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Developing a Sustainable Approach to Waste Management in Nigeria: Lessons from Kwara State

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Abstract
The study examined Kwara State's environmental protection policies and strategies for sustainable waste management systems. Sustainable development theory was adopted. The paper relied on both primary and secondary data. The population of this study was 1207 which comprised personnel in Ministries, Agencies, Associations and the House of Assembly Committee on Health and Environment in Kwara State. The sample for the study was 400. Of the 400 questionnaires distributed, 365 were retrieved and analysed using Statistics Package for Social Sciences version 21. Findings from the study showed that there is public awareness of the importance of environmental protection and waste management in Kwara. The study revealed that there is one approved dumpsite in Kwara. The study also revealed low compliance with environmental and sanitation laws. The study concluded that the Kwara state governments create public awareness and enforce laws on the violators but many people are stubborn to comply. The study recommended that recycling and treatment plants should be established by the Kwara State government. The government should increase allocated funds for environmental conservation. Kwara State government should procure more vehicles and trucks and ensure regular maintenance. Environmentalists should be given priority in the process of recruitment, selection and placement.

Keywords: Enforcement, Environmental Protection, Strategy, Waste Management
JEL Classification Codes: K4, Q2, L2, Q53

1. Introduction

The central role played by quality environment in the life of humans and even animals cannot be over-emphasized. However, its health implication and the uncoordinated policy thrusts governing it at different

levels of government leaves much to be desired. It is taken that qualitative environmental practices engender good health. These put into question, policy initiatives towards ensuring sustainable waste management. Weaving the challenge of waste management around a globally acclaimed principle or variable of sustainability cannot be more poignant. This essentially entails advocating for comprehensive development without jeopardizing the capacity of future generations to support themselves (Amin, Moshood, and Abdulrasheed, 2023).

Globally, especially within the United Nations (UN), from the Millennium Development Goals (MDGs) to the ongoing emphasis on Sustainable Development Goals (SDGs), environmental considerations remain crucial for policymakers around the world. Recently, especially since 2015, there has been a revitalized emphasis on 17 goals. Within this framework, components related to promoting a high-quality environment are evident in goals 3, 6, 11, and 13, encompassing good health and well-being, clean water and sanitation, sustainable cities and communities, as well as climate action. When considered as a whole, environmental protection encompasses the actions taken by individuals, organizations, and governments to safeguard the natural environment. Its main goals involve safeguarding natural resources, preserving the current environment, and undertaking initiatives to address and reverse environmental harm whenever feasible.

Environmental protection is also geared towards averting the degradation of the natural environment, which is under threat due to factors such as population growth, technological advancements, and overconsumption. These factors have collectively contributed to adverse effects on the environment, posing risks to both humans and wildlife. Environmental conservation serves to maintain the planet's biodiversity for the mutual benefit of nature and humanity, allowing nature to continue its vital role in maintaining the health of humans, animals, and the planet itself. The environment plays a crucial role in sustaining healthy living and the existence of life on Earth. A comprehensive analysis of global environmental protection efforts since 1970 indicates the active involvement of the United States Environmental Protection Agency (EPA) in protecting both the environment and public health (United Nations Environment Programme., 2021).

In Africa, the environment faces an array of challenges, including increasing occurrences of natural disasters, fluctuating climate patterns, and diverse weather phenomena. It is increasingly expedient for citizens to exercise greater caution in the way they lead their lives in response to these environmental issues, to achieve a harmonious balance between human

activities and the environment. Specifically, Nigeria's response to the looming challenges can be seen in the promulgation of the National Environmental Standards and Regulations Enforcement Agency (NESREA) established in 2007 as a federal government environmental agency dedicated to ensuring a cleaner and healthier environment for Nigerians.

Nigeria ranks among the primary contributors to waste production in Africa. According to a report from the United Nations Industrial Development Organization, Nigeria produces an astonishing 32 million tonnes of waste each year, with a daily rate of waste generation ranging from 0.65 to 0.95 kilograms per person (Ike, Ezeibe, Anijiofor, and Daud, 2018). Consequently, waste management has become a primary responsibility of all three tiers of government. Despite concerted efforts to promote hygienic living, waste disposal remains a significant challenge in the country. The nature of environmental mismanagement varies from region to region across Nigeria's six geographical zones.

In Kwara State, compliance with global environmental protection and waste management standards has not been achieved. The state faces numerous issues related to environmental mismanagement. For example, the open dumping of solid waste into wetlands, watercourses, and drains, as well as burying waste in pits, is a common method of disposal. In response to these challenges, the Kwara State Government founded the Kwara Waste and Environmental Protection Agency (KWEPA) under the jurisdiction of the Kwara State Ministry of Environment and Tourism. Functioning by the Kwara State Environmental Protection Agency Law of 1992, this agency is assigned the responsibility of overseeing the management and disposal of waste within the state. The agency has equipped itself with packer compactor trucks, roll-on/roll-off bins, shovels, rakes, brooms, parkers, and wheelbarrows to maintain a clean and tidy environment. This study intends to examine the strategies of environmental protection policies on sustainable waste management systems in Kwara State, Nigeria.

Despite growing concerns about the adverse environmental impact of improper waste management practices, many regions and communities continue to struggle with inadequate strategies for waste disposal and recycling. It is presumably observed that there are ineffective strategies for the implementation of environmental protection towards sustainable waste management in Kwara. Waste management practices in the state are often unsustainable and pose significant environmental challenges (Oladejo, Adeyemi, and Oyewale, 2020). The study by Ojo, Oladinrin, and Obi, (2021) point out factors such as limited public awareness, inadequate funding, lack of coordination among stakeholders, and insufficient monitoring and evaluation mechanisms.

Mosgaard (2016) reviewed understanding the role of waste prevention, and Malik, Yahaya, and Ogunleye (2020) assessed the awareness level and practice of environmental management among students in Ilorin, Kwara State, Nigeria. Awopetu et al. (2013) worked on the perception of the public at Makurdi, North Central Nigeria, on the waste minimisation strategy option. Oladepo and Rafiu (2012) studied on challenges of waste management and climate change in the Lagos metropolis and Ahmed (2008) wrote on waste management in the Ilorin metropolis, lessons for Nigerian Cities Ilorin metropolis. The study covers three Local Government Areas which include Ilorin West, Ilorin East, and Ilorin South but none has been written on assessing environmental protection policies towards sustainable waste management systems in Kwara state. This study will identify the strategies for implementation of environmental protection towards sustainable waste management in Kwara state.

2. Empirical Review

Malik, Yahaya, and Ogunleye (2020) assessed the awareness level and practice of environmental management among students in Ilorin, Kwara State of Nigeria. The study revealed that environmental problems have attracted the attention of individuals, organizations and governments all over the world. The increase in environmental concerns has continued to highlight the influential factors in environmental protection such as environmental behaviour, awareness, knowledge and attitude. The article was peculiar to Ilorin alone and failed to address environmental protection policies in Kwara State.

David, Olukanni, and Christiana (2019) studied public-private sector involvement in providing efficient solid waste management services in Nigeria Findings from the study showed that without the right legislation and enforcement, waste generators will not be mandated to dispose of their waste properly. The article is relevant to this work but did not address environmental protection policies in Kwara State. Ambali, Ahmad, and Farah (2013) wrote on environmental policy on biomedical waste, strategies and issues in Malaysia. Findings from the study showed that biomedical activities generate some wastes that pose severe effects on human health and the environment at large, especially if there is no proper management policy in place. The article was domesticated to Malaysia and did not address waste management.

Ogunniran (2018) revealed a distressing and uncontrollable surge in the rate of solid waste generation in Nigeria, attributed to daily human activities and economic practices. Findings from the study pointed out that

the haphazard disposal of solid waste has led to adverse consequences such as climate change, abiotic depletion, photochemical reactions, and extreme weather events like global warming. These environmental issues result from the breakdown of greenhouse gases emanating from chemical and radioactive wastes. The repercussions include water contamination, obstruction of water bodies, soil and air pollution, and the prevalence of both communicable and non-communicable diseases in numerous regions across the country. The article did not address environmental protection policies in Kwara State.

Harit, Sarv, Ashish, and Shadab (2020) wrote on solid waste management: characteristics, techniques, environmental impacts and health effects in Aligarh City", Uttar Pradesh, India. The findings from the study uncovered shortcomings in the existing facilities, attributed to a lack of concern, a high volume of waste generation, insufficient collection space, delayed approval for new landfill sites, and the presence of several open dump sites that contribute to fires. The article is relevant to this work but did not address environmental protection policies in Kwara State.

Samuel and Olamide (2016) assessed the environmental sanitation and solid waste management in Ibadan North Local Government, Oyo State, Nigeria. The results unveiled that the management of environmental sanitation and solid waste involves a collaborative effort among agencies operating at both state and local government levels, in addition to private entities. Additionally, the research demonstrated that residents in the Ibadan North local government area express favourable attitudes toward certain aspects of environmental sanitation but hold negative perceptions regarding specific facets of solid waste management. The article was domesticated to the Ibadan North local government area only.

Zorica, Cristiana, Elena, and Cezarina (2015) posit that the practice of waste management is employed as a measure to safeguard the environment by overseeing the collection, transportation, processing, recycling, disposal, and monitoring of waste materials. The study's results indicated that local government authorities typically handle the management of non-hazardous residential and institutional waste in metropolitan areas. Conversely, the responsibility for managing non-hazardous commercial and industrial waste usually lies with the waste generator. The article did not address environmental protection policies.

Yetunde (2013) wrote on the sustainability of municipal solid waste management in Nigeria with specific reference to Lagos. Findings from the study indicated that numerous countries, especially those in the developed world, have implemented strategies from the waste management hierarchy to ensure the sustainable handling of their municipal solid waste. The

selection of these options typically relies heavily on local factors. The study is relevant to this work but does not address environmental protection policies.

Lishan, Bo, Tong, Liang, and Ouwen (2023) studied promoting and maintaining public participation in waste separation policies in Shanghai, China. The study revealed that with the implementation of waste separation policies, residents' satisfaction with waste management increased by 5.3%, and participation willingness increased by 6.1%. Waste generation is sometimes a result of the environmentally inefficient use of resources, with potential adverse impacts, justifying the need to establish and promote a close relationship between environmental policies and waste management. The article was not domesticated to Nigeria and failed to discuss environmental protection policies while this research work examines the strategies of environmental protection policies on waste management in Kwara State, Nigeria.

Yusuf, Adewoye, and Sawyer (2022 investigated the opinions of Ilorin metropolis residents regarding the central storage of solid waste in the Kwara state of Nigeria. The findings highlighted significant concerns among stakeholders about inefficient waste collection and unsafe disposal practices in Nigeria. The study underscored the escalating nature of the waste problem in Ilorin, as daily waste generation outpaces evacuation efforts. Consequently, the situation of central storage for solid waste in Ilorin is increasingly distressing, emphasizing the pressing need for effective waste management strategies. The article is relevant to this work but did not address environmental protection policies in Kwara State.

Ihuoma (2012) researched the characterization and quantification of solid and liquid wastes in Iwo and Ibadan. The findings indicated that a prevalent disposal method involves openly dumping solid wastes into wetlands, water courses, and drains, as well as burying such wastes in pits. Consequently, this practice has led to the area becoming littered, presenting an eyesore and causing a nuisance due to the associated stench. The article was domesticated to Ibadan and did not address environmental protection policies.

Hushie (2016) engaged in fostering collaborations between public and non-governmental organizations for healthcare initiatives in Ghana. The study revealed that partnership between civil society organizations (CSOs) and the government in the health sector necessitates distinct forms, ranging from equal and formal contractual arrangements to decentralized and advocacy-oriented collaborations. The commitment of both the government and NGOs to collaborative efforts has proven instrumental in enhancing service delivery, mitigating health inequities, and reducing disparities. Non-

governmental organizations contribute significant value through their knowledge, expertise, community legitimacy, capacity to attract donor funding, and implementation capabilities. This is particularly crucial in addressing health needs in areas or communities beyond the government's reach and for services it doesn't provide. The article was domesticated to Ghana and did not address waste management.

Miranda (2013) worked on the legislation that prohibits the transportation, deposition, and dumping of harmful waste on any land or territorial waters, among other related matters. Violation of this law can result in severe penalties, including life imprisonment, and the forfeiture of vehicles or equipment used in the transportation or importation of the waste to the Federal Government of Nigeria. In cases where a corporate entity is responsible for the offence due to the negligence or consent of its principal officers, both the individual officers and the corporate body will be subject to appropriate punishment. The Act stipulates that; individuals are not allowed to engage in activities likely to generate hazardous waste without obtaining a permit from the Agency; waste generators must ensure secure storage methods for such wastes. Equally, those generating hazardous waste are required to treat the waste using approved methods; exporting or transiting hazardous waste without the Agency's permit is prohibited; transporting toxic waste through Nigeria to another country requires prior informed consent from the Agency and non-compliance with the above obligations constitutes an offence punishable by a fine of N5,000,000, imprisonment for five years, or both. The article did not address waste management.

Jenny and Tim (2021) explored how the positive feeling associated with recycling, known as the warm glow, can paradoxically lead to increased wasteful behaviour. Findings indicated that when individuals are presented with alternatives such as transforming plastic packaging into clothing or repurposing unused bread into beer, which have gained widespread popularity; the populace may psychologically perceive their waste creation as a positive contribution to the collective good, generating a sense of personal satisfaction (referred to as a warm-glow effect). The study contended that these potential 'wasteful contribution' effects should be taken into account when evaluating the genuine sustainability benefits of specific recycling initiatives. The article is relevant to this work but did not address environmental protection in Kwara State.

Pradipta and Harminder (2018) investigated the predictors of recycling intentions among the youth in India, addressing the escalating challenge of municipal waste management in the country. The rising urban population and high consumption lifestyles contribute to the challenge of

municipal waste management, exacerbated by India having the world's highest number of young people aged 10–24. Findings from the study showed that social factors significantly influence the recycling intentions of Indian youth. The study emphasizes the importance of policymakers promoting recycling as a social trend in India and ensuring the provision of adequate facilities to facilitate public participation in recycling activities without encountering difficulties. Additionally, schools play a crucial role in enhancing students' awareness of recycling and motivating their engagement in household waste management practices. The article was domesticated to India but did not address environmental protection in Kwara State.

Mekonnen, Amanuel, and Terje (2022) explored the evaluation of stakeholder roles in community projects with a focus on the environmental security and livelihood improvement of impoverished rural societies. The study revealed that involvement of stakeholder participation enhances environmental security and uplifts the livelihoods of the impoverished in a rural Ethiopian community. The study recommended that non-governmental organizations adopt a grassroots approach to community projects to garner acceptance and trust as well as ensure project sustainability. The article was domesticated to Ethiopia but did not address waste management in Kwara State.

Richardson and Razzaque (2006) addressed public participation in environmental decision-making. Findings from the study showed that public involvement in environmental decision-making has become a fundamental aspect of numerous global environmental regulatory systems. Those impacted by development approvals, pollution licenses, land use plans, and various regulatory procedures have progressively called for increased consultation, as well as more transparent and accountable decision-making. The article is relevant to this study but did not address waste management in Kwara State.

Maletz, Dornack, and Ziyang (2018) researched source separation and recycling. The study revealed that there is a global consensus on the development of a circular economy and the establishment of green societies. Both China and Germany, as leading countries in their respective regions in this domain, aim to decrease the environmental impacts of waste and avoid the "Not In My Backyard" (NIMBY) syndrome. They have accumulated significant experience in waste reduction and the efficient utilization of waste. Over the past 30–40 years, strategies such as "Pay As You Throw," the "Green Dot" system, and the "trade-in policy (the new for old policy)" have consistently demonstrated higher recycling rates and reduced waste. The article illustrates the evolution of German waste legislation to achieve

current recycling rates while Germany adheres to European laws. The article was domesticated to China and Germany but did not address waste management in Kwara State.

Johnson *et al.,* (2013) addressed the enhancement of waste segregation and cost reduction in a tertiary-care hospital situated in a lower–middle-income country in Central America. The study revealed that efficient management and segregation of healthcare waste (HCW) are crucial for ensuring safety, environmental protection, and cost control in healthcare institutions. Findings from the study showed that inadequate HCW management poses increased risks and costs to these institutions. Although the hospital staff demonstrated knowledge of waste segregation practices, their compliance with national policies was lacking. Re-segregating waste in biohazardous waste bags revealed that 61% of this waste was common waste, suggesting a possible lack of awareness among staff regarding the cost implications of missegregating healthcare waste. The findings suggest that educating hospital staff on HCW management can lead to better segregation of biohazardous waste and significant cost savings. Hospitals, particularly those in lower-middle-income countries, stand to benefit from optimizing available resources and sustaining best practices in HCW management. The article was domesticated to Central America but did not address waste management in Kwara State.

Al-Salem, Lettieri, and Baeyens (2009) researched the recycling and recovery routes of plastic solid waste (PSW). The study revealed that primary recycling, a method involving the reintroduction of clean scrap of a single polymer into the extrusion cycle to produce products of similar material, is commonly employed within processing lines but is seldom utilized among recyclers due to the often inadequate quality of recycled materials. Secondary techniques involve the use of various waste products, including end-of-life or production (scrap) waste, which are generally resized into more suitable shapes such as pellets, flakes, or powders, depending on their source, shape, and usability. The study also found that energy recovery is a viable solution for PSW, especially in the case of municipal solid waste (MSW). While the amount of energy produced in kilns and reactors in this approach has been extensively investigated up to the operational stage, integration with petrochemical or converting plants remains an underexplored aspect. The article did not address environmental protection policies in Kwara State.

Matter, Dietschi, and Zurbrügg (2013) conducted a study on enhancing the informal recycling sector through household waste segregation in Dhaka. The examination of the informal recycling industry, its stakeholders, and waste generation and composition revealed a

substantial untapped potential. However, any initiative seeking to promote source segregation and increase access to recyclables must meticulously consider all integrated aspects of the waste management system that influence and determine the sustainability and success of the proposed improvements. The study recommended that the practicality of implementing segregation at the household level, as well as the regularity of collection or purchase of recyclables by the informal sector, should be addressed as a top priority. The article did not address environmental protection policies in Kwara State.

3. Methodology

3.1 Population and Sample Size Determination

The population of this study is drawn from the Kwara State Ministry of Environment and Forestry, Kwara State Ministry of Health, Kwara State Environmental Protection Agency, Kwara State Association of Waste Collectors and the Kwara State House of Assembly Committee on Health and Environment were 1,207. The population of this study is 1,207 and the sample size is 400 determined by the Yamane (1967) formulae. Thus:

$$n = \frac{N}{1+Ne^2} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

$$And, plugging\ in\ the\ given\ values:$$

$$n = 1{,}207$$

$$1 + 1{,}207(0.05)2$$

$$n = 1{,}207$$

$$1{,}208x0.0025$$

$$n = 1{,}207$$

$$3.02$$

$$n = 399.668$$

Therefore, approximately n = 400. As a result, the sample size for this study is 400.

4. Results and Discussion

Table 1: Strategies for the Implementation of Environmental Protection Policy in Kwara State

S/N	Statements	SD	D	U	A	SA	Total	Aggregate Response

1	There are awareness campaigns and education programs on environmental conservation in Kwara state.	13 (3.6%)	22 (6%)9	9 (2.5%)	207 (56.7%)	114 (31.2%)	365 (100%)	Agreed
2	There is approval for a dumpsite in Kwara state.	-	11 (3%)	11 (3%)	167 (45.8%)	176 (48.2%)	365 (100%)	Strongly Agreed
3	There is a collaboration between the state government and NGOs for joint initiatives in Kwara state.	3 (.8%)	29 (7.9%)	28 (7.7%)	192 (52.6%)	113 (31%)	365 (100%)	Agreed
4	Enforcement of penalties and fines for improper waste disposal in Kwara state.	1 (.1%)	17 (4.8%)	3 (.8%)	128 (35.1%)	216 (59.2%)	365 (100%)	Strongly Agreed
5	Establishment of recycling programs and waste separation initiatives in Kwara state.	28 (7.7%)	19 (5.2%)	19 (5.2%)	232 (63.5%)	67 (18.4%)	365 (100%)	Agreed
6	Involvement of local communities and stakeholders in decision-making processes in Kwara state.	12 (3.3%)	44 (12.1%)	25 (6.8%)	216 (59.2%)	68 (18.6%)	365 (100%)	Agreed
7	Implementation of waste segregation at the source (Household, Commercial, Industrial) in Kwara state.	28 (7.7%)	87 (23.8%)	46 (12.6%)	127 (34.8%)	77 (21.1%)	365 (100%)	Agreed
8	Encouragement of the reduce, reuse, recycle (3Rs) approach in Kwara state.	59 (16.2%)	53 (14.5%)	23 (6.3%)	174 (47.7%)	56 (15.3%)	365 (100%)	Agreed
9	The state adopts technology (ICT) to capture a database on waste construction in Kwara state.	38 (10.4%)	63 (17.3%)	24 (6.6%)	208 (56.9%)	32 (8.8%)	365 (100%)	Agreed

Key: SD (Strongly Disagree), D (Disagree), U (Undecided), A (Agree), SA (Strongly Agree)

Source: Researcher's Field Survey, 2023

Table 1 shows that 56.7% +31.2% = 87.9% agreed in Kwara state that there are sufficient awareness campaigns and educational programs on environmental conservation in the state. This is in line with respondent 2 from the Kwara State Environmental Protection Agency who alluded that the Kwara State government, through the Ministry of Environment and Forestry and its agency make awareness campaigns and educational programs to sensitize the members of the public on the need to keep their environment clean. The government has put in place a lot of precautionary

measures to ensure that people do not dump refuse indiscriminately. One of the measures is placing bins (popularly called Roro Bin) in strategic areas in the metropolis to ensure that people do not litter the environment.

There are jingles to create awareness and sensitize people to become registered waste collectors with the state government. Measures will be put in place to rest and prosecute those who are dumping refuse illegally in the metropolis. In the area of market sanitation, the Babaloja and Iyaloja (Male and Female Market Leaders) are used as points of contact with the market community. They are charged with the responsibility of organizing meetings to further drive home the messages from the government on the need to properly and effectively dispose of waste without negative backlash on the sanity of the environment. The result is in line with Malik *et al*., (2020) who revealed that environmental problems have attracted the attention of individuals, organizations and governments all over the world and that the increase in environmental concerns has continued to highlight the influential factors on environmental protection such as environmental behaviour, awareness, knowledge and attitude.

It shows that 45.8% +48.2% = 94% strongly agreed in Kwara state that there is approval of dumpsite in the state. This is in line with respondent 1 from the Kwara State Ministry of Environment and Forestry says that "there is only one approved dumpsite in the state. It is situated at Aiyekale along Ogbomosho road". Similarly, respondent 4 from the Kwara State House of Assembly Members' Committee on Health and Environment states that the Kwara State Government has only one approved dumpsite across the state. However, there is agitation for the establishment of more dumpsites from the stakeholders. It is also in line with respondent 6 from the Kwara State Association of Waste collectors that Sokoto Aiyekale is the only approved dumpsite in the metropolis and it is difficult for them to operate especially during the rainy season and the site is far away with poor access road. The finding is similar to Yusuf *et al.*, (2022*)* who opined that there is an officially approved dumpsite in Kwara state, including the Ilorin metropolis. Still, the management of this dumpsite needs improvement to ensure safe and responsible waste disposal.

However, it is found in Kwara State that dumpsite accessibility and insufficiency are an impediment, as the dumpsite was found to be too far and largely inaccessible. This is also in line with respondent 5 from the Environmental Health Department, Ilorin West Local Government Area says that the available waste tippers are not enough and the dumpsite is far away from many strategic areas. As a result, the truck will evacuate waste once instead of twice or three (3) times and abandon the remaining refuse which in turn pollutes the environment. The practice sometimes resulted in

littering the environment, which became irritant and distressful (Ihuoma, 2012).

The table reveals that 52.6% +31% = 83.6% agreed that in Kwara, there is collaboration between the state government and NGOs for joint initiatives. The finding is in line with respondent 1 from Kwara State Ministry of Environment and Forestry states that: Kwara State collaborates with NGOs such as Rotary Club, and Blue Mist. They voluntarily evacuate waste in strategic areas like Oyun Bridge and Tanke Oke-Odo solar power energy. The result is in line with Hushie (2016) acknowledged the positive effect of NGO-government collaboration on the environment and health enhancement and the promotion of programs developed for controlling and preventing diseases such as cholera, communicable diseases, malaria and tuberculosis in different communities. The finding is in line with the previous study by Samuel and Olamide (2016) who stated that the management of environmental sanitation and solid waste involves a collaborative effort among agencies operating at both state and local government levels, in addition to private entities.

The table also reveals that 35.1% +59.2% = 94.3% strongly agreed that in Kwara state**,** there is enforcement of penalties and fines for improper waste disposal. The result is similar to respondent 1 from the Kwara State Ministry of Environment and Forestry: the Kwara state government formed a task force together with the vigilante group (Private Security Guards) for continuous monitoring of those dumping waste illegally. The task force is everywhere and anybody apprehended shall be prosecuted before a mobile court in the Ministry of Environment. Fines are imposed depending on the gravity of the offence committed while those incapable of readily paying are remanded in prison.

Similarly, respondent 2 from Kwara State Environmental Protection Agency that; In the sense we normally carry out the enforcement as KWEPA is in conjunction with the Ministry of Environment, the parent ministry. At times, the staff embarks on night duty when it is discovered that the town is too dirty to arrest people dumping illegally on the road or in illegal places by 7:30 a.m. to 10:00 p.m. So, whoever is caught will be taken to the station and the violator to the court the following day. Such violators will be fined heavily. At times when there are many, the mobile court is organized for them at the Ministry of the Environment so that they will be prosecuted and fined accordingly. The laws are very effective but it hindered by a shortage of staff or personnel.

Miranda (2013) stated that the National Environmental Standards and Regulations Enforcement Agency (NESREA) is responsible for enforcing environmental standards and regulations in Nigeria. They carry

out research and development activities for environmental protection and educate the public on acceptable waste disposal methods. Hakeem and Joseph (2014) asserted that the Harmful Waste Act prohibits the carrying, dumping or depositing of harmful wastes in the air, land, or waters of Nigeria without lawful authority. David *et al.*, (2019) admitted that without the right legislation and enforcement, waste generators will not be mandated to dispose of their waste properly.

The table shows that 63.5% +18.4% = 81.9% agreed that in Kwara state**,** there is an establishment of recycling programs and waste separation initiatives. Respondent 2 from Kwara Environmental and Protection Agency states that; there is an establishment of recycling programs and waste separation initiatives but there is no recycling plant in the state. The finding is in line with Jenny and Tim (2021) state that laudable initiatives designed to limit the environmental damage associated with consumption, such as the recycling of plastic packaging into clothing or unused bread into beer, have become increasingly popular. It is also relevant to the previous study by Pradipta and Harminder (2018) revealed that the recycling of ever-increasing urban waste has become a priority for sustainable environmental management and planning activities in both developed and developing countries.

The table also shows that 59.2% +18.6% = 77.8% agreed that in Kwara state**,** there is involvement of local communities and stakeholders in decision-making processes. Mekonnen *et al*., (2022) state the success of the project depends on the participation of stakeholders at all levels, in projects which require environmental decision-making in particular. The participation of stakeholders is critically important for sustainability and environmental security. Richardson and Razzaque (2006) mentioned that stakeholder participation in the environmental decision-making process helps citizens exercise their democratic rights through the combined involvement of ordinary people, the media, environmentalists, academics and scientists.

The table indicates that 34.8% + 21.1% = 55.9% agreed that in Kwara state**,** there is the implementation of waste segregation at the source (Household, Commercial, Industrial). Respondent 2 states that the Kwara state government encourages waste segregation at the dump site. The scavenging service is rendered to sort the waste and pay tokens to the state government. Equally, Waste contractors evacuate waste to dumpsites and scavengers sort out the waste separately. Some waste collectors are alleged to dump waste in an unapproved dumpsite and segregate their waste. Such practice is considered illegal. The result is in line with Lishan *et al.,* (2023) asserted that with the implementation of waste separation policies, residents'

satisfaction with waste management increased and participation willingness increased also. Waste generation is sometimes a result of the environmentally inefficient use of resources, with potential adverse impacts, justifying the need to establish and promote a close relationship between environmental policies and waste management. The finding is also in line with Maletz *et al*., (2018) expressed that waste segregation is an important step in a road map to circular economy. Johnson *et al*., (2013) said that it is clear that waste segregation has a substantial contribution to effective waste management.

The table also indicates that 47.7% + 15.3% = 63% agreed that in Kwara state, there is encouragement of the reduce, reuse, recycle (3Rs) approach. Respondent 2 from Kwara Environmental and Protection Agency states that: there is encouragement for the reduce, reuse, recycle (3Rs) approach. The waste segregated by scavengers is taken to different places especially for recycling since there is no recycling plant in the state. The result is similar to Zorica *et al*., (2015) who believe that the practice of waste management is employed as a measure to safeguard the environment by overseeing the collection, transportation, processing, recycling, disposal, and monitoring of waste materials. Recycling of plastic waste, the other large waste stream, is also mentioned to reduce waste volume (Al-Salem *et al*., 2009). Waste reuse and recycling can contribute to income generation and may help to reduce complications in handling and disposing of huge volumes of solid wastes (Matter *et al*., 2013).

The table reveals that 56.9% + 8.8% = 65.7% agreed that in Kwara state, there is the state adopts technology (ICT) to capture databases on waste construction. However, Respondent 2 from Kwara Environmental and Protection Agency states that: Kwara state has not adopted technology (ICT) to capture databases on waste construction and monitoring purposes. Because of the lack of CCT cameras for monitoring, the residents around the Government Reserve Area dump refuse illegal after the closing time of the Kwara State Environmental Protection Agency. Likewise, in many strategic areas like Offa Garage, Taiwo and before the Emir's palace.

5. Conclusion and Recommendations

The study examined the environmental protection policies on sustainable waste management systems in Kwara. The study concluded Kwara state government takes environmental protection and waste management as serious issues and it pays attention to them by creating public awareness and enforcing the law on the violators but only that many

members of the public are stubborn to comply. In this contemporary era, the global practice has shown that waste can be converted to wealth. As a result, the Kwara State government can fully key into global standards to drive and improve the economic situation of the state through daily waste generation by the members of the public.

The Kwara state government should procure new technologies such as smart waste bins, anaerobic digestion, and Closed Circuit Cameras Television (CCTV) to enhance environmental protection and sustainable waste management. The government's budgetary allocation for environmental protection should be increased. The Kwara state government should procure more vehicles, trucks, and compactors and ensure regular maintenance. The State government should create and approve more dumpsites through the Ministry of Environment and Forestry and its agency. The recruitment, selection and placement process should be designed and given priority to environmentalists. Recycling and treatment plants should be established by the Kwara State Government to be able to convert waste into wealth. By doing so, it will create job opportunities. Kwara State government should provide incentives and support mechanisms that will encourage local innovation and entrepreneurship aligned with circular principles through policies. The Kwara State Environmental Protection Agency should enforce sanitary laws across the state instead of in strategic areas within the metropolis only. There should be adequate fund allocation for all concerned agencies, and the involvement of Private Sector Participation (PSP) in environmental protection and waste management in the state.

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