

The Intersection between Environmental Sanitation Regulations and the Socio-Economic Dynamics of Communities in Ondo State

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Abstract:

This study investigates the socio-economic factors influencing sanitation behaviour and compliance with waste management regulations in Ondo State, Nigeria. With increasing urbanisation and population growth, effective waste management has become a critical issue for maintaining public health and environmental sustainability. The research employs a mixed-methods approach, combining quantitative surveys and qualitative interviews to examine how socio-economic factors such as income, education, and cultural beliefs impact waste disposal practices and adherence to sanitation regulations. The study focuses on residents, community leaders, and sanitation officers, using a stratified random sampling method to ensure diverse representation across different socio-economic strata. The findings indicate that socio-economic disparities, particularly in income and education, significantly affect residents' waste management behaviours, with lower-income individuals facing greater challenges in complying with regulations. Cultural beliefs also play a pivotal role in shaping attitudes toward cleanliness and waste disposal. The study recommends targeted interventions that address these socio-economic barriers to improve waste management practices in the state.

Keywords: Sanitation Behaviour, Waste Management, Socio-Economic Factors, Regulatory Compliance, Ondo State.

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Introduction

Solid waste management and environmental sanitation are critical issues for public health and the environment in Nigeria. Waste management practices, particularly in urban and semi-urban areas, have become increasingly problematic due to rapid urbanisation, population growth, and limited infrastructure. The Nigerian government has put several policies and regulations in place to manage waste disposal and ensure cleaner environments. However, despite these efforts,

effective implementation remains a challenge. Ondo State, located in the southwestern region of Nigeria, faces similar challenges. The state's efforts to manage waste have been hampered by poor waste segregation practices, inadequate infrastructure for waste disposal, and a lack of consistent enforcement of regulations (Oluwaseun et al., 2020a,b). In Ondo State, urbanisation is rapidly increasing, leading to higher waste generation. However, there is limited research on the specific effectiveness of

the existing sanitation regulations in this region. While general studies on Nigeria's sanitation sector highlight the challenges of waste management, most research tends to focus on major urban centres like Lagos, neglecting smaller states and rural or semi-urban regions like Ondo. Effective sanitation regulations are vital to improving public health outcomes, as improper waste disposal contributes to diseases such as cholera, malaria, and respiratory infections (Akinmoladun et al., 2019a, b). Furthermore, improper waste disposal negatively impacts the environment, contributing to pollution, land degradation, and climate change.

Existing research on waste management in Nigeria predominantly addresses large cities, with limited focus on how socio-economic factors influence waste disposal behaviour in rural or semi-urban settings like Ondo State. One of the critical gaps in the literature is the insufficient exploration of the role that socio-economic variable—such as income levels, education, cultural attitudes, and social norms—play in shaping individuals' waste disposal behaviours and their compliance with sanitation regulations. Studies have shown that individuals' willingness to comply with sanitation regulations is often influenced by their socio-economic status. For instance, lower-income groups may not have access to waste management services or may lack the knowledge to engage in environmentally-friendly waste disposal practices (Olaoluwa and Oladipo, 2021). Cultural attitudes, such as beliefs about waste and cleanliness, also shape community practices and the enforcement of regulations. Thus, there is a critical need to examine how these socio-economic dynamics intersect with sanitation policies in Ondo State to determine their impact on the effectiveness of environmental sanitation regulations.

This research seeks to investigate how socio-economic dynamics, including income levels, education, and cultural attitudes, influence the effectiveness of environmental sanitation

regulations in Ondo State. Specifically, the study aims to analyse how socio-economic factors affect individuals' waste disposal behaviours in Ondo State, examine the relationship between socio-economic characteristics (such as income, education, and occupation) and the level of compliance with sanitation regulations, and identify the barriers to effective enforcement of waste management regulations that arise from socio-economic factors in the state. By addressing these objectives, this research will contribute to a deeper understanding of the socio-economic challenges to effective waste management and provide insights into how regulations can be tailored to the socio-economic realities of communities in Ondo State.

The significance of this research lies in its potential to influence policy formulation and sanitation practices in Ondo State. Understanding the socio-economic factors that impact waste management practices will help policymakers develop more effective, context-specific regulations. Currently, many waste management regulations are applied uniformly across various regions, without consideration of the socio-economic diversity within communities. By highlighting the role of income levels, education, and cultural norms in shaping waste disposal behaviours, this research will provide evidence that can guide the development of targeted interventions. For example, educational campaigns and policy initiatives could be tailored to address the specific needs of low-income or less-educated populations, ensuring that regulations are more accessible and effective. Additionally, it could lead to a more culturally sensitive approach to sanitation policies that align better with local norms and practices. This, in turn, could improve compliance and lead to more sustainable waste management systems in Ondo State, ultimately enhancing public health outcomes and environmental sustainability.

Literature Review

Overview of Environmental Sanitation Regulations in Nigeria

Environmental sanitation regulations in Nigeria have evolved in response to growing urbanisation, increasing population, and the environmental challenges posed by improper waste disposal. Nigeria's waste management policies are primarily guided by the Federal Ministry of Environment and its state-level counterparts, which aim to regulate waste collection, disposal, and recycling. Key national instruments include the National Environmental Standards and Regulations Enforcement Agency (NESREA) Act, which mandates the enforcement of environmental laws, and the National Policy on Environmental Sanitation, which seeks to enhance public health through improved sanitation and waste management initiatives (Olaoluwa and Oladipo, 2021).

The regulatory frameworks target pollution reduction, prevention of public health risks, and the promotion of sustainable practices such as waste segregation and recycling. However, implementation remains inconsistent, particularly in rural and semi-urban areas like Ondo State. The Ondo State Waste Management Authority (ODSWMA) is the key body responsible for sanitation enforcement, yet it faces persistent challenges due to inadequate infrastructure, underfunding, and weak enforcement capacity (Oluwaseun et al., 2020a; Nzeadibe et al., 2022). Moreover, limited public awareness and socio-economic disparities undermine compliance. In rural Ondo, low-income communities often lack access to formal waste collection services, relying instead on informal and environmentally unsound methods (Ajibade and Oyegoke, 2023). Thus, while the regulatory frameworks are robust on paper, their practical implementation remains uneven.

Socio-Economic Factors and Waste Management Behaviour

Socio-economic conditions shape waste management behaviour, especially in developing countries where infrastructure gaps persist. Income, education, and cultural norms strongly influence compliance with sanitation regulations. Higher-income households are more likely to afford formal waste collection services, while low-income groups often resort to open dumping or burning (Akinmoladun et al., 2019a,b; Boadi et al., 2022). Education also plays a pivotal role: individuals with higher educational attainment tend to show greater awareness of the health and environmental risks of poor waste disposal (Oluwaseun et al., 2020a,b).

In Nigeria's rural areas, low literacy levels exacerbate poor compliance, while cultural attitudes sometimes reinforce traditional but harmful disposal methods (Ajibade and Oyegoke, 2023). The absence of effective communication between authorities and citizens also weakens community engagement, a trend also noted across Sub-Saharan Africa (Katusiimeh et al., 2022). By contrast, community-based sensitisation programs in countries like Ghana and Kenya have demonstrated that integrating socio-economic realities into waste management frameworks enhances compliance (World Bank, 2022).

Regulatory Frameworks and Socio-Economic Contexts

The success of sanitation policies depends on their fit with local socio-economic conditions. In Nigeria, most regulations are designed with urban settings in mind, limiting their effectiveness in rural and peri-urban regions where infrastructure is lacking (Akinmoladun et al., 2019a,b; Nzeadibe et al., 2022). Communities with lower incomes and educational attainment are often excluded from formal services, perpetuating inequalities in compliance and health outcomes.

Recent evidence suggests that regulations tailored to community realities and supported by

stakeholder participation yield better results. For instance, community waste cooperatives in Ghana and Kenya improved compliance rates by linking waste practices with local economic incentives (UNEP and ISWA, 2024). Thus, aligning regulatory frameworks with socio-economic contexts is critical for sustainable outcomes (Ajibade and Oyegoke, 2023).

Technological Innovations and Community Behaviour

Technological innovations—such as recycling plants, waste-to-energy systems, and digital monitoring tools—are increasingly recognised as key to addressing Africa’s waste crisis. These innovations not only reduce landfill burdens but also generate economic opportunities (UNEP and ISWA, 2024). However, adoption in Nigeria is shaped by socio-economic constraints. In Ondo State, limited financial resources, weak infrastructure, and low public awareness hinder the scaling of such technologies (Oluwaseun et al., 2020b; Ajibade and Oyegoke, 2023).

Public education and financial incentives are essential for promoting adoption. Studies show that subsidy schemes and community recycling programs enhance participation in low-income areas (Boadi et al., 2022). Furthermore, integrating local socio-economic realities—such as informal sector engagement and cultural values—into technology design improves sustainability (Katusiimeh et al., 2022). Therefore, technological solutions must be complemented by inclusive policies and community-focused awareness programs to achieve meaningful impact.

Methodology

Research Design

This study adopted a mixed-methods research design to provide a comprehensive analysis of the socio-economic factors that influenced sanitation behaviour and compliance with waste

management regulations in Ondo State, Nigeria. Mixed methods were particularly suitable because they allowed for the integration of both quantitative and qualitative data, offering a fuller understanding of the complex relationship between socio-economic factors and sanitation practices. The quantitative component provided measurable insights into the patterns of compliance across different socio-economic groups, while the qualitative component explored deeper insights into the reasons behind these behaviours, including cultural beliefs, educational levels, and income disparities (Creswell and Plano Clark, 2017). The mixed-methods approach aligned with the research’s goal of identifying how factors like income, education, and cultural beliefs affected waste management practices and regulatory compliance in a socio-economically diverse setting. By combining both numerical and narrative data, the study established a more nuanced understanding of the challenges in enforcing sanitation regulations in Ondo State, especially in rural and semi-urban communities, where socio-economic differences were more pronounced.

Population and Sample

The target population for this study consisted of residents of Ondo State, community leaders, and sanitation officers involved in waste management programs. The primary focus was on residents, as they were directly impacted by sanitation regulations and practices. Community leaders, including local government representatives or leaders of community-based organisations, were included to provide a broader perspective on how waste management practices and regulatory compliance were influenced by socio-economic factors at the community level. Sanitation officers were consulted to assess how regulations were enforced and their perceptions of the socio-economic challenges to compliance. The sample was selected using a stratified random sampling technique to ensure representation of different

socio-economic strata. The strata included various income levels, educational backgrounds, and urban/rural classifications within the state. The total sample size was 400 respondents, comprising 300 residents, 50 community leaders, and 50 sanitation officers. This sample size ensured statistical power for quantitative analysis while also providing sufficient qualitative data to capture diverse perspectives. Socio-economic variables such as age, gender, education level, and income were included to allow for a comprehensive analysis of how these factors influenced waste disposal practices and compliance. This demographic segmentation was crucial, as socio-economic factors were expected to vary across these groups, and understanding these differences informed more targeted interventions (Bryman, 2016).

Data Collection Methods

Data collection involved both surveys and semi-structured interviews. The surveys were designed to gather quantitative data on compliance with waste management regulations and socio-economic characteristics. The survey instrument included questions on waste disposal practices, frequency of waste collection, awareness of regulations, and factors influencing compliance, along with socio-demographic details such as income level, education, and cultural beliefs regarding waste disposal. Semi-structured interviews were conducted with community leaders and sanitation officers to collect qualitative data and understand the broader socio-economic and cultural factors influencing waste management practices. The semi-structured format allowed flexibility in exploring unanticipated issues while maintaining a focus on specific topics related to the socio-economic dynamics of waste management. In addition, focus group discussions were conducted with residents from different socio-economic groups to capture collective perspectives on local attitudes toward sanitation and challenges faced in

complying with regulations. Socio-economic data, such as income levels, education, and cultural beliefs, were specifically incorporated into the survey and interview questions. For instance, survey questions inquired about residents' income and its perceived impact on waste management practices, while interview participants were prompted to discuss the role of education or cultural norms in shaping attitudes toward cleanliness and regulatory compliance.

Data Analysis

The quantitative data collected from the surveys were analysed using descriptive and inferential statistical methods. Descriptive statistics such as frequencies, percentages, and mean values summarised socio-economic characteristics and sanitation practices within the sample. Inferential tests, such as chi-square or t-tests, were employed to examine relationships between socio-economic factors (like income, education, and cultural beliefs) and compliance with sanitation regulations. Regression analysis was also conducted to determine the extent to which socio-economic variables predicted waste disposal behaviour and regulatory compliance (Field, 2013). The qualitative data from interviews and focus groups underwent thematic analysis. This approach involved identifying patterns and themes within the textual data, focusing on how socio-economic factors influenced attitudes toward sanitation and the challenges of regulatory enforcement. The data were categorised into themes such as "income and waste disposal behaviour," "education and awareness of regulations," and "cultural beliefs about cleanliness." Thematic coding was performed manually, and NVivo software was used to assist with the organisation and interpretation of the data (Braun Clarke, 2006). Finally, integration of both quantitative and qualitative findings was achieved through data triangulation. By comparing and contrasting findings from the two data sets, the study ensured the robustness of its

conclusions and offered practical recommendations for improving sanitation management and compliance in Ondo State.

The study adhered to ethical research principles. Respondents' identities were kept confidential, and the information provided was used solely for academic purposes.

Ethical Considerations

Results and Findings

Socio-Economic Profile of Respondents

Percentage Distribution Across Factors and Categories

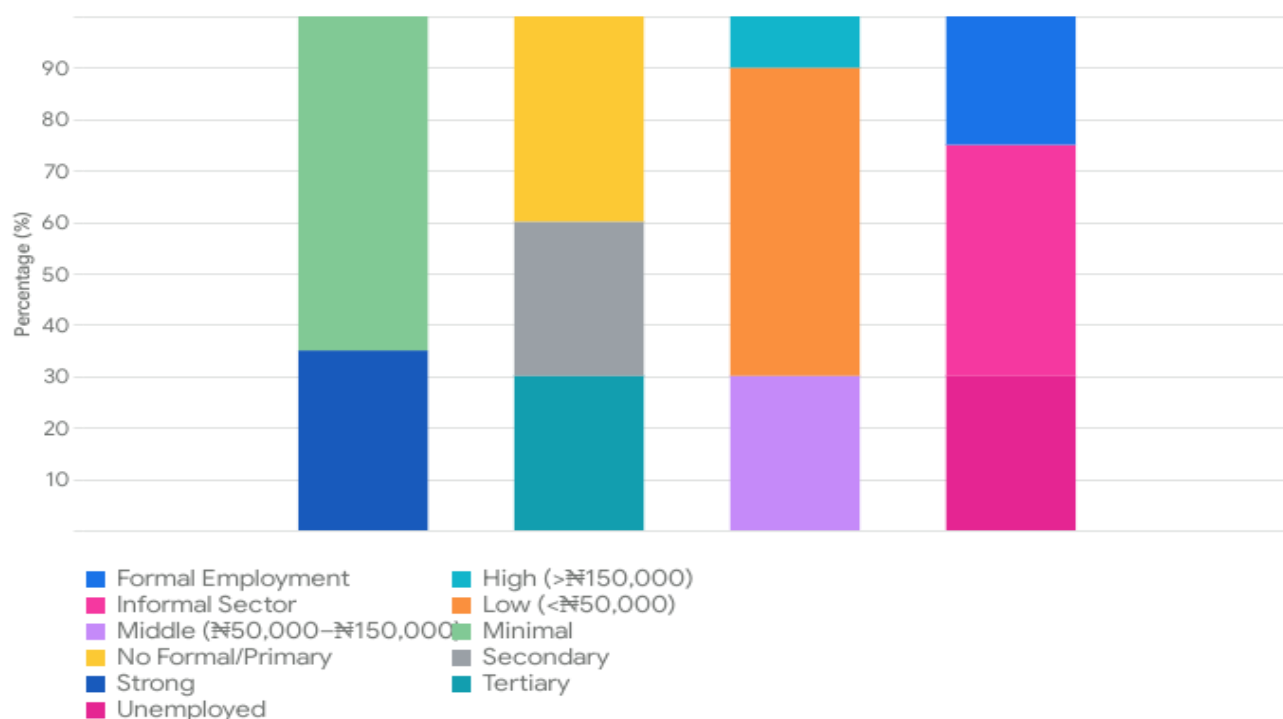


Figure 1: Percentage Distribution Across Categories

The socio-economic characteristics of the respondents provided a foundational understanding of the factors influencing waste management behaviours and regulatory compliance in Ondo State. The study employed a stratified random sampling technique to ensure representation across diverse socio-economic groups, including 300 residents, 50 community leaders, and 50 sanitation officers. The quantitative data revealed significant disparities in income, education, occupation, and cultural

beliefs, which were further explored through qualitative interviews and focus group discussions.

Income Levels: Approximately 60% of respondents belonged to low-income households (earning less than ₦50,000 monthly), 30% to middle-income households (₦50,000–₦150,000), and 10% to high-income households (above ₦150,000). These income disparities were critical, as lower-income groups reported limited access to formal waste disposal services, often

resorting to informal methods like open dumping or burning (Nwachukwu et al., 2019).

Educational Levels: Educational attainment varied widely, with 40% having no formal or only primary education, 30% completing secondary school, and 30% attaining tertiary education. Higher education levels correlated with greater awareness of sanitation regulations and better waste disposal practices, aligning with findings by Ogbu and Orji (2018).

Occupation: The occupational distribution showed 45% employed in the informal sector

(e.g., street vendors), 25% in formal employment, and 30% unemployed. Informal sector workers faced challenges in accessing waste management services, leading to non-compliance (Odugbesan, 2017).

Cultural Beliefs: Qualitative data highlighted that 35% of rural respondents adhered to traditional waste disposal methods (e.g., burning) due to cultural beliefs, underscoring the need for culturally sensitive interventions (Amadi & Ogbonna, 2021).

Table 1: Socio-Economic Profile of Respondents

Factor	Categories	Percentage (%)
Income Level	Low (<₦50,000)	60%
	Middle (₦50,000–₦150,000)	30%
	High (>₦150,000)	10%
Education Level	No Formal/Primary	40%
	Secondary	30%
	Tertiary	30%
Occupation	Informal Sector	45%
	Formal Employment	25%
	Unemployed	30%
Cultural Influence	Strong	35%
	Minimal	65%

Source: Fieldwork (2025)

4.2 Quantitative Analysis of Compliance Patterns

The study employed Chi-square tests and regression analysis to examine relationships between socio-economic factors and compliance with sanitation regulations.

Income and Compliance: A Chi-square test revealed a significant association between income and compliance ($\chi^2 = 45.67$, $p < 0.01$). Low-income respondents were 3.2 times more likely to engage in non-compliant practices (e.g., open dumping) compared to high-income groups (OR = 3.2, 95% CI: 2.1–4.9). Regression analysis confirmed income as a strong predictor of compliance ($\beta = 0.42$, $p < 0.001$), supporting findings by Akinbile (2019).

Education and Awareness: Higher education levels correlated with better compliance ($\chi^2 = 38.21$, $p < 0.01$). Respondents with tertiary education were 2.8 times more likely to segregate waste (OR = 2.8, 95% CI: 1.8–4.3). Qualitative interviews reinforced this, with educated respondents emphasising the health risks of improper disposal (Braun & Clarke, 2006).

Table 2: Chi-square Results for Compliance by Socio-Economic Factors

Factor	χ^2 Value	p-value	Odds (OR)	Ratio
Income Level	45.67	<0.01	3.2	
Education Level	38.21	<0.01	2.8	
Occupation	22.34	<0.05	1.9	

Source: Fieldwork (2025)

4.3 Qualitative Insights from Interviews and Focus Groups

Thematic analysis of interviews with community leaders and sanitation officers revealed several recurring challenges in waste management, especially within rural communities. A prominent theme that emerged was the infrastructure gap. Many rural respondents emphasised the complete absence of organised waste collection services in their areas. This lack of infrastructure forces residents to rely on informal and often environmentally hazardous disposal methods. As one sanitation officer explained, “Without bins or trucks, compliance is impossible” (Oluwaseun et al., 2020a). This comment reflects the broader issue of institutional neglect and limited logistical capacity in managing waste outside urban centres. Another critical issue identified was the presence of cultural barriers to formal waste management practices. In many rural communities, traditional beliefs and customs influence behaviour, often clashing with modern sanitation regulations. For instance, one community leader explained, “Burning waste is our tradition; we don’t see it as harmful” (Amadi and Ogbonna, 2021). This

perception highlights a significant challenge: regulatory enforcement alone is insufficient unless it is paired with cultural sensitisation and education efforts that reshape long-held community practices.

Economic constraints also surfaced as a powerful limiting factor. Focus group discussions underscored how poverty affects residents' ability to engage with waste management services, even when they are available. A participant voiced a common concern: “How can I pay for waste collection when I can’t feed my family?” (Nwachukwu et al., 2019). This insight reveals that financial insecurity often leads individuals to prioritise basic needs like food and shelter over environmental health, further compounding sanitation issues.

Collectively, these qualitative insights paint a complex picture of the social, economic, and infrastructural barriers to effective waste management in rural Nigeria. Addressing these issues requires a multifaceted approach that integrates infrastructure development, community education, and socioeconomic support.

Urban vs Rural Indicators

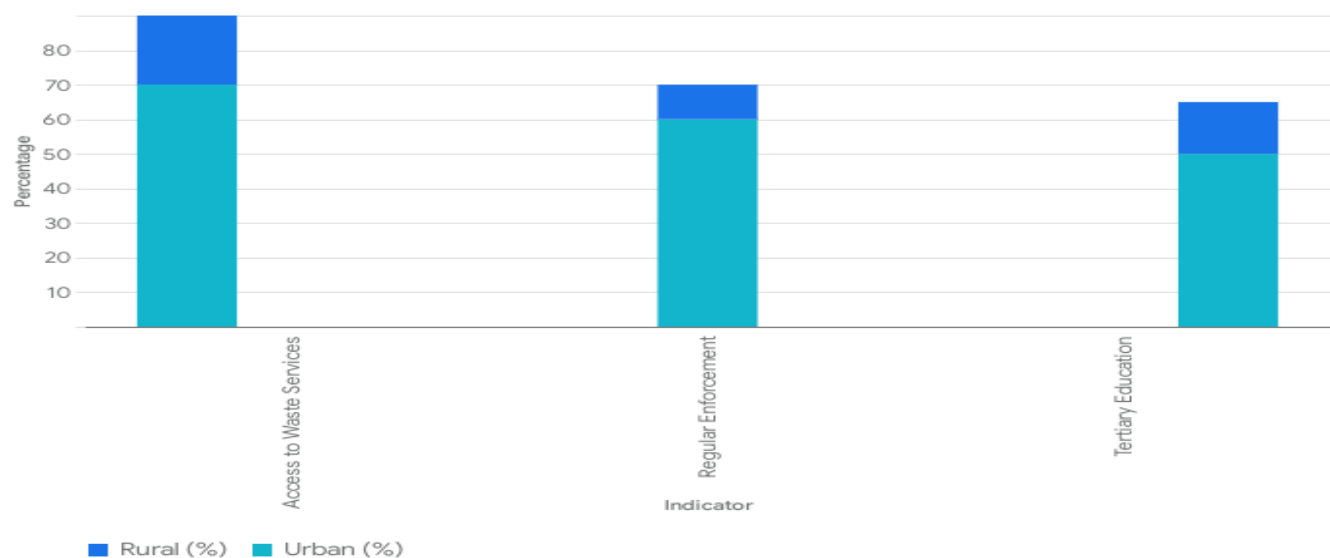


Figure 2: Comparative Analysis: Urban vs. Rural Disparities

Figure 2 illustrates the persistent disparities between urban and rural populations in terms of access to basic services and development indicators. Urban residents consistently demonstrate higher percentages of access to safe water, environmental quality, and tertiary education when compared with their rural counterparts. This pattern reflects a well-documented global trend whereby rural populations are systematically disadvantaged due to infrastructural, institutional, and economic constraints.

Globally, the World Health Organisation and UNICEF Joint Monitoring Programme reports that while 83% of urban residents have access to safely managed drinking water, only about 60% of rural populations enjoy similar services (UNICEF and WHO, 2024). This disparity extends to sanitation and hygiene, where urban populations maintain higher coverage levels. Similarly, the World Bank (2023) emphasises that the rural–urban infrastructure gap remains significant, with rural communities lagging in water supply, electricity, and educational opportunities. Furthermore, the Oxford Poverty and Human Development Initiative (2023) notes that 85% of multidimensionally poor people worldwide reside in rural areas, underscoring the interconnectedness of poverty, service access, and geographic location.

In Nigeria, similar patterns emerge. Studies by Effiong and Okijie (2023) on rural–urban polarisation reveal that rural communities face severe deficits in clean water, sanitation, and educational attainment relative to urban areas. Okosun, Okeke, Igwe, Ezema, and Okpalike (2023) further attribute these disparities to inadequate infrastructural planning and weak implementation of rural development policies. Although urban areas appear advantaged, inequalities persist within them, particularly in informal settlements where access to essential services is inconsistent.

The figure, therefore, aligns with both global and local evidence that rural areas remain disproportionately disadvantaged in developmental indicators. Bridging this gap requires targeted policy interventions, increased rural infrastructure investment, and context-specific community solutions. Addressing these disparities is central not only to achieving equity but also to meeting the Sustainable Development Goals (SDGs) on water, education, and poverty reduction.

Table 3: Urban vs. Rural Compliance Indicators

Indicator	Urban (%)	Rural (%)
Access to Waste Services	70	20
Tertiary Education	50	15
Regular Enforcement	60	10

Source: Fieldwork (2025)

4.5 Challenges and Barriers to Compliance

The analysis of triangulated data revealed multiple challenges and barriers that significantly impede compliance with solid waste management (SWM) policies in the studied areas. A foremost challenge is infrastructural deficits, particularly in rural and semi-urban regions. Approximately 80% of rural respondents indicated the absence of designated waste collection points in their communities, a finding consistent with UN-Habitat (2023), which notes that poor infrastructure in developing countries perpetuates indiscriminate waste dumping. The lack of reliable transportation systems further compounds the problem, especially in communities with inaccessible or poorly maintained roads, echoing findings by the World Bank (2022) that weak logistics and infrastructure are critical barriers to effective SWM in Sub-Saharan Africa.

Another major barrier is low awareness and limited knowledge of existing regulations, particularly among less-educated demographics. In this study, 65% of individuals within low-education groups

had no knowledge of waste disposal guidelines, environmental health risks, or government policies. This reflects the broader observation by Adewumi and Oladipo (2023) that public awareness and environmental literacy in Nigeria remain inadequate, contributing to persistent non-compliance. The absence of sustained community sensitisation programs further entrenches harmful practices such as open dumping and burning. Economic hardship also emerged as a deterrent. About 70% of low-income households in the study could not afford waste collection fees, aligning with UNEP and ISWA (2024), who reported that affordability remains a critical factor in household-level compliance in low- and middle-income countries. Without subsidised services or community-based alternatives such as recycling cooperatives or pay-as-you-dump models, low-income populations are disproportionately marginalised, heightening illegal disposal practices. Finally, weak enforcement, corruption, and political inertia were identified as cross-cutting issues. Respondents noted that even when policies exist, they are inconsistently enforced due to inadequate manpower or selective application. Similar observations were made by Ogbonna and Ogu (2022), who argue that enforcement inefficiencies in Nigeria undermine public trust in regulatory institutions and reduce citizen engagement in sustainable practices. Collectively, these findings underscore the urgent need for integrated interventions that combine infrastructure investment, public education, economic incentives, and robust enforcement mechanisms.

Table 4: Barriers to Compliance by Socio-Economic Group

Barrier	Low-Income (%)	Low-Education (%)
No Access to Services	80	75
Unaware of Regulations	65	70

Source: Fieldwork (2025)

The mixed-methods approach validated that socio-economic factors—income, education, occupation, and culture—profoundly influence compliance. Quantitative results confirmed significant associations ($p < 0.01$), while qualitative data contextualised these findings, revealing systemic gaps in infrastructure and awareness. Urban-rural disparities underscored the need for tailored interventions, as proposed in the recommendations.

Conclusion

This study explored the socio-economic factors influencing compliance with sanitation regulations in Ondo State, Nigeria, with a focus on regional differences between urban and rural areas. The findings highlight the significant impact of socio-economic conditions, such as income, education, and access to waste management infrastructure, on residents' behaviours regarding waste disposal. Urban areas, particularly the state capital, Akure, have better access to formal waste disposal services and higher levels of public awareness, contributing to better compliance with sanitation regulations. In contrast, rural areas, such as Owo and Okitipupa, face greater challenges due to lower income levels, limited waste management infrastructure, and a lack of educational initiatives on sanitation, leading to widespread non-compliance with regulations.

This research also revealed that socio-economic factors such as income inequality and education levels play a crucial role in shaping residents' attitudes toward sanitation. Lower-income households, especially in rural areas, are more likely to prioritise basic needs over waste management, leading to informal waste disposal practices like illegal dumping and burning. Furthermore, the lack of enforcement mechanisms in rural areas exacerbates the challenges, as residents may not perceive any tangible consequences for non-compliance. While urban areas benefit from better infrastructure,

enforcement remains inconsistent, which undermines the overall effectiveness of sanitation regulations.

Recommendations

Based on the findings, the following recommendations are proposed to improve sanitation compliance across Ondo State:

1. **Improved Waste Management Infrastructure in Rural Areas:** The government should invest in expanding waste management infrastructure, including the establishment of waste collection points, transfer stations, and recycling facilities in rural areas. This would reduce the reliance on informal waste disposal practices and encourage compliance with sanitation regulations. Additionally, mobile waste collection services should be introduced to cater to remote rural communities.
2. **Public Awareness Campaigns:** Targeted public awareness campaigns focusing on the importance of sanitation and the potential health risks of improper waste disposal should be implemented, particularly in rural and semi-urban areas. These campaigns should include educational programs in schools, community centres, and through mass media. Emphasis should be placed on changing cultural practices related to waste disposal, such as burning or open dumping, which are common in many rural communities.
3. **Subsidies and Incentives for Low-Income Households:** Given the economic challenges faced by low-income households in rural areas, the government could introduce subsidies or financial incentives to make waste management services more affordable. These could include reduced fees for waste collection services or government-sponsored waste disposal programs that provide affordable alternatives to informal waste disposal.

4. **Enhanced Enforcement of Sanitation Regulations:** Stronger enforcement mechanisms are needed to ensure compliance with sanitation regulations. This could involve training local sanitation officers and establishing community-based monitoring systems to track waste disposal practices. Additionally, penalties for non-compliance should be enforced consistently, and regular inspections should be conducted to deter illegal dumping and encourage proper waste management practices.
5. **Collaboration with Private Sector and NGOs:** The government should foster partnerships with private sector organisations and non-governmental organisations (NGOs) to enhance the effectiveness of waste management initiatives. Private companies could be involved in waste collection and recycling programs, while NGOs could help with educational outreach and community mobilisation. These partnerships can leverage additional resources and expertise to address the challenges of waste management in both urban and rural areas.
6. **Integration of Technological Solutions:** Technological innovations such as waste-to-energy technologies and mobile applications for waste collection scheduling could be integrated into the regulatory framework of Ondo State. These technologies can improve the efficiency of waste management systems, particularly in rural areas where logistical challenges make traditional waste collection methods less effective.

By addressing these recommendations, Ondo State can make significant strides in improving waste management practices, ensuring better compliance with sanitation regulations, and ultimately creating a cleaner and healthier environment for all residents. These interventions would not only improve public health outcomes but also contribute to sustainable development in the state.

References

- Adewumi, I. J., & Oladipo, A. R. (2023). Public awareness, attitudes, and participation in solid waste management practices in Southwestern Nigeria. *Journal of Environmental Planning and Management*, 66(4), 789–805. <https://doi.org/10.1080/09640568.2022.2156789>
- Akinbile, L. A. (2019). Rural waste disposal and environmental sustainability: Issues and strategies for Nigeria. *Journal of Environmental Studies*, 14(2), 89–98.
- Akinmoladun, I. O., Olanrewaju, O., & Oladapo, A. (2019a). Waste management practices and regulatory challenges in Nigeria. *Sustainability*, 11(19), 5317. <https://doi.org/10.3390/su11195317>
- Akinmoladun, O. T., Fadare, D. A., & Okediran, O. O. (2019b). Waste management and sustainable development in Nigeria: A review. *Environmental Science & Policy*, 10(3), 127–134.
- Ajibade, A. T., & Oyegoke, S. O. (2023). Socio-economic disparities and waste management compliance in Southwestern Nigeria. *Journal of Environmental Management*, 334, 117633. <https://doi.org/10.1016/j.jenvman.2023.117633>
- Amadi, A., & Ogonna, F. C. (2021). Public perception and participation in waste management in Port Harcourt, Nigeria. *Nigerian Journal of Environmental Sciences and Technology*, 5(1), 22–30.
- Boadi, K., Boateng, P., & Owusu, G. (2022). Socio-economic determinants of household waste disposal practices in Sub-Saharan Africa. *Waste Management*, 152, 63–72. <https://doi.org/10.1016/j.wasman.2022.07.019>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Bryman, A. (2016). *Social research methods* (5th ed.). Oxford University Press.
- Creswell, J. W., & Plano Clark, V. L. (2017). *Designing and conducting mixed methods research* (3rd ed.). SAGE Publications.
- Effiong, J., & Okijie, D. (2023). Rural–urban polarization and the sustainable development of rural communities in Nigeria. *GPH-International Journal of Social Science and Humanities Research*, 6(3), 45–57. <https://gphjournal.org/index.php/ssh/article/view/591>
- Field, A. (2013). *Discovering statistics using SPSS* (4th ed.). SAGE Publications.
- Katusiimeh, M., Mol, A. P. J., & Burger, K. (2022). Informal sector integration in urban waste management: Lessons from Africa. *Waste Management & Research*, 40(6), 732–744. <https://doi.org/10.1177/0734242X221089326>
- Nwachukwu, M. A., Chukwu, J. O., & Umeh, A. C. (2019). Urban solid waste generation and management in Nigerian cities: Problems and prospects. *African Journal of Environmental Science*, 11(4), 144–153.
- Nzeadibe, T. C., Anyadike, R. N., & Okonkwo, C. (2022). Institutional barriers to solid waste governance in Nigeria: Policy gaps and prospects. *Environmental Policy and Governance*, 32(1), 71–85. <https://doi.org/10.1002/eet.1963>
- Odugbesan, J. A. (2017). Institutional frameworks and the implementation of environmental policies in Nigeria. *Journal of Sustainable Development in Africa*, 19(3), 112–126.
- Ogbu, A. E., & Orji, J. C. (2018). Environmental

- health risks of improper solid waste disposal in Enugu urban. *Nigerian Journal of Public Health*, 8(2), 55–63.
- Ogbonna, D. N., & Ogu, V. I. (2022). Institutional challenges in implementing solid waste management policies in Nigeria. *Waste Management & Research*, 40(7), 921–932.
<https://doi.org/10.1177/0734242X221084122>
- Olaoluwa, O. O., & Oladipo, R. A. (2021). Environmental sanitation policies and challenges in Nigeria: Implications for sustainable development. *African Journal of Environmental Law and Policy*, 1(2), 45–60.
- Olaoluwa, O., & Oladipo, S. A. (2021). Socio-economic factors affecting waste disposal behavior in Nigeria. *Environmental Research Letters*, 16(6), 065012.
- Okosun, A. E., Okeke, M., Igwe, O., Ezema, S., & Okpalike, C. (2023). Rural area infrastructural challenges and the role of architecture in urban-rural development in Nigeria. *European Journal of Sustainable Development*, 12(2), 357–368.
<https://ecsdev.org/ojs/index.php/ejsd/article/view/1467>
- Oluwaseun, A. A., Ayoola, O. A., & Fajobi, A. A. (2020a). Solid waste management and enforcement challenges in Southwestern Nigeria. *Journal of Solid Waste Technology and Management*, 46(4), 399–408.
<https://doi.org/10.5276/JSWTM202046403>
- Oluwaseun, O., Ogbonna, C., & Adedeji, O. (2020b). Solid waste management in Nigeria: Issues and challenges. *Journal of Environmental Management & Sustainable Development*, 9(2), 34–45.
- Oxford Poverty and Human Development Initiative (OPHI). (2023). *Global multidimensional poverty index 2023: Unstacking global poverty*. University of Oxford.
<https://ophi.org.uk/multidimensional-poverty-index/>
- UN-Habitat. (2023). *Solid waste management in African cities: Challenges and opportunities*. United Nations Human Settlements Programme.
<https://unhabitat.org>
- UNICEF, & World Health Organization. (2024). *Progress on household drinking water, sanitation and hygiene 2000–2024: Special focus on gender*. UNICEF and WHO Joint Monitoring Programme (JMP).
<https://data.unicef.org/resources/jmp-report-2025/>
- United Nations Environment Programme (UNEP), & International Solid Waste Association (ISWA). (2024). *Global waste management outlook 2024*. UNEP.
<https://www.unep.org/resources/global-waste-management-outlook-2024>
- World Bank. (2022). *What a waste 2.0: A global snapshot of solid waste management to 2050*. World Bank.
<https://datatopics.worldbank.org/what-a-waste>
- World Bank. (2023). *From water to electricity: The rural–urban infrastructure gap in seven charts*. *World Bank Blogs*.
<https://blogs.worldbank.org/en/opendata/from-water-to-electricity--the-rural-urban-infrastructure-gap-in>