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REGULATORY FRAMEWORKS AND SUSTAINABLE WASTE MANAGEMENT IN OYO STATE, NIGERIA

Moshood Olayinka SALAHU (PhD)[1]
moshoodsalahu@gmail.com ; moshood.salahu@kwasu.edu.ng
and
Amin AMIN (PhD) [2]
amin.amin@kwarastatepolytechnic.edu.ng

[1]Department of Politics and Governance, Kwara State University, Malete, Nigeria
[,2]Department of Public Administration, Kwara State Polytechnic, Ilorin, Nigeria
Corresponding email: moshoodsalahu@gmail.com

Abstract
The study investigated the effectiveness of regulatory frameworks for sustainable waste management in Oyo State by engaging a population of 380 individuals, including professionals, residents, and representatives from key environmental and health institutions. A sample of 191 respondents was determined using Krejcie and Morgan's formula, and 188 completed questionnaires were analyzed using SPSS version 21. To enrich the findings, key informant interviews were also conducted with relevant stakeholders. Findings reveal that Oyo State has established comprehensive regulatory frameworks aimed at promoting waste reduction, reuse, recycling, and community participation. Agencies such as the Oyo State Waste Management Authority (OYOWMA), the Ministry of Environment, and the National Environmental Standards and Regulations Enforcement Agency (NESREA) actively enforce compliance through inspections, sanctions, and routine monitoring, while private actors like Mottainai Recycling Limited support implementation through structured franchise initiatives. Despite these frameworks, the study identified significant challenges, including limited public awareness, insufficient enforcement capacity, weak coordination among institutions, corruption, and inconsistent compliance by households and businesses. The study recommends strengthening the operational capacity of regulatory agencies through targeted training, provision of modern monitoring technologies, and increased field resources. Additionally, public awareness campaigns should be intensified, led collaboratively by the Ministry of Information, Culture, and Tourism and the Ministry of Environment, to foster a culture of compliance and community engagement in sustainable waste management.
Keywords: Community engagement, Environmental protection, Regulatory frameworks, Sustainable waste management, Urbanization

Introduction

Environmental protection has become a cornerstone of sustainable development, addressing the intertwined challenges of resource management, climate change, and public health. The need for effective waste management systems is especially critical in developing countries like Nigeria, where rapid urbanization, population growth, and industrial expansion contribute to escalating waste generation (Adewumi et al., 2018). Oyo State, located in southwestern Nigeria, epitomizes these challenges due to its status as a socio-economic hub, with major cities such as Ibadan grappling with mounting waste management issues. Sustainable waste management goes beyond the collection and disposal of refuse; it encompasses waste reduction, recycling, and recovery in a manner that safeguards environmental quality and public health (Onwughara et al., 2015). Regulatory frameworks play a pivotal role in guiding these processes. However, in Nigeria, weak enforcement of environmental policies, limited institutional capacity, and inadequate public awareness have

hampered the success of waste management initiatives (Ogungbuyi et al., 2019). Despite the existence of national and state-level environmental regulations, such as the National Environmental Standards and Regulations Enforcement Agency (NESREA) Act, implementation gaps and poor monitoring have constrained their effectiveness.

In Oyo State, the challenges of environmental governance are compounded by socio-economic factors, including inadequate funding, informal waste disposal practices, and limited access to waste processing technologies. Ibadan, the state's capital, has faced recurrent challenges with improper waste disposal, leading to environmental degradation and health risks (Adeola&Omololu, 2020). These issues underscore the urgency of evaluating existing regulatory frameworks to identify policy gaps and propose sustainable solutions tailored to the state's unique context. This study examines the effectiveness of environmental protection policies in addressing waste management challenges in Oyo State, focusing on their regulatory frameworks.

Statement of the Problem

Despite the increasing recognition of the importance of sustainable waste management for environmental protection, Oyo State continues to face significant challenges in implementing effective systems. The state's urban centers, particularly Ibadan, are marred by issues of improper waste disposal, illegal dumpsites, and inadequate waste collection services. For example, popular markets such as Bodija and Ojoo are often surrounded by heaps of uncollected waste, leading to environmental pollution and health risks such as outbreaks of cholera and other waterborne diseases (Adeola&Omololu, 2020). Although Nigeria has established environmental regulations like the National Environmental Standards and Regulations Enforcement Agency (NESREA) Act and state-level laws, their enforcement in Oyo State is weak. Cases such as the failure to regulate waste management contractors and the prevalence of informal waste pickers operating without oversight demonstrate the lapses in policy implementation (Adewumi et al., 2018). The lack of structured recycling initiatives and facilities further exacerbates the problem, with recyclable materials often ending up in dumpsites rather than being reused or repurposed.

Socio-economic factors also worsen the waste management crisis. For instance, in densely populated areas like Orita-Aperin and Beere, residents often resort to burning or indiscriminately dumping waste due to the unavailability of proper disposal services. Additionally, informal settlements frequently lack access to organized waste collection, leading to clogged drainage systems and flooding during the rainy season (Onwughara et al., 2015). Furthermore, there is little evidence of effective monitoring and evaluation mechanisms to assess the impact of existing policies. For example, the Oyo State Waste Management Authority (OYOWMA) has struggled to track the performance of waste contractors and penalize violators of environmental laws. These inefficiencies prevent the establishment of a robust and sustainable waste management system capable of addressing the state's growing waste generation challenges (Ogungbuyi et al., 2019).

This situation highlights the urgent need for a comprehensive evaluation of the regulatory frameworks governing waste management in Oyo State. Without addressing the systemic issues, such as poor enforcement, lack of infrastructure, and insufficient stakeholder engagement, the state risks continued environmental degradation and missed opportunities to align with global sustainable development goals (UNEP, 2016). This study aims to fill this gap by analyzing the effectiveness of Oyo State's regulatory frameworks on environmental protection policies.

Literature Review

i. Regulatory Frameworks

A regulatory framework refers to a structured set of rules, guidelines, policies, and institutions designed to govern activities within a specific sector or industry. It establishes the legal and administrative mechanisms for ensuring compliance with laws, promoting accountability, and safeguarding public interest. Regulatory frameworks are essential in guiding economic, environmental, social, and political processes by providing stability, predictability, and enforceability of rules (Baldwin, Cave, & Lodge, 2012). According to Gasser and Almeida (2022), a regulatory framework establishes the legal and institutional boundaries within which economic and social actors operate, providing both incentives and sanctions to align behavior with policy objectives. In advanced economies, the rapid evolution of emerging technologies like AI and green energy has exposed regulatory lag, fragmentation, and inconsistencies across jurisdictions (Gasser & Almeida, 2022).

Effective regulatory frameworks facilitate sustainable waste disposal, encourage eco-friendly initiatives, and mitigate environmental degradation. A sound regulatory framework reduces transaction costs, curbs corruption, enhances transparency, and fosters investor confidence by ensuring predictable and fair enforcement of rules (Blind & Mangelsdorf, 2023). However, the effectiveness of regulatory frameworks depends on factors such as institutional capacity, political will, public participation, and enforcement mechanisms. Weak regulatory enforcement, corruption, and lack of stakeholder engagement can undermine the objectives of a regulatory framework, leading to inefficiencies and non-compliance (Meckling&Nahm, 2018). Furthermore, opaque rulemaking processes and insufficient stakeholder engagement frequently erode public trust and the perceived legitimacy of regulatory regimes (Ezeanya-Esiobu, 2023; Chirisa & Mabeza, 2024). However, strengthening regulatory frameworks requires transparency, public involvement, and continuous policy evaluation to ensure they remain relevant and effective in addressing emerging challenges.

ii. Environmental Protection Policies

Environmental protection policies refer to a set of laws, regulations, and guidelines established by governments and international bodies to safeguard the environment from degradation. These policies aim to prevent pollution, manage natural resources sustainably, and mitigate environmental hazards such as climate change, deforestation, and waste mismanagement (McCormick, 2018). They are designed to balance economic development with environmental sustainability by ensuring that industrial, agricultural, and urban activities do not harm ecosystems or public health (Sterner & Coria, 2012). Environmental protection policies typically include legal instruments, economic incentives, voluntary programs, and enforcement mechanisms. Legal instruments such as environmental laws and regulations set binding rules for pollution control, waste management, and biodiversity conservation. Economic incentives, including tax benefits, subsidies, and penalties, encourage businesses and individuals to adopt environmentally friendly practices (OECD, 2020). Voluntary programs, such as corporate social responsibility (CSR) initiatives, encourage industries to adopt green practices beyond regulatory requirements. Effective enforcement mechanisms, including monitoring agencies and penalties for non-compliance, ensure adherence to environmental laws (Gunningham& Sinclair, 2017).

In Nigeria, environmental protection policies are guided by legislation such as the National Environmental Standards and Regulations Enforcement Agency (NESREA) Act, which oversees environmental compliance and enforcement. Policies such as the National Policy on theEnvironment provide frameworks for addressing pollution, waste management, and resource conservation (Adeoti, 2021). However, challenges such as weak enforcement, regulatory capture, and lack of public awareness often hinder effective implementation.

Strengthening environmental protection policies requires enhanced institutional capacity, public participation, and sustainable funding mechanisms to achieve long-term environmental sustainability.

iii. Sustainable Waste Management

Sustainable waste management refers to the systematic handling of waste materials in a way that minimizes environmental pollution, conserves resources, and supports economic and social well-being. It emphasizes waste reduction, reuse, recycling, and responsible disposal methods to ensure long-term environmental sustainability and public health protection (Wilson et al., 2015). The goal is to transition from a linear economy (produce, use, dispose) to a circular economy, where waste is minimized through resource recovery and efficient waste treatment (Ellen MacArthur Foundation, 2019).

Sustainable waste management is guided by the waste hierarchy, which prioritizes waste prevention, followed by reuse, recycling, recovery (such as composting and energy generation), and, as a last resort, disposal in landfills (UNEP, 2020). Effective waste management systems integrate policy frameworks, technology, infrastructure, and community participation to enhance efficiency and compliance. Economic incentives such as extended producer responsibility (EPR) and pay-as-you-throw (PAYT) systems encourage industries and households to adopt waste-reducing behaviors (Hoornweg&Bhada-Tata, 2012).

In Nigeria, waste management faces significant challenges, including poor waste segregation, inadequate infrastructure, weak enforcement of regulations, and public apathy (Adeoti, 2021). Many cities, including those in Oyo State, rely heavily on open dumping and landfilling, which contribute to environmental pollution and health hazards. To achieve sustainable waste management, the government must implement strong regulatory frameworks, invest in waste processing technologies, promote recycling initiatives, and engage communities in waste reduction efforts (Ogunyemi, 2021).

Empirical Review

Regulating and administrative frameworks for sustainable waste management are increasingly facing major challenges in municipalities globally. Unlike previous waste management studies in Nigeria, Adekola et.al (2021) empirically examined the implications of waste management based on awareness levels and perception of urban inhabitants in Benin City. Blocking was utilized to collect data from a total of 2720 randomly selected inhabitants through a self-administered survey questionnaire. Results reveals low awareness level in terms of indiscrimination dumping of waste, thereby promoting sustainable mitigation and adaptation measures region-wide. The study concludes that integrating various aspects of regional government services and good regulatory framework are key to achieving sustainable waste management, while recommending that Waste management policy can only be strengthened via working groups, community, and regional authorities.

Ologunagba, Ogunbode & Owoeye (2025) study on Public Perception of Environmental Sanitation Regulations on Solid Waste Management in Owo and Akure Cities, Ondo State, Nigeria equally align with Adekola et.al (2021) that Effective regulatory frameworks facilitate sustainable waste disposal. The study employed a quantitative research design using structured questionnaires administered to residents in Akure and Owo, Ondo State. The survey of 600 questionnaires with 350 and 250 from Akure and Owo respectively yielded 100% retrieval. Data were analysed using Factor Analysis with SPSS software to identify key factors influencing perceptions of environmental sanitation regulations. In Akure, five principal components explained 64.2% of the variance in perception. Community leadership was the most significant factor, accounting for 20.5% of the variance, followed by the belief

that waste management is primarily a government responsibility (17.4%) and weak enforcement (14.4%). In Owo, seven principal components explained 60.5% of the variance. Notable factors included poor monitoring by law enforcement (13%), efficacy of enforcement agents (10.9%), and governance quality (7.3%). Findings reveal that both cities shared concerns related to regulation, enforcement and governance. It concludes that effective regulatory frameworks facilitate sustainable waste disposal in the two cities. Strengthening law enforcement capacity, improving governance transparency, and promoting inclusive community participation are recommended to achieve sustainable compliance and effective solid waste management.

Theoretical Framework

The study adopts Regulatory Capture Theory developed by George Stiglerin 1971. Stigler argued that regulatory agencies, which are meant to act in the public interest, often end up serving the industries they regulate due to undue influence and lobbying power (Stigler, 1971). This theory is particularly relevant in evaluating environmental protection policies for sustainable waste management, as it explains how regulatory agencies may fail to enforce laws effectively due to corporate or political influence. The theory assumes that both regulators and industries act in their self-interest rather than prioritizing public welfare. Industries, having superior financial resources and technical expertise, are able to exert greater influence over regulatory bodies than the general public (Dal Bó, 2006). The theory highlights information asymmetry, where industries possess more knowledge about technical and operational aspects of regulation, allowing them to shape policies in their favor. It points to the "revolving door" effect, where individuals transition between regulatory agencies and private sector jobs, leading to conflicts of interest and biased decision-making (Carpenter & Moss, 2014). The theory assumes that even when strong environmental laws exist, enforcement remains weak due to regulatory capture, allowing industries to operate with minimal oversight (Laffont&Tirole, 1991).

Regulatory Capture Theory has faced significant critiques. Baldwin, Cave, and Lodge (2012) argued that it overemphasizes industry power while underestimating the role of civil society, media, and public pressure in influencing regulatory actions. Regulatory agencies can act in the public interest, particularly when transparency mechanisms and independent oversight bodies are in place (Hertog, 2010). Additionally, the theory does not fully explain cases where environmental regulations have been successfully implemented and enforced, demonstrating that public interest regulation is achievable under certain conditions (Meckling&Nahm, 2018).

The relevance of Regulatory Capture Theory to waste management in Oyo State is significant. If regulatory agencies are influenced by private waste management firms, enforcement of waste disposal laws may be compromised, leading to environmental degradation. Political and corporate influence can result in policies that prioritize economic interests over sustainability, reducing the effectiveness of recycling programs and waste segregation initiatives (Adeoti, 2020). Moreover, regulatory capture can lead to inadequate public participation in decision-making processes, as community voices and environmental advocates may be sidelined in favor of industry-driven policies.

Methodology

The study adopts quantitative and qualitative methods of analysis. The descriptive method of analysis was employed. The population of this study was 380 drawn from the staff of Mottainai Recycling Ibadan, Oyo State Ministry of Environment and Natural Resources, Oyo State Ministry of Health, environmentalists, lawyers, medical practitioners and residents. The sample size was 191 determined by Krejcie and Morgan's (1970) formula.

$$X^2NP(1-P) \div e^2(N-1) + \mathrm{X}^2\mathrm{P}(1-P) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

$$n = 3.841\ X\ 380\ x\ 0.5\ x\ 0.5$$
$$(0.05)^2\ x\ \ 380 - 1 + (3.841\text{x}\ 0.5\ 0.5)$$
$$n = 364.895 \div 1.90775$$
$$n = 191$$

A total of one hundred and ninety-one questionnaires (191) were distributed, while one hundred and eighty-eight questionnaires (188) were returned correctly and analyzed using Package for Social Sciences (SPSS) Statistical software version 21. To complement the descriptive analysis, a key informant interview was also conducted. Below is a table containing the details of the key informants interviewed:

Table 1: Key Informants, Category/Profession and Identification Code

S/N	Key Informant Interviewee	Ministry/ Agency/ Organisation	Identification Code
1	Deputy Director, Environment	Oyo State Min. of Environment & Natural Resources	Interviewee 1
2	Senior Environmental Officer	Oyo State Waste Management Authority	Interviewee 2
3	Environment Inspector	National Environmental Standards and Regulations Enforcement Agency	Interviewee 3
4	Production Line Manager	Mottainai Recycling Company, Ibadan	Interviewee 4
5	Environmental Lawyer	Legal Practitioner with a Reputable Law Firm in Ibadan, Oyo State	Interviewee 5
6	Environmental Health Officer	Oyo State Ministry of Health	Interviewee 6

Result and Discussion

Results are presented and analysed in the table below:

Table 2: Presentation of Result from the Survey

S/N	STATEMENTS	SD	D	U	A	SA	Total	Aggregate Response
1	The regulatory frameworks for waste management in the state are comprehensive and aligned with sustainable practices.	7 (3.7 %)	12 (6.4 %)	7 (3.7 %)	**87 (46.3 %)**	75 (39.9 %)	188 (100%)	Agreed
2	The waste management regulations in the state are effectively enforced by the responsible authorities.	2 (1.1 %)	5 (2.7 %)	6 (3.2 %)	**97 51.6 %)**	78 (41.5 %)	188 (100%)	Agreed
3	There is sufficient monitoring and oversight of waste management	4 (2.1%)	7 (3.7 %)	9 (4.8 %)	42 (22. 3%)	**126 (67 %)**	188 (100%)	Agreed

	activities to ensure compliance with regulatory frameworks in the state.							
4	Adequate penalties and sanctions are imposed on individuals and organizations that violate waste management regulations in the state.	1 (.5%)	15 (8%)	12 (6.4%)	**118 (62.8%)**	42 (22.3%)	188 (100%)	Agreed
5	The regulatory frameworks prioritize the reduction, reuse, and recycling of waste materials	8 (4.3%)	4 (2.1%)	13 (6.9%)	**111 (59%)**	52 (27.7%)	188 (100%)	Agreed
6	There are clear guidelines and procedures for the proper handling and disposal of hazardous waste.	6 (3.2%)	25 (13.3%)	5 (2.7%)	**101 (53.%)**	51 (27.1%)	188 (100%)	Agreed
7	The involvement of local communities and stakeholders in waste management decision-making processes encouraged.	7 (3.7)	23 (12.2%)	7 (3.7%)	**125 (66.5%)**	26 (13.8%)	188 (100%)	Agreed
8	The regulatory frameworks encourage public participation and awareness of waste management practices in the state.	9 (4.8)	4 (2.1%)	5 (2.7%)	**135 (71.8%)**	35 (18.6%)	188 (100%)	Agreed

Source: Researcher's Field Survey, 2023

From Table 2 above, it is revealed that 46.3% +39.9% = 86.2% of the survey respondents agreed that the regulatory frameworks for waste management in the state are comprehensive and aligned with sustainable practices. This is in consonance with the position of **Interviewee 5**, who says *the protection policies set aside the requirements needed to be put in place by the household and cooperate bodies in order to meet the current challenges.* However, it is clear that both the literate and non-literate sections of the Nigerian population are unaware of environmental planning laws (Ikelegbe&Onwuemele, 2012). Reinforcing the above empirical facts from the survey result and the interviewee's response, the two positions are in agreement with Adekola et.al (2021) who concluded that Effective regulatory frameworks facilitate sustainable waste disposal.

The table also reveals that 51.6% + 41.5% = 93.1% of the respondents agreed that the regulatory frameworks for waste management in the state are comprehensive and aligned with sustainable practices. **Interviewee 1** stated *that the regulatory frameworks for waste management in the state are fully effective. Routine inspections are carried out to detect and arrest sanitary defaulters that dump illegally while such defaulters are prosecuted and fined accordingly.* **Interviewee 4** from Mottainai Recycling Limited Ibadan, states that local governments are tasked with supporting good practices in solid waste management and making annual budgetary provisions for the same. The Ministry of Environment and Habitat oversees OYOWMA's activities, and conducts weekly Environmental Sanitation Exercises. Private sector participation in waste management and waste-to-wealth program provides employment opportunities for locals while reducing the amount of waste sent to landfills. However, the plastic waste management program bans the production and use of non-biodegradable plastics in the state.

Interviewee 4 from Mottainai Recycling Limited Ibadan outlines the company's responsibilities, emphasizing their role in formulating policies and administering efficient waste management. Due to their contract with the state government, they operate a franchisee model with set guidelines, focusing on merit and capacity-based selection of waste collectors. Zacchaeus (2017) argued that the regulations set for operations were unsuccessful because of the absence of effective sanctions, coupled with economic considerations that are deficit of knowledge of interdependent linkages among various processes involved in both human and environmental resources to mitigate the myriad of waste management challenges

Table 2 above also indicates that 67% + 22.3% = 89.3% of the respondents agreed that there is sufficient monitoring and oversight of waste management activities to ensure compliance with regulatory frameworks in the state. **Interviewee 5** Legal Practitioner states that *several corporate clients of mine do comply with the regulations to an appreciable extent.* The myriad regulations governing compliance for these operations, especially hazardous waste compliance, can become a tangle that even experienced facilities find challenging. National Environmental Standards and Regulations Enforcement Agency (NESREA) partners with relevant stakeholders at the federal, state and local government levels; including civil society organisations (CSOs), state planning authorities, community-based organisations (CBOs), faith-based organisations (FBOs), non-governmental organisations (NGOs), the international community and donor agencies and other law enforcement agencies to strengthen enforcement. The above empirical position is equally in harmony with Ologunagba, Ogunbode & Owoeye (2025) and Adekola et.al (2021) findings that Effective regulatory frameworks facilitate sustainable waste disposal. And also in consistence with Ologunagba, Ogunbode & Owoeye (2025) recommendation that strengthening law enforcement capacity, improving governance transparency, and promoting inclusive community participation are recommended to achieve sustainable compliance and effective solid waste management.

It is also indicated in Table 2 above that 62.8% +22.3% = 85.1% of the respondents strongly agreed that there is adequate penalties and sanctions are imposed on individuals and organizations that violate waste management regulations in the state. Despite repeated reminders to clean the environment and remove refuse to prevent potential disease outbreaks in the state, there was no compliance, leading to the closure (Oyekola,2023). The closure serves as a warning to all other markets in the state to refrain from violating environmental laws, as non-compliance may result in similar actions by the ministry. The Oyo State Government announced that individuals who violate environmental laws will face either a fine of N10,000.00 payable to the government or a month of community service (BusinessDay, 2024). **Interviewee 1** from Oyo State Ministry of Environment and Natural Resources states that: *The Environmental Task Force of the Ministry will conduct weekly exercises to enforce the fines. And that arbitrary refuse dumping throughout the state will no*

longer be tolerated under the rule of law in Oyo State. Specifically, dropping refuse on road medians is considered a significant offense. **Interviewee 2** also expressed concern about the negative impact of such actions, especially during festive periods, and appreciated residents who have shown understanding and compliance.

Equally, **Interviewee 1** says that: The Oyo State Government sealed a facility, Shri-Balaji Industry Limited, engaging in the recycling of waste tyres to produce pyrolysis oil, carbon black and steel wire as by-products. The Shri-Balaji Industry Limited had earlier been culpable and sanctioned with a fine of N1.5m, to be paid to government coffers. The government expressed dissatisfaction with the non-compliant attitude of certain facility owners, industries, companies, and corporate organizations towards existing rules and regulations.The Oyo State Government sealed a church after residents repeatedly complained of noise disturbance. An inspection on November 9, 2023, showed the church produced 74 decibels during worship, exceeding the Environmental Regulations of 2023, which limit daytime residential noise to 65 decibels (Punch, 2023).

Nabegu and Naibbi (2017) expressed concern over the inadequate enforcement of existing regulations in the country, leading to significant social and environmental welfare losses. They attribute this issue to several factors, including the absence of comprehensive national data, insufficient technical capabilities among staff responsible for enforcing environmental regulations, an inadequate institutional framework, and the overall weakness of the institutions overseeing environmental regulations, which contributes to corruption and other challenges. Adewuyi(2023) underscored initiatives aimed at improving the well-being of waste operators, such as the standardization of tariffs and the implementation of a profit-sharing percentage including the enforcement of compliance and the tackling of falsified claims, reaffirming Mottainai's dedication to efficient waste management within the framework of the Zero Waste, Zero Budget Initiative. The resolution of the ongoing conflict between waste disposal contractors and the state government is expected upon Governor Makinde's return (Blueprint Newspaper, 2023).Malavasi and Menegaki (2017) suggested incorporating economic incentives alongside penalties. They propose that offering rewards for compliance and innovative waste management practices could motivate individuals and organizations to adopt more sustainable waste management practices, creating a positive reinforcement loop.

The table also indicates that 59% + 27.7% = 86.7% of the respondents agreed that the regulatory frameworks prioritize the reduction, reuse, and recycling of waste materials. **Interviewee 2** says that through segregation of waste by scanvage at the approved dump sites. Also, Scavenger activities reduce waste such as Ankara cloth and nylon which reduces waste that is to be taken to dumpsite and the Government encourages people to sort their waste from the source. (**Interviewee 6**) This is in alignment with Abubakar, Khandoker, Maher, and Tareq (2022) position which emphasize the need for a more sustainable waste management approach that prioritizes practices such as reduced production, waste classifications, reuse, recycling, and composting.

The table shows that 53.7% + 27.1% = 80.8% of the respondents also agreed that there are clear guidelines and procedures for the proper handling and disposal of hazardous waste. The table also shows that 66.5% +13.8% = 80.3% of the respondents also agreed that there is the involvement of local communities and stakeholders in waste management decision-making processes is encouraged. The result is similar to **Interviewee 3** who says that they organize meetings with the stakeholders on how to ensure a clean environment and also embarking on weekly Thursday market sanitation. Wahab and Ola (2016) perceived community participation in waste management as important as any other urban service. The public (households) form the largest category of stakeholders in waste management. Berry et al., (2019) argue that environmental policy and project success depend on stakeholders' participation since stakeholder participation is critically important for sustainability and

environmental security. Stakeholder participation also invites and creates spaces. Participation of stakeholders is critically important for sustainability and environmental security (Zikargae et al., 2021).

The table reveals that 71.8% + 18.6% = 90.4% of the respondents agreed that the regulatory frameworks encourage public participation and awareness of waste management practices in the state. The relevant laws already stipulate public enlightenment but the laws are not self-enforcing. It is still the government, particularly through its agencies, that is to ensure enforcement of the laws" through sensitization, embarking on radio programs and jingles **(Interviewee 5**). However, a major flaw in Nigerian environmental policy, however, is lack of implementation. The implementation is also shaky and "ding-dong," hampered by growing and entrenching corruption (Onyenekenwa&Agbazue, 2011). For instance, in the 1999 constitution, there is no clear definition of the agency or level of government that has the power to supervise the environment and the authority to impose rules or set standards on polluters.

Summary of Findings

1. The study reveals that the regulatory frameworks for waste management in Oyo State are comprehensive and aligned with sustainable practices.
2. It is also revealed through the findings that adequate penalties and sanctions are imposed on individuals and organizations that violate waste management regulations in Oyo State.
3. Findings also indicates that the regulatory frameworks prioritize the reduction, reuse, and recycling of waste materials in the state.
4. It is discovered through study that there is sufficient monitoring and oversight of waste management activities to ensure compliance with regulatory frameworks in the state.
5. The study also reveals that the regulatory frameworks encourage public participation and awareness of waste management practices in Oyo State through public enlightenment and sensitization sessions.

Conclusion

The study examined the regulatory frameworks guiding environmental protection policies for sustainable waste management in Oyo State and found that the state has established a relatively comprehensive system aimed at promoting environmental sustainability. The majority of respondents acknowledged that the regulatory frameworks are well aligned with global best practices, particularly by emphasizing waste reduction, reuse, recycling, and active community participation. Insights from key stakeholders including officials from public institutions and private operators such as Mottainai Recycling Limited further affirmed the existence of structured oversight mechanisms such as regular inspections, enforcement activities, and sanctions for environmental infractions. The study therefore concludes that there are significant challenges that undermine the effective implementation of waste management regulations in Oyo State such as limited enforcement capacity, weak institutional coordination among relevant agencies, corruption, inadequate technical expertise, insufficient public awareness, and inconsistent compliance from both households and corporate organizations, which if well addressed has the propensity to strengthen environmental regulatory framework, with the aim of engendering sustainable waste management in the state.

Recommendations

The following recommendations are made in line with the findings:

i. On the issue of strengthening the regulatory framework, enforcement remains key. Here, The Oyo State Ministry of Environment and Natural Resources, together with the Oyo State Waste Management Authority (OYOWMA) and the National Environmental Standards and Regulations Enforcement Agency (NESREA), are advised to enhance their enforcement capacity by providing adequate training, modern monitoring equipment, and increased operational resources for field inspections.

ii. Public sensitization should be intensified by the Ministry of Information, Culture, and Tourism, working collaboratively with the Ministry of Environment, to conduct continuous awareness campaigns through radio programs, community outreach, market sensitization, and school programs to improve household compliance with waste segregation and disposal guidelines.

iii. Furthermore, the introduction of incentive-based compliance mechanisms, such as reward systems for compliant communities, recycling rebates, or deposit–refund schemes, should be implemented by the Ministry of Environment in partnership with OYOWMA and private sector recycling firms such as Mottainai Recycling Limited to complement existing punitive measures.

iv. Improved institutional coordination is necessary, and this should be overseen by the Office of the Governor and the State Executive Council to harmonize the roles of state ministries, local governments, and federal agencies like NESREA, particularly in hazardous waste management and environmental monitoring.

v. Strengthening community participation is also essential; local government councils, community-based organizations (CBOs), civil society groups (CSOs), and traditional institutions should collaborate with the Ministry of Environment to promote inclusive stakeholder engagement and ensure that community voices shape waste management decisions.

vi. Additionally, the Ministry of Environment and OYOWMA must ensure consistent application of penalties and sanctions by empowering the Environmental Task Force to enforce environmental laws uniformly across all sectors and to sustain weekly sanitation exercises.

vii. The Ministry of Environment and OYOWMA should further streamline the franchise model used by waste contractors, ensuring transparent, merit-based selection and clearly defined operational responsibilities for private operators.

viii. The state should also develop a comprehensive waste management data system, jointly coordinated by the Ministry of Environment, Oyo State Bureau of Statistics, and relevant local governments, to track waste generation patterns, compliance levels, and recycling performance for evidence-based policymaking.

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