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Environmental Protection Policies and Sustainable Waste Management in Kwara and Oyo States, Nigeria

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Abstract
This study examines the strategies of environmental protection policies for sustainable waste management in Kwara and Oyo States, Nigeria, using the Marxian Political Ecology theory as its theoretical framework. The research population was 11,170,478, with a sample size of 400. Out of the 400 questionnaires distributed, 363 were correctly filled, retrieved, and analyzed using SPSS version 21 for data analysis. Despite growing concerns about the adverse environmental impacts of improper waste management practices, many regions and communities, including Kwara and Oyo States, struggle with inadequate waste disposal and recycling strategies. The study found that most respondents in both states agreed that there are awareness campaigns and education initiatives on environmental conservation. Additionally, there is collaboration between state governments and non-governmental organizations (NGOs), and approved dumpsites exist. However, the study also identified gaps in implementing these strategies, particularly in the areas of recycling, waste segregation, and the adoption of advanced waste management technologies. The study recommends that the governments of Kwara and Oyo States develop recycling and treatment facilities, create more dumpsites, prioritize the hiring of environmentalists, and implement landfills instead of dumpsites. Furthermore, Kwara State should foster a supportive environment for private waste collectors to enhance waste management efficiency.

Keywords*: Environment, protection, management, policy, strategies, waste*

INTRODUCTION

The importance of a clean and healthy environment for the well-being of both humans and animals cannot be overstated. However, the health implications of environmental degradation and the lack of coordinated policy efforts at various levels of government leave much to be desired. It is widely acknowledged that adopting qualitative environmental practices contributes to good health and sustainable development (Coenen 2009). This raises concerns about the effectiveness of policies aimed at ensuring sustainable waste management, particularly in developing nations like Nigeria. Waste management must be approached within the framework of globally recognized principles, with a focus on sustainability. This means developing society in all directions without compromising the ability of future generations to meet their own needs. From the Millennium Development Goals (MDGs) to the current emphasis on Sustainable Development Goals (SDGs), the United Nations (UN) has consistently prioritized environmental challenges on a global scale. With the adoption of the SDGs in 2015, 17 objectives have become the new focal points for global development. The promotion of a high-quality environment is included in Goals 3, 6, 11, and 13, which focus on good health and well-being, clean water and sanitation, sustainable cities and communities, and climate action, respectively.

Environmental protection encompasses the joint actions of individuals, organizations, and governments aimed at safeguarding the natural environment. Its objectives include the preservation of natural resources, the maintenance of existing ecosystems, and, whenever possible, the restoration of damaged environments (David and Christiana 2019). Environmental protection aims to avert the deterioration of the natural environment, a process intensified by factors such as population growth, technological advancements, and excessive consumption. These elements have contributed to a detrimental impact on the environment, posing risks to both humans and animals. The persistent challenge of establishing an efficient waste management system is evident in many developing societies. Population growth compounds this issue, as higher population densities in specific geographic locations result in increased levels of waste generation. This exacerbates the complexity of waste management within those areas. Despite the acknowledgment of poorly managed waste as a significant environmental hazard, the ineffective handling of waste by societies plays a substantial role in magnifying existing environmental pressures and degradation (Alam, Chowdhury, Hassan, Karanjit, & Shrestha, 2007); (Donnini et al, 2007).

The United States Environmental Protection Agency (EPA) has been striving to protect the environment and human health since 1970, according to a global overview of the issue. United States citizens officially produce 4.4 pounds (2.0 kg) of municipal solid waste (MSW) per person per day, more rubbish than any other country in the world. In contrast, China's environmental policies, which include appropriate waste management rules and regulations, have continued to foster innovation by converting trash into valuable resources. The environment in Africa is ever-changing, and with it comes the need to raise awareness of the environmental problems that are contributing to these changes. People must be far more careful with how they live their lives in conjunction with the types of environmental issues our planet is facing, given the massive increase in natural disasters, warming and cooling periods, and various types of weather patterns. To

guarantee a cleaner and healthier environment for Nigerians, the Federal Government of Nigeria founded the National Environmental Standards and Regulations Enforcement Agency (NESREA) in 2007. Nigeria ranks among Africa's top generators of garbage, producing 32 million tons of waste annually, according to a report by the United Nations Industrial Development Organization. This study will examine the strategies adopted in environmental protection policy in Kwara and Oyo States.

STATEMENT OF THE PROBLEM

Despite rising awareness of the damaging effects that inappropriate waste management methods have on the environment, many areas and towns still struggle with insufficient recycling and disposal plans. The aims of sustainability, human health, and the environment are all seriously threatened by this circumstance. Presumably, it is noted that Kwara and Oyo States lack efficient plans for integrating environmental protection with sustainable waste management. Furthermore, short-term affordability and convenience are frequently given precedence over long-term sustainability and environmental preservation in current trash management strategies. Many academics, like Matter, Dietschi, & Zurbrügg (2013), Ibrahim and Amin (2023), and Amin, Raji, & Salawu (2023), have studied waste management and environmental protection. This study will look at Kwara and Oyo State's strategies for implementing environmental protection policies on sustainable waste management.

LITERATURE REVIEW

Conceptual Clarification

The prevention of unintended changes to ecosystems and their parts is known as environmental protection (Clive, Andrew, Nicoletta, and Simone, 2018). Waste is defined by Coker, Achi, Sridhar, and Donnett (2016) as the underused, throwaway, or disposable sections of materials. According to UN-ESCAP (2018), trash is an inevitable byproduct of human activity. Wastes are defined as products or substances that have spoiled, been rejected, or are no longer needed for their intended function by Festus and Omoboye (2015); (Fagbohun, 2012).

Waste Management Strategies

The most desirable approach to managing waste is waste prevention. Technologies can be deployed at various stages of a product's life cycle, including manufacturing, usage, and post-use, to eliminate waste and mitigate pollution. Some effective strategies involve eco-friendly manufacturing methods that employ less hazardous materials, the implementation of advanced leakage detection systems for material storage, and innovative chemical neutralization techniques to reduce reactivity. Additionally, water-saving technologies can help decrease the demand for freshwater inputs. (Hakeem & Joseph, 2014)

Waste minimization encompasses a range of strategies aimed at designing and creating products or services that either reduce the quantity of generated waste or lower the toxicity of the resulting waste. These efforts are often a response to identified trends or specific products causing issues in

the waste stream. Multiple strategies can be employed to minimize waste generation, such as reusing materials in industry, substituting less hazardous materials, or altering design and processing components. Waste minimization brings several advantages, including a reduction in natural resource consumption and decreased waste toxicity. This approach is particularly common in manufacturing, leading to resource conservation and significant cost savings. (Ojo et. al. 2021).

Recycling involves recovering valuable materials like glass, paper, plastics, wood, and metals from the waste stream for use in manufacturing new products. By incorporating more recycled materials, the need for raw materials for the same applications is reduced. Recycling not only diminishes the necessity for exploiting natural resources for raw materials but also transforms waste materials into valuable resources. It conserves natural resources, reduces energy consumption and emissions linked to the extraction of virgin materials, minimizes overall energy use and greenhouse gas emissions contributing to global climate change, and decreases the incineration or landfilling of recyclable materials. (Oladejo, 2020).

Waste can be incinerated directly to generate energy. Incineration involves the combustion of waste at extremely high temperatures to produce electrical energy. The resulting byproduct is ash, which must be properly characterized before disposal or, in some cases, beneficially reused. This method is widely employed in developed countries, primarily due to limited landfill space. Approximately 130 million tons of waste are incinerated annually in more than 600 plants across 35 countries. Incineration is also used effectively to manage hazardous waste such as chlorinated hydrocarbons, oils, solvents, medical waste, and pesticides. (Oladepo and Rafiu, 2012).

EMPIRICAL REVIEW

Oberlin (2013) conducted a study focusing on the characterization of household waste in the Kinondoni municipality of Dar Es Salaam. The findings revealed a household waste generation rate of 0.44 kg/person/day. On average, the composition of household solid waste included kitchen/food waste, paper, plastics, glass, metals, aluminum, and other materials, with approximate proportions of 74.10%, 8.30%, 9%, 0.75%, 0.60%, 0%, and 7.25%, respectively. An analysis of the relationship between daily per capita household waste generation and socio-economic factors indicated a weak positive correlation with household size ($r = 0.219$ for middle-income households and $r = 0.138$ for low-income households). Additionally, the Pearson coefficient (r) suggested a very weak negative correlation ($r = -0.108$ for middle-income households and $r = -0.096$ for low-income households) between per capita daily waste generation and household income. The article was domesticated to Dar Es Salaam but did not address waste management and environmental protection policies in Kwara and Oyo States.

Armijo, Ojeda, & Ramírez (2018) undertook a study focusing on the characterization of solid waste and the recycling potential for a university campus. The study revealed that Campus Mexicali I generates 1 ton of solid waste daily, with over 65% of this waste being recyclable or having the potential for recycling. These results indicate the feasibility of implementing a segregation and recycling program on a university campus. Additionally, the study demonstrated that, given current conditions such as the number of recycling companies and their capacities, the

local market can absorb all of these recyclable wastes. The article did not address waste management and environmental protection policies in Kwara and Oyo States.

Donnini, Rodrigues, Saide, & de Mattos (2007) conducted a study focusing on the recycling potential of urban solid waste designated for sanitary landfills in Brazil. The study revealed that approximately 90% of the waste held the potential for recycling, while only 10% needed landfilling. The study also revealed that compostable organic matter, represented by food and garden waste with high moisture content (51% and 41%, respectively), constituted 54% in mass and 21% in volume. The predominant plastic type in the waste stream was high-density polyethene, with an estimated disposal of about 5000 kg/day. A socioeconomic analysis of waste generation indicated that low-income neighborhoods tended to discard relatively less packaging, and more food waste, shoes, and construction debris compared to middle and high-income areas, possibly attributed to lower purchasing power and education levels. The study pointed out that more aluminum and colored polyethylene terephthalate were discarded during the warmer months, likely due to increased consumption of canned and bottled beverages. The article was domesticated to Brazil but did not address environmental protection policies in Kwara and Oyo States.

The attitudes of people living in Ilorin, the capital city of Kwara State, Nigeria, about the central storage of solid waste were studied by Yusuf, Adewoye, and Sawyer (2022). The results brought to light major worries among interested parties regarding unsafe disposal methods and ineffective trash collection in Nigeria. The study highlighted the fact that garbage generation in Ilorin is outpacing evacuation efforts daily, indicating the problem's increasing severity. As a result, the state of Ilorin's central solid waste storage is becoming more and more concerning, highlighting the urgent need for efficient waste management techniques. Although the article is pertinent to this work, it did not discuss Kwara and Oyo State's environmental protection policies.

The characterization and quantity of solid and liquid wastes in Iwo and Ibadan were studied by Ihuoma (2012). The results showed that burying solid wastes in pits and openly disposing of them in wetlands, water courses, and drains are common disposal techniques. As a result of this behavior, the region is now littered, which is unsightly and bothersome because of the stink it produces. The article did not discuss environmental protection policies; instead, it was localized to Ibadan.

Hushie (2016) worked to promote partnerships for healthcare initiatives in Ghana between governmental and non-governmental organizations. The research findings indicate that many forms of partnerships are required for civil society organizations (CSOs) and the government in the health sector. These forms range from formal contractual arrangements to decentralized partnerships focused on lobbying. The government's and non-governmental organizations' dedication to cooperative endeavors has demonstrated a crucial role in improving the provision of services, alleviating health disparities, and cutting down on delays. Non-governmental organizations add substantial value by virtue of their implementation skills, community legitimacy, knowledge, experience, and ability to draw in funds from donors. This is especially important when it comes to meeting health requirements for groups or locations that are outside the government's purview and for services that it does not offer. Waste management was not covered in the article because it was localized to Ghana.

Among other connected issues, Miranda (2013) worked on legislation that forbids the transportation, depositing, and dumping of hazardous waste on any land or territorial seas. Serious consequences for breaking this rule include life in jail and the seizure of any vehicles or equipment used to import or transport garbage to the Federal Government of Nigeria. Both the corporate body and its officers shall face the relevant penalties in situations where the corporate entity is accountable for the violation because of the carelessness or approval of its key executives. According to the Act, waste generators are required to provide secure storage systems for their waste, and individuals are prohibited from participating in activities that are likely to generate hazardous waste without first getting a permit from the Agency. Similar requirements apply to those who generate hazardous waste: they must treat the waste using approved methods; they cannot export or transit hazardous waste without a permit from the Agency; they must obtain prior informed consent from the Agency before transporting toxic waste through Nigeria to another nation; and they must comply with all other obligations; failure to do so will result in an offence that carries a fine of N5,000,000, a five-year prison sentence, or both. Waste management was not discussed in the article.

Jenny and Tim (2021) investigated the counterintuitive relationship between rising wasteful behavior and the warm glow of a good emotion linked to recycling. Results showed that when people are given options like repurposing bread into beer or plastic packaging into clothing, both of which have become popular—people may psychologically view their waste creation to contribute to the greater good, which makes them feel good about themselves (a phenomenon known as the warm-glow effect). According to the study, these possible "wasteful contribution" impacts need to be considered when assessing the actual sustainability benefits of recycling programs. Although it is pertinent to this work, the paper did not discuss Kwara and Oyo States' environmental protection.

Maletz, Dornack, and Ziyang (2018) investigated recycling and source separation. The survey found that the creation of green communities and the growth of a circular economy are widely agreed upon. As leaders in this field in their respective regions, China and Germany share the goal of reducing waste's negative environmental effects and avoiding the "Not In My Backyard" (NIMBY) phenomenon. They have gained a great deal of expertise in waste reduction and effective waste management. Strategies like "Pay As You Throw," "Green Dot," and "Trade-in policy (the new for old policy)" have continuously shown higher recycling rates and decreased trash over the past 30 to 40 years. The article shows how German waste laws have changed over time to attain the country's current recycling rates while still abiding by EU regulations. The essay did not discuss waste management in Kwara and Oyo States; instead, it was tailored for China and Germany.

THEORETICAL FRAMEWORK

The study adopts Marxian Political Ecological Theory. Ecological Marxists engage in critical discussions concerning the global power structure, particularly addressing issues such as resource inequality and the lopsided configuration of the international capitalist system and its impact on access to natural resources. In 1997, Roggers advocated for the concept of ecological security,

defining it as the state in which a community's physical environment can fulfil its needs without depleting its natural capital. This concept aligns well with the foundations of the Marxian political ecology framework. Furthermore, Robbins (2004) pointed out that political ecology encompasses a wide array of themes, including environmental consumption, pollution, degradation, exploitation, marginalization, resource extraction, conflicts, resource equity, ecological justice, conservation, and control. However, it is worth noting the limitation in radical environmental critiques of capitalism. Consequently, they may not fully address the historically specific factors contributing to environmental crises in the twentieth and twenty-first centuries. This limitation prevented him from fully capturing the essential characteristics of environmental degradation that emerged with the advent of monopoly capitalism.

The theory is relevant to this study because the Kwara and Oyo States environs are polluted with heaps of refuse in many areas like Ipata, Sango, Okelele, Omoda, Isale Aluko, Pakata, and Gambari in the Ilorin metropolis of Kwara State and Gbagi market, Foko, Oniyanrin, Ogunpa Gege, Iyana Church, Beere, Bodija in the Ibadan metropolis of Oyo State. The process of waste disposal occasionally caused traffic hold-ups in some strategic areas of the urban center. The performance of Kwara and Oyo states Ministries and agencies had been rebuked as a result of their poor performance by the general public. Many people in the states, including beggars, have a lot of health issues resulting from water, air, and pest-borne diseases within and areas where the prevalence of effluents prevailed. (Olawale & Adebola, O. (2019).

METHODOLOGY

The study embraced Marxian Political Ecology theory. The Taro Yamane formula was used to determine the sample size, which came out to be 400, given the population of 11,170,478 in this study. Out of the 400 surveys that were issued, 363 were collected for examination. It was based on secondary data (journals, textbooks, newspapers) as well as primary data (interviews and questionnaires). The key stakeholders, which included the personnel of the Ministry of Environment and its agencies, the House of Assembly staff, environmentalists, private garbage collectors, and medical professionals in Kwara and Oyo, were interviewed and given questionnaires. The gathered data were analyzed using SPSS version 21 for convenience of analysis. Regression and correlation analysis were used to analyze the data using a 5-point Likert scale: 1 for strongly disagreed, 2 for disagreed, 3 for undecided, 4 for agreed, and 5 for strongly agreed.

DATA PRESENTATION, INTERPRETATION AND ANALYSIS

Table 1: *Bio Data*

	States		**Frequency**		**Percentage (%)**
Sex					
Male	Kwara	56		196	53%
Oyo			140		
Female	Kwara	48		167	47%
Oyo			119		
Total		**363**		**100%**	

Age	**States**		**Frequency**	**Percentage (%)**
18-30	Kwara	20	128	35.3%
	Oyo		108	
31-50	Kwara	71	213	58.7%
	Oyo		142	
51 and above	Kwara	13	22	6%
	Oyo		9	
Total		**363**	**100%**	
Educational Qualification	**States**		**Frequency**	**Percentage (%)**
SSCE	Kwara	4	12	3.3%
	Oyo		8	
ND/NCE	Kwara	14	45	12.4%
	Oyo		31	
HND/BSc/MA	Kwara	73	262	72%
	Oyo		189	
Master	Kwara	11	41	11.3%
	Oyo		30	
PhD	Kwara	2	3	1%
	Oyo		1	
Total		**363**	**100%**	
Marital Status	**States**		**Frequency**	**Percentage (%)**
Single	Kwara	18	111	30%
	Oyo		93	
Married	Kwara	85	242	66.6%
	Oyo		157	
Divorced	Kwara	Nil	2	1%
	Oyo		2	
Widow	Kwara	1	5	1.4%
	Oyo		4	
Widower	Kwara	Nil	3	1%
	Oyo		3	
Total		**363**	**100%**	

Source: Researcher's Field survey, 2025

The data revealed that 53% of respondents were male, and 47% were female. Most respondents were aged 31-50 (58.7%), and 72% had university or polytechnic qualifications. Regarding environmental strategies, 85.5% in Kwara and 90.6% in Oyo agreed that there are awareness campaigns on environmental conservation. Additionally, 86.5% in Kwara and 96.2% in Oyo agreed that there are approved dumpsites. Collaboration between state governments and NGOs was supported by 76% in Kwara and 86.5% in Oyo. Enforcement of penalties for improper waste disposal was agreed upon by 91.4% in Kwara and 94.3% in Oyo.

The table also reveals that 62.5% + 27% = 89.5% agreed that in Kwara state, there is an establishment of recycling programs and waste separation initiatives, and 59.8% + 18.1% = 77.8% of the respondents also agreed in Oyo state that there is an establishment of recycling programs and waste separation initiatives. Respondent 2Kw claims that: Despite the creation of a trash separation program and recycling program, the state lacks a recycling plant. Respondent 3Oy states that: The Oyo state government embarks on a series of recycling programs and waste separation initiatives, but there is no recycling plants in the state. The scavengers sort the waste and convert it to wealth. However, there is no functioning recycling plant or treatment plant in the state. The finding is in line with Jenny and Tim (2021), who point out that commendable initiatives aimed at mitigating environmental harm caused by consumption, such as the transformation of plastic packaging into clothing or repurposing unused bread into beer, have gained substantial popularity.

Table 2: *Responses to the strategies for the implementation of environmental protection policy in Kwara and Oyo states*

Table 2: *Responses to the strategies for the implementation of environmental protection policy in Kwara and Oyo states*	**STATEMENTS**	**STATES**	**SD**	**D**	**U**	**A**	**SA**	**Total**	**Aggregate Response**
S/N									
1	There are awareness campai	**Kwara**	2 (1.9%)	11 (10.6%)	2 (1.9%)	**69 (66.3%)**	20 (19.2%)	104 (100%)	**Agreed**
		Oyo	5 (1.9%)	12 (4.6%)	8 (3.1%)		96	259 (100%)	**Agreed**

	gns and education programs on environmental conservation in the state.					**138 (53.3%)**	(37.1%)		
2	There is approval of the dumpsite in the state.	**Kwara Oyo**	Nil Nil	8 (7.7%) 3 (1.2%)	6 (5.8%) 7 (2.7%)	**59 (56.7%)** 89 (34.4%)	31 (29.8%) **160 (61.8%)**	**104** (100%) 259 (100%)	**Agreed Strongly Agreed**
3	There is a collaboration between the state government and NGOs for joint initiatives.	**Kwara Oyo**	2 (1.9%) 1 (.4%)	14 (13.5%) 14 (5.4%)	9 (8.7%) 20 (7.7%)	**53 (51%) 131 (50.6%)**	26 (25%) 93 (35.9%)	**104 (100%) 259 (100%)**	**Agreed Agreed**
4	Enforcement of penalties and fines	**Kwara Oyo**	1 (1.%) Nil	7 (6.7%) 13 (5%)	1 (2.9%) 2 (.8%)	**50 (48.1%) 68 (26.3%)**	45 (43.3%) 176 (68%)	**104 (100%) 259 (100%)**	**Agreed Strongly Agreed**

	for improper waste disposal.								
5	Establishment of recycling programs and waste separation initiatives.	**Kwara Oyo**	6 (5.8%) 17 (6.6%)	3 (2.9%) 24 (9.3%)	3 (2.9%) 16 (6.2%)	**65 (62.5 %) 155 (59.8 %)**	27 (26.%) 47 (18.1%)	**104 (100%) 259 (100%)**	**Agreed Agreed**
6	Involvement of local communities and stakeholders in decision-making processes.	**Kwara Oyo**	2 (1.9%) 10 (3.9%)	14 (13.5%) 36 (13.9%)	6 (5.8%) 8 (3.1%)	**44 (42.3 %) 171 (66%)**	38 (36.5%) 34 (13.1%)	**104 (100%) 259 (100%)**	**Agreed Agreed**
7	Introduction of waste-to-energy technologies (Anaerobic Digesti	**Kwara Oyo**	8 (7.7%) 24 (9.3%)	20 (19.2%) 52 (20.1%)	17 (16.3%) 32 (12.4%)	**37 (35.6 %) 129 (49.8 %)**	22 (21.2%) 22 (8.5%)	**104 (100%) 259 (100%)**	**Agreed Agreed**

	on, Incineration, etc.)								
8	Implementation of waste segregation at the source (Household, Commercial, Industrial).	**Kwara** **Oyo**	3 (2.9%) 14 (5.4%)	41 (39.4%) 57 (22%)	22 (21.2%) 11 (4.2%)	**36 (34.6%)** **137 (52.9%)**	2 (1.9%) 40 (15.4%)	**104 (100%)** **259 (100%)**	**Disagreed** **Agreed**
9	Encouragement of the reduce, reuse, recycle (3Rs) approach	**Kwara** **Oyo**	6 (5.8%) 28 (10.8%)	21 (20.2%) 37 (14.3%)	5 (4.8%) 8 (3.1%)	**57 (54.8%)** **97 (37.5%)**	15 (14.4%) 89 (34.4%)	**104 (100%)** **259 (100%)**	**Agreed** **Agreed**
10	The state adopts technology (ICT) to capture a database on waste construction.	**Kwara** **Oyo**	23 (22.1%) 67 (25.9%)	29 (27.9%) 25 (9.7%)	13 (12.5%) 18 (6.9%)	**35 (33.7%)** **104 (40.2%)**	4 (3.8%) 45 (17.4%)	**104 (100%)** **259 (100%)**	**Agreed** **Agreed**

Source: Researcher's Field survey, 2025

The table also reveals that 42.3% + 36.5% = 78.8% agreed that in Kwara state, there is involvement of local communities and stakeholders in decision-making processes, and 66% + 13.1% = 79.1% of the respondents also agreed in Oyo state that there is involvement of local communities and stakeholders in decision-making processes. The finding is in line with respondent 3Oy, who states that: Stakeholder consultation is the key to addressing environmental protection and waste management because it gives them a sense of belonging. Mekonnen, Amanuel, and Terje (2022) stress that the active involvement of stakeholders at all levels is critical to a project's success, particularly when environmental decision-making is involved. To guarantee sustainability and environmental security, stakeholder involvement is crucial. According to Richardson and Razzaque (2006), the involvement of the public, the media, environmentalists, academics, and scientists in the environmental decision-making process enables citizens to exercise their democratic rights. Bulkeley and Mol (2003) assert that involving civil society in shaping political decisions enhances a country's capacity to enact enforceable laws and formulate sustainable environmental policies. Public participation in environmental policymaking establishes a vital connection between the public and environmental governance, making accountability and transparency more achievable. Berkes (2009) emphasizes that engaging local communities allows for the integration of indigenous practices and innovative solutions tailored to the specific challenges of each area. Gutberlet (2008) points out that collaborative education and awareness initiatives with communities can lead to improved waste management practices and a deeper understanding of environmental consequences.

The table also reveals that 35.6% + 21.2% = 56.8% agreed that in Kwara state, there is the introduction of waste-to-energy technologies (Anaerobic Digestion, Incineration, etc.), and 49.8% + 8.5% = 58.3% of the respondents also agreed in Oyo state that there is the introduction of waste-to-energy technologies (Anaerobic Digestion, Incineration, etc.). Moshood, Olawale, and Temitope (2022) strongly emphasized that the adoption of a waste-to-energy system holds the potential to significantly reduce the adverse environmental impact caused by waste generation. Such a system would not only help in the production of renewable and sustainable energy but also contribute to the realization of a circular economy. Evangelisti et al. (2017) have pointed out that integrating waste-to-energy (WtE) technologies into the energy and waste management system is one of the most effective solutions for ensuring sustainable waste management and diversifying the energy generation mix.

The table also reveals that 34.6% + 1.9% = 36% agreed that in Kwara state, there is implementation of waste segregation at the source (Household, Commercial, Industrial), and 52.9% + 15.4% = 68.3% of the respondents also agreed in Oyo state that there is implementation of waste segregation at the source (Household, Commercial, Industrial). Respondent 5Kw explains that garbage segregation at the dumpsite is promoted by the Kwara state government. The scavenging service is used to sort rubbish and gives the state government a token in exchange. Equally, respondent 2Kw specifies that waste contractors transport garbage to a dump, where scavengers separate and sort the material. It is stated that certain trash collectors separate their material and deposit it in an

unapproved dumpsite. This kind of behavior is forbidden. Respondent 3Oy states that: Oyo state government encourages people to sort their waste from the source. They sort the waste and convert it to wealth. The Oyo state government embarks on waste separation initiatives. Waste collectors and scavengers are allowed to operate to segregate waste into different categories to reduce, reuse, and recycle. The discovery aligns with the perspective expressed by Maletz et al. (2018), who emphasized that waste segregation plays a pivotal role in the roadmap toward achieving a circular economy.

The table also reveals that 54.8% + 14.4% = 69.2% agreed that in Kwara state, there is encouragement of the reduce, reuse, recycle (3Rs) approach, and 37.5% + 34.4% = 71.9% of the respondents also agreed in Oyo state that there is encouragement of the reduce, reuse, recycle (3Rs) approach. Respondent 2Kw declares: The three Rs: reduction, reuse, and recycle are encouraged. Scavengers separate rubbish and transport it to other locations, specifically for recycling, as the state does not have a recycling factory. Respondent 3Oy states that the service of registered scavengers is allowed to operate at the dumpsite from 8:00 am to 5:00 pm daily. Scavengers are allowed to operate because their activities reduce waste. Their activities reduce waste that is to be taken to a dump site. Oberlin (2013) further unveiled that the informal practice of reusing and recycling materials like plastics, electronics, and metals involves a selling chain that extends from households to waste collectors, recycling centers, and eventually to industries. Armijo De Vega et al. (2008) and Donnini Mancini et al. (2007) contend that a well-planned and managed system of waste reuse, recycling, and recovery (RRR) can significantly reduce the volume of waste that needs disposal, up to 65% of the total waste generated. Moreover, waste recovery and reuse can yield direct economic benefits, as observed by Batool et al. (2008), Kumar et al. (2017), Li et al. (2015), and Zhang et al. (2012). Waste reuse and recycling contribute to income generation and can alleviate complications associated with handling and disposing of large volumes of solid waste, as acknowledged by Matter et al. (2013) and Wilson et al. (2006).

The table also reveals that 33.7% + 3.8% = 37.5% agreed that in Kwara state, the state adopts technology (ICT) to capture databases on waste construction, and 40.2% + 17.4% = 57.6% of the respondents also agreed in Oyo state that the state adopts technology (ICT) to capture databases on waste construction. Respondent 3Oy states that: The Oyo state government has adopted technology (ICT) to capture databases on waste construction and monitoring purposes. The activities of waste collectors are monitored through tracking. CCT cameras are fixed to monitor both the waste collectors and the polluters. However, Respondent 2Kw says Kwara state has not embraced information and communication technology (ICT) to gather databases on waste construction and monitoring purposes, according to the Kwara Environmental and Protection Agency. Residents in the vicinity of the Government Reserve Area illegally dump trash after the Kwara State Environmental Protection Agency closes due to a lack of CCT cameras for monitoring. Similarly, in numerous key locations such as Offa Garage, before the Emir's palace, and in Taiwo.

CONCLUSIONS

The study revealed that, while Kwara and Oyo States have made great achievements in environmental upkeep and sustainable waste management, there are still areas for improvement.

Awareness campaigns, education initiatives, licensed dumpsites, and collaborations with NGOs all indicate that state governments are taking a proactive approach. These programs reflect a dedication to addressing environmental concerns and cultivating a sustainable culture among citizens.

However, it is critical to improve the success of these techniques through proper implementation, monitoring, and community involvement. Implementation gaps, insufficient monitoring methods, and a lack of community engagement can all hinder the effectiveness of well-intended programs. As a result, strong implementation frameworks, regular monitoring, and active community participation are required in environmental efforts.

Furthermore, capacity building among government agencies, community leadership training programs, and public-private partnerships can help to increase waste management infrastructure and environmental conservation activities. By investing in these areas, Kwara and Oyo states can create resilient and sustainable waste management systems that not only protect the environment but also enhance public health and well-being.

Furthermore, incorporating technology and innovation into waste management can create new potential for efficiency and sustainability. Modern waste management strategies, such as waste-to-energy projects, smart garbage collection systems, and digital monitoring tools, can help maximize resource usage while reducing environmental effects.

In conclusion, while Kwara and Oyo States have made remarkable efforts to protect the environment and manage trash sustainably, long-term success requires ongoing development, innovation, and community engagement. Addressing the identified difficulties and applying the recommended methods can lead to a cleaner, healthier, and more sustainable future for all citizens.

RECOMMENDATIONS

The paper recommended that the governments of Kwara and Oyo should buy additional cars and trucks and make sure they are maintained on a regular basis. To maintain a sustainable environment, the ministries and agencies in both States should enhance the frequency of waste collection in the state. There ought to be more disposal sites built. Priority should be given to environmentalists during the hiring, placement, and selection processes. Landfills should be implemented in place of dumpsites in both States. The governments of Kwara and Oyo states ought to construct recycling and treatment facilities. Private garbage collectors should operate in a supportive atmosphere, particularly in Kwara State.

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