attitudes towards solid waste management practices Akwa Ibom State to be high. The hypothesis tested also affirmed that the level of citizens' awareness and attitudes affect solid waste management practices Akwa Ibom State.

Finally, the study ascertained through the research questions that majority of respondents agreed with the fact that improper solid waste management practices have negative impact on environment and health in Akwa Ibom State; the hypothesis affirming that improper solid waste management practices have negative impact on environment and health in Akwa Ibom State.

Discussion of Findings

This essentially deals with the analysis of the findings of the research and calculations testing the hypotheses earlier stated. Three hypotheses were formulated and stated and these were in context of the research problem. The three hypotheses were restated and used for calculating the responses from the questionnaire. From research hypothesis one, it was observed that the effect of public policies affects solid waste management practices in Akwa Ibom State. This agrees with the findings of Oteng-Ababio (2013) study, which revealed that public policies play a crucial role in shaping solid waste management practices in developing countries. Similarly, a study by Wilson *et al.* (2015) found that effective public policies can significantly improve solid waste management outcomes, including increased recycling rates and reduced waste disposal in landfills. This implies that effective public policy increases the outcome of waste disposal practices in Akwa Ibom State. It was also discovered in hypothesis two that the level of citizens' awareness and attitudes affect solid waste management practices Akwa Ibom State. This is in line with the findings of Al-Khatib *et al.* (2010) study, which revealed that public awareness and attitudes play a crucial role in determining solid waste management practices. Similarly, a study by Sujauddin *et al.* (2011) found that citizens' awareness and attitudes towards solid waste management significantly influence their participation in waste management activities. The results of this study also indicate that citizens' awareness and attitudes are influenced by various factors, including education, income, and occupation. For instance, citizens with higher levels of education and income tend to have more positive attitudes towards solid waste management.

From research hypothesis three, it was observed that improper solid waste management practices have negative impact on environment and health in Akwa Ibom State. This is in line with the findings of Ogwueleka (2009) study which indicated that improper disposal of solid waste has severe consequences on human health and the environment. This study is also in agreement with the findings of Imam, *et al.* (2008) study which revealed that lack of proper waste management constitutes one of the major environmental and health hazards in Nigeria. The findings of this study reveal a disturbing trend in Akwa Ibom State, where improper solid waste management practices have become a norm. This trend has severe consequences on both human health and the environment. The health implications are particularly alarming, with the spread of diseases such as cholera, dysentery, and typhoid fever being a significant risk due to poor waste management. One of the primary health risks associated with improper solid waste management is the contamination of water sources. When waste is not disposed of properly, it can seep into groundwater and contaminate surface water, making it unfit for human consumption. This can lead to the spread of water-borne diseases, such as diarrhea and gastroenteritis. Furthermore, the pollution of air and soil can also have devastating health consequences, including respiratory problems and cancer. The environmental implications of improper solid waste management in Akwa Ibom State are equally severe. The pollution of air, water, and soil can have far-reaching consequences for the state's ecosystems and natural resources. For instance, the contamination of water sources can harm aquatic life and disrupt the delicate balance of ecosystems. Similarly, the pollution of soil can affect agricultural productivity and food security, having a ripple effect on the entire food chain. The pollution and degradation of the environment can lead to the loss of livelihoods, particularly for communities that depend on natural resources for their survival.

Conclusion

Solid wastes are a major source of pollution in Nigeria; they contribute to the spread of various human diseases. Paper and cartons, plastics/bags/bottles, food wastes, and tins/cans were all identified as solid waste types that pollute the environment in this study. Commercial activities, households, public services/hospitals/clinics, schools, and restaurants/hotels all were the main source of these solid waste categories. The waste management services provided by the authority in Akwa Ibom State, including waste collection frequency, evacuation of refuse from public places and dustbins and clearing of any other domestic waste found within residential premises, fall short of meeting the demands posed by the state's high waste generation rate. The challenges of effective solid waste management in Akwa Ibom State comprises of poor legislation and implementation of policy, poor sensitization programmes on environmental sanitation, limited infrastructures and professionals, poor funding of environmental agencies, lack of incentive to recycling initiatives and disposal techniques.

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