

Institutional Arrangements for Environmental Sanitation Practices in Major Markets of Akwa Ibom State, Nigeria

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Abstract

Environmental sanitation and effective waste management remain critical challenges in public markets across many developing countries due to rapid urbanization, increasing commercial activities, and weak institutional coordination. This study examined the institutional arrangements for environmental sanitation and waste management in major markets of Akwa Ibom State, Nigeria, while also assessing the spatial distribution of the markets using Geographic Information Systems (GIS). A descriptive survey research design incorporating quantitative and qualitative approaches was adopted. Primary data were collected through structured questionnaires administered to 396 market users, field observations, Global Positioning System (GPS) surveys, and key informant interviews with relevant government agencies and market officials. Secondary data were obtained from policy documents, government reports, maps, and published literature. Descriptive statistics, GIS-based spatial analysis, and content analysis were employed for data analysis. The findings revealed that the selected markets were strategically distributed across the three senatorial districts and exhibited varying waste generation patterns associated with urban, semi-urban, and coastal economic activities. Although 70.5% of respondents acknowledged the existence of formal sanitation policies, inadequate funding (69.2%), limited trader participation in sanitation decision-making (55.8%), insufficient sanitation infrastructure, and weak private-sector involvement constrained effective waste management. Nevertheless, market users demonstrated relatively high participation in routine sanitation activities, including regular market clean-up exercises and payment of sanitation fees. The study concludes that strengthening institutional collaboration, improving financial support, expanding sanitation infrastructure, promoting stakeholder participation, and integrating GIS into environmental planning are essential for achieving sustainable market sanitation and waste management. The study provides empirical evidence to support policy reforms aimed at improving environmental governance and public health in market environments across Akwa Ibom State and comparable urban centres in sub-Saharan Africa.

Keywords: Environmental sanitation; Waste management; Institutional arrangements; Markets; Akwa Ibom State; Nigeria.

1. Introduction

Environmental sanitation remains a critical public health and environmental governance issue, particularly in rapidly urbanizing regions of developing countries. The effectiveness of environmental sanitation practices depends largely on the quality of institutional arrangements established to regulate, coordinate, and monitor sanitation activities. Benneh (2017) argued that the successful management of environmental resources depends largely on the effectiveness of institutional structures established by government. These institutional arrangements encompass the organizational structures, policies, regulations, financial mechanisms, stakeholder coordination, and monitoring systems that guide environmental sanitation practices. Consequently, governance structure, policy and regulatory framework, institutional capacity, financial management, and stakeholder participation constitute the major components of effective institutional arrangements for environmental sanitation.

Waste generation in markets is an inevitable consequence of commercial and socio-economic activities (Mariwah, 2012). However, environmental problems arise not from the volume of waste generated but from weak institutional capacity to ensure its proper collection, transportation, treatment, and disposal (Udobia & Akpan, 2023). Jones (2019), Brown (2021), and Green (2018) emphasized that effective waste management requires coordinated planning, efficient collection systems, adequate infrastructure, skilled personnel, sustainable financing, and resource recovery mechanisms. These elements collectively determine the effectiveness of environmental sanitation practices in public places such as markets.

Across many African cities, poor environmental sanitation is manifested through indiscriminate waste disposal, blocked drainage systems, overflowing refuse dumps, and inadequate sanitation facilities. Nigeria continues to experience significant challenges in providing efficient sanitation services due to weak institutional capacity and ineffective service delivery (Udobia & Akpan, 2023). Such deficiencies increase environmental pollution and expose communities to disease outbreaks, flooding, and other environmental hazards.

Markets require particular attention because they are centres of intense commercial activities that generate substantial quantities of solid and liquid waste daily. According to Oluwole, Oluwaseun and Oluwafemi (2018), market environments are often characterized by indiscriminate littering, poor wastewater disposal, inadequate sewage management, open defecation, and other unhygienic practices. Since many markets are located within residential neighbourhoods, poor sanitation conditions pose serious health and environmental risks to surrounding communities. Olatunji (2023) identified sanitation workforce, budget allocation, sanitation infrastructure, waste treatment facilities, recycling equipment, and community participation as key indicators of environmental sanitation, while waste collection frequency, waste segregation efficiency, sanitation service coverage, water quality monitoring, and vector control constitute important operational indicators.

Poor environmental sanitation also undermines sustainable development. Yusuf (2018) noted that inadequate sanitation threatens the achievement of sustainable development objectives through its adverse effects on environmental quality and public health. Similarly, Amadi (2020) emphasized that protecting lives and property requires the creation of a healthy and sustainable environment. Effective environmental sanitation therefore involves the systematic reduction, recycling, reuse, treatment, and safe disposal of waste to minimize environmental and health risks (Tuyahabwe et al., 2022; Udobia & Akpan, 2023).

Markets are indispensable to economic development because they facilitate trade, employment, and income generation (Arthur & Imoro, 2021). However, they are also major sources of environmental pollution when sanitation systems are poorly managed. Fakere and Fadamiro (2012) and Arthur and Imoro (2021) observed that inadequate sanitation in markets contributes to disease outbreaks, flooding, environmental degradation, and loss of aesthetic value.

In Akwa Ibom State, environmental sanitation and waste management are coordinated by the Akwa Ibom State Environmental Protection and Waste Management Agency (AKSEPWMA), established under Akwa Ibom State Law CAP 47 (2000). The Agency is responsible for waste collection, evacuation, environmental protection, and sanitation management across the state. Idemokon (2021) and Esara, Asuquo and Samuel (2024) reported that AKSEPWMA has contributed significantly to maintaining Akwa Ibom's reputation as one of Nigeria's cleanest states between 2018 and 2023. Despite these achievements, many major markets continue to experience indiscriminate waste disposal, overflowing communal refuse depots, blocked drainage channels, and poor sanitation conditions, indicating persistent institutional and operational challenges.

Against this background, this study examines the institutional arrangements for environmental sanitation practices in major markets of Akwa Ibom State, Nigeria, with emphasis on the roles of relevant institutions, policy implementation, stakeholder coordination, institutional capacity, and governance mechanisms influencing sanitation service delivery. The study also assesses the spatial distribution of major markets in the state and evaluates how existing institutional arrangements shape environmental sanitation practices within these markets.

2. Materials and Methods

This study adopted a descriptive survey research design, which was considered appropriate for examining environmental sanitation and waste management practices in major markets across Akwa Ibom State. The design enabled the collection, description, and interpretation of data in their natural settings using both quantitative and qualitative approaches. It provided a systematic framework for assessing the spatial distribution of markets, institutional arrangements for environmental sanitation, waste management practices, and the effectiveness of existing policies and regulations.

Data for the study were obtained from both primary and secondary sources. Primary data were collected through structured questionnaires, field observations, Global Positioning System (GPS) surveys, and in-depth interviews with relevant stakeholders. Secondary data were obtained from published and unpublished materials, including government reports, base maps, population statistics, environmental sanitation policies, waste management regulations, textbooks, journal articles, and official documents from relevant ministries and agencies. These sources provided background information and complemented the field data collected during the study.

The sampling frame comprised 47 major markets distributed across the three senatorial districts of Akwa Ibom State. A systematic random sampling technique was employed to select the study markets. Three major daily markets were selected from each senatorial district, resulting in a total of nine markets. The selection was made using a sampling interval of five from the market inventory, beginning with the first market on the sampling list. The selected markets were Itam Main Market (Itu LGA), Akpan Andem Market (Uyo LGA), and Nung Udoe Market (Ibesikpo Asutan LGA) in Uyo Senatorial District; Abak Main Market (Abak LGA), Ikot Ekpene Main Market (Ikot Ekpene LGA), and Oduk Market (Ikono LGA) in Ikot Ekpene Senatorial District; and

Ibeno Market (Ibeno LGA), Oron Main Market (Oron LGA), and Eket Main Market (Eket LGA) in Eket Senatorial District.

A total of 396 structured questionnaires were administered to market users across the selected markets. Forty-four questionnaires were distributed in each market using a simple random sampling technique, thereby ensuring that respondents had equal chances of participating in the survey. The questionnaire was designed to obtain information on environmental sanitation practices, waste generation, waste disposal methods, sanitation facilities, and respondents' perceptions of waste management services.

To complement the questionnaire survey, in-depth interviews were conducted with key informants who were directly involved in environmental sanitation and waste management. These included the Head of Operations of the Akwa Ibom State Waste Management Agency, the Head of the Environmental Health Department, the Head of the Environmental Sanitation Project, officials of the Ministry of Environment, market management officials, and selected community leaders. These respondents were purposively selected because of their knowledge, experience, and responsibilities relating to environmental sanitation and waste management within the study area. Relevant policy documents, institutional reports, and operational guidelines were also reviewed to provide additional insights into existing sanitation policies and institutional frameworks.

The study also incorporated a spatial analysis of the selected markets. Geographic coordinates comprising latitude and longitude were collected during field surveys using a handheld Global Positioning System (GPS) receiver. The coordinates were imported into ArcGIS software to produce maps showing the spatial distribution of the selected markets across Akwa Ibom State. The GIS analysis facilitated the identification of the geographic distribution and spatial patterns of the markets, thereby providing spatial information to support environmental sanitation planning and management.

Study Area

Akwa Ibom State is located in the South-South geopolitical zone of Nigeria and forms part of the core Niger Delta region. The state lies between latitudes 4°30'N and 5°32'N and longitudes 7°27'E and 8°25'E, covering approximately 8,412 km² (AKADEP, 2006). It shares boundaries with Cross River State to the east, Abia State to the north, Rivers State to the west, and the Atlantic Ocean to the south. Administratively, the state comprises 31 Local Government Areas (LGAs) with Uyo serving as the state capital. Akwa Ibom State occupies a strategic economic position within Nigeria. It is served by three export processing zones, including the Ikot Abasi Export Processing Zone, while also benefiting from its proximity to the Calabar Export Processing Zone and the Oil and Gas Free Zone in Port Harcourt. These facilities, together with access to the Calabar and Port Harcourt seaports, enhance the state's commercial and industrial significance (AKSHTB, 2009).

Physiographically, the state consists of five major terrain types: alluvial plains, beach ridge sands, rolling sandy plains, dissected uplands, and the Obotme isolated hills, which rise to approximately 150 m above sea level (AKSHTB, 2009, cited in Ekong, 2016). The landscape is predominantly low-lying coastal plain underlain by young sedimentary formations. However, the northern parts around Itu, Ibiono Ibom, Ini, Nkari and Obotme are characterized by rugged valleys and dissected ridges.

The drainage system is dominated by three major rivers—the Cross River, Qua Iboe River, and Imo River—which discharge into the Atlantic Ocean. Drainage density is generally low within the upland areas where streams are relatively sparse. The climate is tropical humid with distinct wet and dry seasons. Rainfall is controlled by the interaction of the Tropical Maritime (mT) and Tropical Continental (cT) air masses (NACD, 2011). The rainy season extends from March/April to November, interrupted briefly by the August Break. Annual rainfall ranges from approximately 4,000 mm along the coastal belt to about 2,000 mm inland.

Based on projections from the 2006 National Population Census using an annual growth rate of 3.4%, the estimated population of Akwa Ibom State in 2024 was 7,181,821, comprising 3,745,542 males and 3,436,279 females. The study focused on the major markets distributed across the three senatorial districts of Akwa Ibom State (Figure 1).

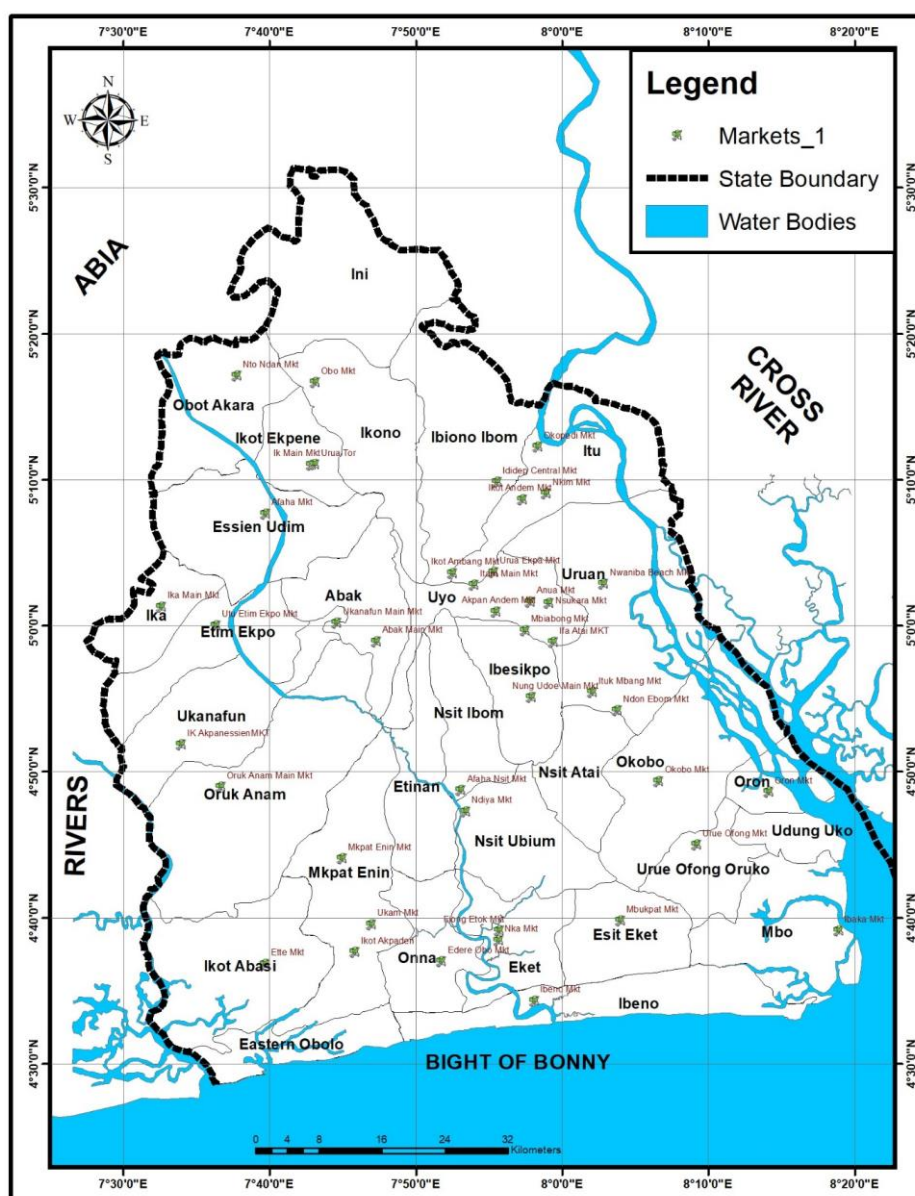


Figure 1: Location of Main Markets in Akwa Ibom State

Source: GIS Unit, UNIUYO, 2026

Table 1 Distribution of Main Markets in Akwa Ibom State

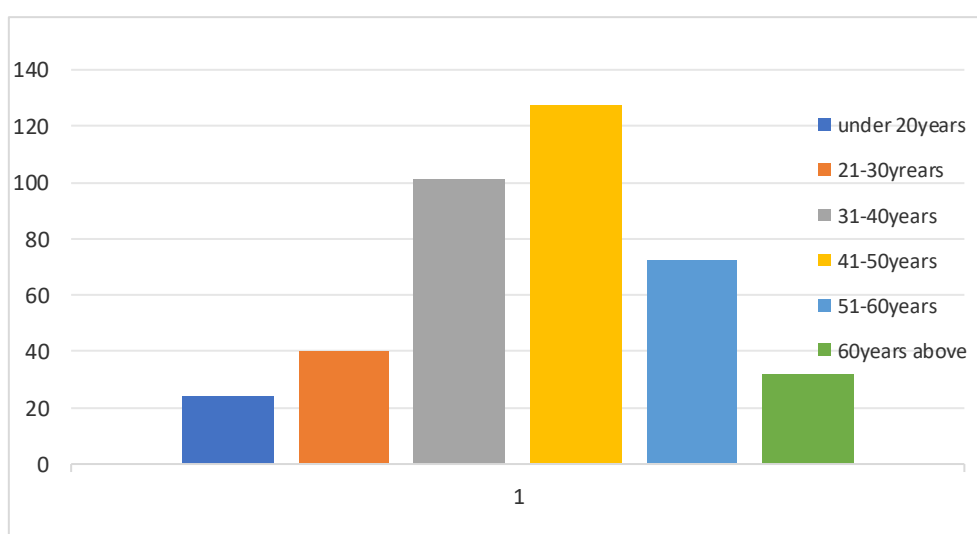
S/n	Location of markets	No of markets	Percentage (%)
1	Ikot Ekpene	12	25.5
2	Uyo	20	42.5
3	Eket	15	31.9
Total		47	100

Source: Researcher's Field Survey, 2026

Data collected from the questionnaires, interviews, observations, and document reviews were analysed using both quantitative and qualitative techniques. Descriptive statistical tools, including frequencies, percentages, tables, charts, and maps, were employed to summarize and present the quantitative data. Spatial data were analysed using GIS to illustrate the distribution of markets within the study area. Qualitative data obtained from interviews and document reviews were analysed using content analysis, which enabled the identification of key themes relating to environmental sanitation policies, institutional arrangements, regulatory frameworks, and waste management practices. The combination of these analytical techniques provided a comprehensive understanding of environmental sanitation and waste management in the major markets of Akwa Ibom State.

3. Results and Findings

On the age status, it was discovered that more respondents were within the range of 41-50years with one hundred and twenty-seven (127) respondents representing 32.1% of the total respondents, age range between 31-40years was next in line with a total of one hundred and one (101) respondents representing 25.5% of the total respondents. Seventy-two (72) of the respondents representing 18.2% of the total respondents fell within 51-60years, forty (40) respondents representing 10.0% were within 21-30years. 61years and above were thirty-two (32) respondents representing 8.1% of the total respondents while twenty-four (24) respondents representing 6.1% of the total respondents were under 20. This shows that most people involved in market sanitation and waste management are adults.

**Figure 2 Age Distribution of Respondents**

Source: Researcher Field Survey, 2026

The research study shows that one hundred and sixty-nine (169) respondents representing 42.7% of the respondents were male while two hundred and twenty-seven (227) respondents representing 57.3% of the total respondents were female. This shows a good representation and involvement of men and women in the sanitation and waste managements in the market.

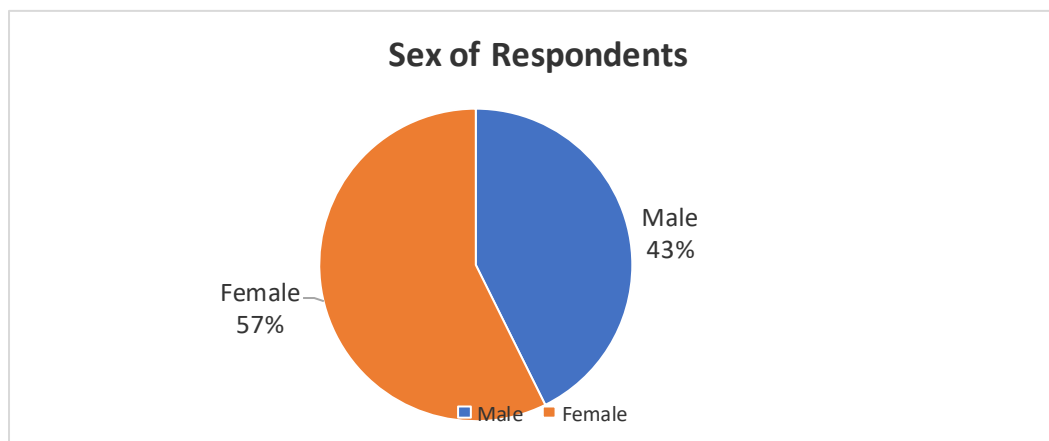


Figure 3 Sex of Respondents

Source: Researcher Field Survey, 2026

On educational status, two (2) respondents representing 0.5% of the total respondents had no informal education, one hundred and four (104) of the total respondents representing 26.3% had primary education. One hundred and sixty-eight (168) of the respondents representing 42.4% had secondary education while one hundred and twenty-two (122) representing 30.8% of the total respondents had tertiary education. This indicate that majority of the respondents were literates.

Table 2 Educational Status of Respondents

S/n	Educational status	Frequency	Percentage (%)
1	No formal education	2	0.5
2	Primary	104	26.3
3	Secondary	168	42.4
4	Tertiary	122	30.8
	Total	396	100

Source: Researcher Field Survey, 2026

A total of two hundred and seventy-five (275) respondents representing 69.4% of the total respondents asserted they are vendors. Sixty-six respondents (66) representing 16.7% were buyers, ten (10) respondents representing 2.5% of the total respondents were suppliers. seventy (17) respondents representing 4.3% were transporters while twenty-eight (28) respondents representing 7.1% of the total respondents were market staff. This indicated the involvement of market stakeholders in environmental sanitation and waste management and their inclusion in the research findings.

Table 3 Occupation of the Respondents

S/n	Occupations	Frequency	Percentage (%)
1	Vendors	275	69.4
2	Buyers	66	16.7

3	Suppliers	10	2.5
4	Transporters	17	4.3
5	Market staff	28	7.1
	Total	396	100

Source: Researcher Field Survey, 2026

On average monthly income, one hundred and fifty-four (154) respondents representing 38.9% of the total respondents earned income less than ₦50,000 monthly. One hundred and thirty-four (134) respondents representing 33.8% of the total respondents earned monthly income between ₦51,000-₦100,000. Sixty-seven (67) respondents or 16.9% of the total respondents earned between ₦101,000- ₦200,000 while forty-one (41) respondents representing 10.4% of the total respondents earned ₦201,000 and above. This indicated that majority of the market people earns below the Nigeria new minimum wage of ₦70,000 per month.

Table 4 Average Monthly Income of Respondents

S/n	Income / month	Frequency	Percentages (%)
1	Less than ₦50,000	154	38.9
2	₦51,000-₦100,000	134	33.8
3	₦101,000-₦200,000	67	16.9
4	₦201,000 above	41	10.4
	Total	396	100

Source: Researcher Field Survey, 2026

Considering the movement time of respondents to the market which indicate their distance to the market, one hundred and ninety-two (192) respondents representing 48.5% of the total respondents used less than 1km, one hundred and twenty-one (121) respondents representing 30.6% of the respondents said 1-5km. Fifty-six (56) respondents or 14.1% of the total respondents used a distance of 6-10km while twenty-seven (27) respondents representing 6.8% of the total respondents distanced 10km and above from the market.

Table 5: Formal Rules or Policies on Sanitation and Waste Management

S/N	Availability of Rules/Policies	Frequency	Percentage (%)
1	Yes	279	70.5
2	No	15	3.8
3	No Idea	102	25.7
	Total	396	100

Source: Researcher Field Survey (2026)

The result in Table 5 shows that 279 respondents (70.5%) confirmed the existence of formal rules and policies guiding sanitation and waste management in their respective markets. However, 102 respondents (25.7%) indicated that they had no knowledge of such policies, while 15 respondents (3.8%) stated that no formal regulations existed. The findings indicate that although institutional frameworks for environmental sanitation are established in most markets, awareness of these regulations among market users remains inadequate. This limited awareness may reduce compliance with sanitation guidelines and weaken institutional effectiveness. The finding supports Benneh (2017), who argued that institutional arrangements are only effective when stakeholders are adequately informed and actively participate in implementation. Similarly, Udobia and Akpan

(2023) reported that inadequate awareness of environmental regulations contributes to indiscriminate waste disposal and poor sanitation practices in Nigerian urban centres.

Table 6: Those Responsible for Waste Management in the Market

S/N	Responsible Institution	Frequency	Percentage (%)
1	Market Association	196	49.5
2	Local Government	183	46.2
3	Private Waste Collectors	17	4.3
4	NGOs	0	0
Total		396	100

Source: Researcher Field Survey (2026)

As shown in Table 6, 196 respondents (49.5%) identified market associations as the institutions primarily responsible for waste management, while 183 respondents (46.2%) attributed the responsibility to local government authorities. Only 17 respondents (4.3%) indicated private waste collectors, whereas none identified non-governmental organizations as responsible for sanitation activities. The findings suggest that environmental sanitation in the markets is predominantly managed through institutional collaboration between market associations and government agencies, with very limited participation from the private sector and civil society. This agrees with Idemokon (2021), who observed that waste management in Akwa Ibom State is mainly coordinated by government institutions, particularly AKSEPWMA. However, the finding contrasts with the World Bank (2022), which recommends stronger public-private partnerships to improve efficiency and sustainability in municipal waste management.

Table 7: Regular Allocation of Funds for Sanitation and Waste Management

S/N	Fund Allocation	Frequency	Percentage (%)
1	Yes	26	6.6
2	No	274	69.2
3	No Idea	96	24.2
Total		396	100

Source: Researcher Field Survey (2026)

The findings in Table 7 indicate that 274 respondents (69.2%) stated that there was no regular allocation of funds for sanitation and waste management, while only 26 respondents (6.6%) confirmed the availability of regular funding. Another 96 respondents (24.2%) were unaware of the funding situation. This demonstrates that inadequate financial support remains one of the major institutional challenges affecting environmental sanitation in major markets. Without adequate funding, waste collection, maintenance of sanitation facilities, monitoring, and enforcement become ineffective. This finding corroborates Brown (2021) and Ezeudu et al. (2021), who identified inadequate financing as one of the greatest constraints to effective waste management in developing countries.

Table 8: Traders and Vendors Involvement in Decision-Making on Sanitation Policies

S/N	Involvement	Frequency	Percentage (%)
1	Yes	70	17.7
2	No	221	55.8
3	No Idea	105	26.5
Total		396	100

Source: Researcher Field Survey (2026)

The findings presented in Table 8 reveal that 221 respondents (55.8%) stated that traders and vendors were not involved in decision-making concerning sanitation policies within their markets. In contrast, 70 respondents (17.7%) confirmed their involvement, while 105 respondents (26.5%) indicated that they had no knowledge of such participation. The result suggests that sanitation governance in major markets is largely implemented through a top-down institutional approach with limited stakeholder participation. Since traders are the primary generators of market waste, their exclusion from policy formulation may reduce ownership of sanitation programmes and weaken compliance with established regulations. This finding supports Mariwah (2012), who emphasized that sustainable environmental sanitation depends on the active participation of waste generators in planning and implementation. The result also aligns with the participatory governance principles advocated under Sustainable Development Goal 11, which encourage inclusive urban governance and stakeholder engagement in environmental management.

Table 9: Methods of Waste Disposal in the Market

S/N	Disposal Methods	Frequency	Percentage (%)
1	Dump in public bin	193	48.7
2	Burn it	0	0
3	Leave on the ground	15	3.8
4	Dump in drains	26	6.6
5	Pay private waste collectors	162	40.9
Total		396	100

Source: Researcher Field Survey (2026)

As shown in Table 9, 193 respondents (48.7%) disposed of their waste through designated public bins, while 162 respondents (40.9%) relied on private waste collectors. However, 26 respondents (6.6%) admitted dumping refuse into drainage channels and 15 respondents (3.8%) disposed of waste by leaving it on open ground. None of the respondents reported burning waste within the market environment. These findings indicate that although most traders adopt acceptable waste disposal methods, a small but significant proportion still engage in indiscriminate disposal practices capable of blocking drainage systems, degrading environmental quality, and increasing public health risks. The finding corroborates Oluwole, Oluwaseun and Oluwafemi (2018), who observed that indiscriminate waste disposal remains common in Nigerian markets because of inadequate sanitation infrastructure and weak enforcement of environmental regulations. Similarly, Arthur and Imoro (2021) reported that poor waste disposal contributes significantly to flooding, environmental pollution, and disease outbreaks in market environments.

Table 10: Availability of Public Toilets and Hand-Washing Stations

S/N	Availability	Frequency	Percentage (%)
1	Yes	143	36.1
2	No	181	45.7
3	No Idea	72	18.2
Total		396	100

Source: Researcher Field Survey (2026)

The result in Table 10 indicates that 181 respondents (45.7%) reported that public toilets and hand-washing stations were unavailable in their markets, while 143 respondents (36.1%) confirmed their

availability. Another 72 respondents (18.2%) were uncertain about the existence of such facilities. The findings suggest that sanitation infrastructure remains inadequate in many major markets across Akwa Ibom State. The absence of basic sanitation facilities may encourage unhygienic practices, increase environmental contamination, and expose traders and consumers to communicable diseases. This finding agrees with Olatunji (2023), who identified sanitation infrastructure as a critical determinant of environmental sanitation. It also supports the World Health Organization (2022), which emphasized that adequate sanitation facilities are essential for preventing disease transmission and maintaining hygienic public environments.

Table 11: Responsibility for Cleaning the Market

S/N	Cleaning Responsibility	Frequency	Percentage (%)
1	Traders	244	61.6
2	Paid Cleaners	127	32.1
3	Local Government	0	0
4	No Idea	25	6.3
Total		396	100

Source: Researcher Field Survey (2026)

The findings in Table 11 show that 244 respondents (61.6%) identified traders as those primarily responsible for cleaning the market, while 127 respondents (32.1%) indicated that paid cleaners performed this responsibility. None of the respondents attributed routine market cleaning directly to the local government, whereas 25 respondents (6.3%) had no knowledge of who was responsible. This finding demonstrates that routine environmental sanitation in major markets relies heavily on traders and market management rather than direct government intervention. The result reflects a community-based sanitation approach in which market users assume considerable responsibility for maintaining cleanliness.

Furthermore, respondents reported a high level of participation in sanitation activities, with 79.0% regularly sweeping their stalls and surrounding areas, 76.0% disposing of waste in designated bins, 85.1% participating in scheduled market sanitation exercises, and 83.1% paying sanitation or waste management fees. However, none of the respondents practiced waste segregation into recyclable and non-recyclable materials. This indicates that while individual commitment to maintaining clean market environments is commendable, sustainable waste management practices such as recycling and resource recovery remain poorly developed. These findings agree with Sridhar, Oluborode and Uwadiogwu (2017), who observed that although participation in routine sanitation activities is relatively high in Nigeria, waste segregation at source remains uncommon because of inadequate infrastructure, weak recycling systems, and limited environmental education. Likewise, Green (2018) argued that effective waste management should extend beyond waste collection and disposal to incorporate waste sorting, recycling, and resource recovery for long-term environmental sustainability.

5. Conclusion

This study examined the institutional arrangements and responses to environmental sanitation and waste management in major markets across Akwa Ibom State. The findings demonstrate that while institutional structures, sanitation policies, and stakeholder coordination mechanisms exist, their effectiveness is constrained by inadequate funding, weak stakeholder participation, insufficient sanitation infrastructure, and limited public awareness of environmental regulations.

The GIS analysis further established that the spatial distribution of markets significantly influences waste generation patterns, indicating that waste management strategies should be location-specific rather than adopting a uniform approach. Urban markets generate larger quantities of municipal solid waste, whereas coastal and semi-urban markets produce distinctive waste streams requiring specialized management strategies.

Although market users exhibited commendable participation in sanitation activities, the absence of waste segregation and limited recycling initiatives reveal significant gaps in sustainable waste management practices. Overall, strengthening institutional collaboration, increasing financial investment, expanding sanitation infrastructure, promoting environmental education, and encouraging community participation will substantially improve environmental sanitation and waste management in major markets across Akwa Ibom State.

5.1 Recommendations

Based on the findings of the study, the following recommendations are proposed:

1. The Akwa Ibom State Government should strengthen institutional coordination among the Ministry of Environment, Akwa Ibom State Environmental Protection and Waste Management Agency, Local Government Authorities, market associations, and private waste management operators through clearly defined responsibilities and regular inter-agency meetings.
2. Government should establish dedicated and sustainable funding mechanisms for environmental sanitation and waste management in major markets to ensure regular waste collection, maintenance of sanitation facilities, and effective monitoring.
3. Environmental sanitation policies should be widely disseminated through continuous public enlightenment campaigns, market sensitization programmes, and environmental education to improve awareness and compliance among traders and market users.
4. Market associations should be actively involved in environmental policy formulation, implementation, and monitoring to promote participatory governance and enhance compliance with sanitation regulations.
5. Modern sanitation infrastructure, including public toilets, handwashing facilities, waste bins, transfer stations, and recycling collection centres, should be provided in all major markets to improve environmental hygiene.
6. Source segregation of waste should be introduced by providing colour-coded waste bins for biodegradable, recyclable, and non-recyclable wastes. This should be accompanied by sustained public education on waste sorting and recycling practices.

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Authors' contributions

All authors read and approved the final manuscript.

Declarations

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Competing interests

The authors declare that they have no competing interests.

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