

Waste Management Administration and Environmental Sustainability in Nigeria

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Abstract: This study aimed to determine the relationship between waste management administration and environmental sustainability in Lagos, Nigeria. Although waste production is an inevitable byproduct of human activity, sustainable refuse management remains challenging in many nations today. With this idea in mind, we conducted this investigation. According to previous research, several states lack the necessary planning and infrastructure to efficiently and sustainably manage municipal solid waste. The research population comprised 700 waste administrators in the Ikeja Local Government Area; 250 were chosen using the Yamen sample technique. However, 233 of the 250 distributed questionnaires were retrieved. In order to determine the ANOVA and coefficient results, linear regression (at a significance level of 5% or 0.05) was utilized. The results revealed a negative correlation between waste management agency operations and environmental sustainability, as well as between waste disposal, waste separation, and environmental cleanliness. Furthermore, a negative correlation between waste recycling and pollution control was discovered. Therefore, it is suggested that effective collection techniques, sufficient system coverage, proper waste disposal, institutional coordination, adequate financial resources, enforceable regulations and standards, and appropriate technology be implemented.

Keywords: Environmental sustainability, Waste Management, Waste Disposal, Waste Recycling, Waste Separation, Pollution Control, and Environmental cleanliness.

1. INTRODUCTION

The term "waste" is frequently used to refer to any material or substance generated and disposed of or intended to be abandoned by the individual responsible for its oversight. Regardless of its legal categorization or geological era, garbage can acquire many meanings depending on its context (Williams, 2005). Igbinomwanhia (2011) posits that waste management encompasses the utilization of a planned amalgamation of methodologies to efficiently transfer trash from its origin to its final disposal location, to sustain a secure condition while minimizing costs. Waste management has been recognized as a complex worldwide problem in numerous countries, with a special emphasis on developing nations. A correlation has been observed between accelerated urbanization, population increase, technological advancements, and the trash production rate in these nations' metropolitan areas (Narayana, 2009). In broad terms, a notable fraction of human behaviors results in waste development, given that waste production is an unavoidable aspect of daily life. Consequently, it is crucial to establish and execute efficient strategies for managing waste. Hence, the increase in population presents a formidable obstacle to waste management, as it leads to a higher volume of waste produced due to more individuals inhabiting a specific region. Inadequate waste management practices, in turn, give rise to substantial ecological hazards.

Furthermore, the inability of society to effectively address waste management issues contributes to the accumulation of residual landfills (Alam et al., 2007). The matter at hand presents a complex and multi-dimensional challenge, which involves a considerable volume and necessitates adopting efficient strategies for organizing, planning, and executing sustainable waste management methods. The safe management of waste is vital, necessitating careful attention to the prevailing environmental conditions and the welfare of the general public, alongside proactive measures to mitigate any adverse consequences for future generations (Ali et al., 1999).

The concept of sustainability in developed nations involves the assurance that current actions do not result in adverse effects on future generations. However, in many impoverished countries, the emphasis is placed on the immediate benefits of such decisions, particularly those of a financial nature (Khatib, 2011). Developed nations are actively engaged in enhancing their waste management efficiency. In contrast, developing countries face challenges due to limited resources, weak institutional frameworks, inadequate technological advancements, inadequate human resource management, the emergence of less eco-friendly products, and constantly changing consumption patterns. These factors have contributed to the persistent problems in waste management in developing countries (Oteng-Ababio, 2011). In the context of developing nations, a considerable proportion of urban expenditures (as much as 40%) are allocated to the administration of waste management, rendering it one of the costliest sectors. The costs are dissociated from the quality of the services rendered, which persistently remain substandard. The assets typically at the disposal of local authorities tasked with this responsibility are inadequate for establishing efficient management protocols. Hence, the scenario above showcases inadequate and inappropriately positioned waste transfer stations, which highlights the prevalent issue of conflicting waste management approaches at the local level, owing to the varying circumstances and demands that shaped their development (UN-HABITAT, 2010). In numerous developing nations, hazardous waste is often disposed of in grossly unsuitable sites, such as roadways and unapproved transfer points, as Igbinomwanhia (2011) noted. Many developing nations, such as Nigeria, possess a sturdy waste management infrastructure; therefore, compared to other sources of waste commonly attributed to aging, such as educational and business establishments or municipal entities, family units are considered valid contributors to waste generation, particularly in cleaning public spaces such as streets. Their notable contribution to organic waste, particularly food waste, households produce various forms of waste, including polyethylene, glass, aluminum, paper, and textiles, as well as hazardous waste such as batteries and automotive components are evident (Magutu & Onsongo, 2011). Therefore, the state's long-standing history of hazardous and inefficient waste management can be attributed to several factors, such as inadequate organization and insufficient funding. According to the Lagos Waste Management Authority (LAWMA) report 2011, the state produces approximately 9000 metric tonnes of waste daily, which has led to the state being labelled as the most polluted state in the country due to the gravity of its waste management challenges, as noted by Kofoworola in 2007.

1.1 Research Problem

The prevalence of urban obsession has resulted in congestion in numerous major African cities. However, inadequate management of solid and liquid waste generated in metropolitan areas is a consequence of ineffective regulation in urban areas. This gives rise to many sanitation concerns; according to the World Health Organization (2000), there is a regular practice of regulating the wastewater that travels through boulevards and enters residential areas, releasing significant malodorous emissions which are hazardous to residents' health.

Furthermore, the continuous contamination of drinking water is attributed to its linkage with sewage; this phenomenon presents significant health risks and leads to considerable ecological illnesses. They represent the most commonly observed etiology of diarrhea. Insufficient wastewater and drainage systems can lead to the formation of stagnant bodies of water, which can serve as breeding grounds for mosquitoes that transmit various diseases, some of which may not be disclosed. The issue of efficient waste management has been recognized as a significant challenge faced by state and local government bodies responsible for ensuring ecological sustainability in Lagos State. The rate at which hazardous waste is produced exceeds the financial and specialized resources offices have available to accommodate this increase. In Lagos State, suboptimal waste collection practices, inadequate incorporation of the accumulation framework, and imprudent disposal of hazardous waste collectively contribute to substandard waste management. While it is true that developed nations produce more hazardous waste than developing nations, the management of metropolitan hazardous waste in the latter still needs to be improved. Notably, the management of solid waste in developing nations differs from that of developed nations; developing nations, such as Nigeria, encounter significant challenges in managing waste. These challenges include

composition, density, political and financial systems, waste quantity, accessibility of collection services, awareness, and mindset. According to Ogwueleka (2009), the wastes produced in developing cities are characterized by greater weight, moisture content, and hazardousness compared to those generated in developed cities. Hence, adopting a comprehensive approach in the domain of environmental conservation in Lagos State could serve as a feasible tactic for surmounting inherent obstacles within the system. According to Adewole (2009), various significant obstacles exist to achieving effective waste management and sustainable development in the State. These challenges include the rise in population, the waste disposal practices of individuals, the disposition of waste collectors and disposal personnel, and the need for appropriate equipment. The prevailing conditions hinder the ability to administer and maintain long-term growth efficiently. Therefore, it is imperative to promptly tackle implementing a suitable waste management framework for environmental progress.

1.2 Aims and Objectives of the Study

This study's primary aim is to assess waste management administration's impact on the attainment of environmental sustainability in Lagos State. The specific objectives are: to

1. determine the extent to which the waste management agency in Lagos State contributes to environmental sustainability.
2. assess the impact of waste separation and appropriate waste disposal methods on the level of environmental cleanliness in Lagos State.
3. assess the impact of waste recycling on pollution mitigation in Lagos state.
4. evaluate the impact of waste management agencies, waste separation practices, waste disposal methods, and waste recycling initiatives on environmental sustainability.

2. REVIEW OF LITERATURE

2.1 Operations of waste management agency and environmental sustainability

Environmental sustainability or care is a fundamental requirement for effective environmental management. The attitude towards nature is multifaceted, encompassing various aspects of human-nature interaction, such as ecological knowledge, adherence to environmental regulations, involvement in environmental activism, and demonstration of environmentally conscious behaviour (Bao, 2009). Environmental concern pertains to an individual's perspective regarding the environment and the interdependence between human beings and ecological systems (Bao, as cited). Bao asserts that environmental concern encompasses a proactive stance towards the ecosystem and actions aimed at conserving and preserving the environment. A heightened level of environmental consciousness frequently characterizes the initial stage of solid waste management.

The study conducted by Onumiyan (2017) pertains to evaluating waste management in the Lagos Metropolitan Area, specifically focusing on the Lagos State Waste Management Agency. Notwithstanding the implementation of routine environmental sanitation measures in the Lagos metropolis, the investigation revealed that a substantial quantity of refuse persists on the thoroughfares. As per the research participants, LAWMA conducts waste disposal activities every week. However, there are instances where waste management authorities experience delays, leading to the accumulation of waste in the surroundings. Momodu and colleagues (2011) have argued that solid waste poses an environmental threat when its evacuation and disposal fail to keep pace with its generation. LAWMA has implemented a Private Sector Partnership (PSP) initiative to enhance efficiency by enlisting the aid of private and corporate entities in waste management and disposal. The report highlights a primary concern regarding the tardiness of domestic solid waste collection, leading to garbage bins overflow and consequent contamination of the surrounding area. Furthermore, participants in the study area reported that an inadequate transport infrastructure poses a barrier to the effective provision of services by LAWMA, which aligns with Bakare (2016) claim. Furthermore, it has been observed that the non-enforcement of penalties on defaulters who fail to remit LAWMA's monthly collection fees has led to financial constraints and adverse effects on the provision of services.

Agunwamba (1998) conducted a study on waste management. The author posits that the environmental policies implemented by the government are disjointed and inadequately managed. Additionally, the author contends that public education campaigns are insufficient in scope, depth, and regularity to effectively modify individuals' attitudes toward the environment. The author posited that inadequate financial resources, insufficient infrastructure and personnel, ineffective

technological tools, and an unjust tax regime limit the actions of state environmental agencies. In summary, although there have been some advancements in waste management in Lagos, it remains insufficient. It negatively impacts the environment's visual appeal and the well-being of individuals. Although LAWMA's efforts towards solid waste management in Lagos State are commendable, further measures are required to guarantee the well-being and safety of all inhabitants of Lagos, as well as Nigerians at large. The proposal suggests the government should regularly maintain LAWMA's trucks and initiate public education, orientation, and awareness campaigns on proper garbage handling through mass media channels. Additionally, LAWMA should enhance waste collection frequency across the state to promote environmental sustainability.

Hypothesis I: The operations of waste management agency do not contribute to environmental sustainability in Lagos State.

2.2 Citizens Participation in Waste Management and cleanliness of the Lagos State environment

According to Williams (2005), organic waste comprises food and plant waste and represents a substantial reservoir of biodegradable material. The author defined solid waste as those materials that have been utilized and have lost their utility. Throughout history, waste production has been a consistent aspect of human activity; however, as civilization has progressed, the nature of waste generated has become increasingly complex. Consequently, the segregation of waste materials has assumed greater significance recently; the benefits stem from segregated and treated waste are of immense value. According to Sharholy et al. (2007), refuse composting is a natural phenomenon that reduces the volume of waste to approximately 68% of its original volume. According to UNEP (2005a), the process entails the regulated degradation of compostable solid waste under primarily aerobic conditions, resulting in a stable state safe for storage, handling, and agricultural use. Composting is advantageous for amending agricultural soils because it provides a steady supply of nutrients such as nitrogen, potassium, and phosphorus (Ameen & Dohuki, 2023).

According to Siddiqua et al. (2022), open dumping is disposing of large quantities of refuse in areas not designated for such activities; this improper waste disposal poses a risk to human and animal health. In many African cities, the dumping of solid refuse in landfills or dumping grounds contrasts with the practices of reuse and recycling. Hence, inadequate management and administration of solid waste, indiscriminate dumping, and a lack of acceptable disposal sites, pose significant challenges to residents (Kamaruddin & Muhammed, 2022). In addition, most of the challenges faced in waste administration in developing countries are road deterioration, vehicle failures, and increasing traffic. Unintentional conflagrations also transpire at a landfill or dumpsites, where fires are either spontaneously ignited by the decomposition of organic waste or intentionally ignited by scavengers in temperate climates for heating, cooking, or retrieving metal refuse from specific waste constituents.

Kirunda (2009) conducted a study on citizen participation in waste management. The author asserted that due to the insufficient waste collection services provided by the municipal government, there is little public interest in waste management. The researcher found that reducing waste by reusing garbage cans or bags was ineffective; this practice was attributed to a lack of knowledge and awareness regarding the principles and methods of environmental stewardship.

On the other hand, Modebe & Onyeonoro (2008) investigated the administration of household solid waste in Awka, Anambra State. The researchers utilized a descriptive research approach with cross-sectional data. Using a multistage selection method, 200 households were selected and surveyed with questionnaires. Relevant proportions and statistical analyses were performed on the analyzed data. The authors asserted that the preponderance of waste generated consists of organic materials and nylon bags. The majority, consisting of 85 percent, were stored outside trash in an airtight container. Approximately 70% of participants surveyed reported using the government-provided waste management agency to dispose of garbage. 27% of respondents indicated that they dispose of trash in unauthorized areas, while the remaining percentage utilizes mobile cart pushers. It indicates that before disposal, waste undergoes no processing. Although recycling waste is a well-known concept, only 18% of the population recycles. More than fifty percent of respondents were dissatisfied with the level of government intervention. As observed in certain regions, community participation, and possibly tribal and private sector involvement appears to offer a viable solution to the dilemma of sanctuary management currently confronting the residents.

Hypothesis II: Waste separation and disposal practices have no effect on the cleanliness of the Lagos State environment.

2.3 Waste recycling for Sustainable Development

Pattmik & Reddy (2009) defined waste recycling as the organized collection, classification, and treatment of waste materials. Utilization of waste is a significant factor that has led to the possibility of recycling organic and inorganic waste fractions such as paper, aluminum, polymer, and glassware components; therefore, repurposing waste is frequently associated with the concept of recycling (Williams, 2005). According to Magutu & Onsongo (2011), segregation of these materials is a prevalent practice that can be accomplished through the use of distinct containers or collection trucks, or by separating them directly from mixed waste. Therefore, recycling has become an integral part of effective waste management, as it includes both the recycling and reuse of materials.

Tauová et al. (2019) conducted a study that focused solely on refuse management as a component of environmental conservation. The study utilized publicly available European statistical data to investigate the production and recycling of municipal waste in 36 European Union member states. The authors noted that despite the growing quantity of municipal waste, empirical evidence suggests a positive trend in waste recycling has been observed. Although recycling rates increased in some European Union member states, however, the average recycling rate remained relatively low at 24.6 percent. The study showed that recycling rates declined in Malta, Austria, Greece, and Norway. Germany had the highest rate of municipal waste production among these countries, while also having the highest recycling rate at 65.6%. The study also noted that social and economic factors are intricately attached to municipal waste production. Therefore, the evaluations of refuse production and recycling have the potential to yield valuable insights for both government waste management policies and community waste management practices (Almulhim (2022) asserted that).

Hypothesis III: There is no positive and significance relationship between waste recycling and pollution control practices in Lagos state.

2.4 Municipal Solid Waste Management

Waste management practices exhibit significant variation across different countries. In the Nigerian context, the provision of waste management services is predominantly the responsibility of local governments and private sector entities (Adedigba, 2022). According to Akinbode (2002), the environment incorporates the various locales and conditions in which individuals reside, work, and engage in cultural, religious, political, and socioeconomic endeavors for personal fulfillment and the advancement of their communities. The 3Rs approach to refuse management incorporates the principles of reuse, reduction, and recycling (Kwenda et al., 2022). The waste management hierarchy of the 3Rs emphasizes waste management strategies prioritizing resource utilization optimization and waste generation reduction (UNEP, 2005b). The concept of hierarchy has been extensively incorporated into waste management policies at the regional and national levels, especially in developed countries (UNEP, 2005a).

Ning (2011) researched sustainable urban design, focused on municipal solid waste management. The author asserted that with projected population growth and the corresponding increase in refuse output, effective waste management is one of the most crucial aspects of sustainable development. According to World Commission on Environment and Development (1987), waste management necessitates addressing present needs without jeopardizing future generations' capacity for self-sufficiency. Therefore, effective waste management in urban areas is of the utmost importance because urban waste is frequently transported to other regions for processing and treatment as materials. In addition, the effects of waste disposal activities may extend beyond the immediate jurisdiction and affect future generations; hence, a sustainable urban system must adhere to the principles of resource consumption not exceeding resource generation and waste generation not exceeding the ecosystem's capacity to assimilate it (Fan et al. 2023).

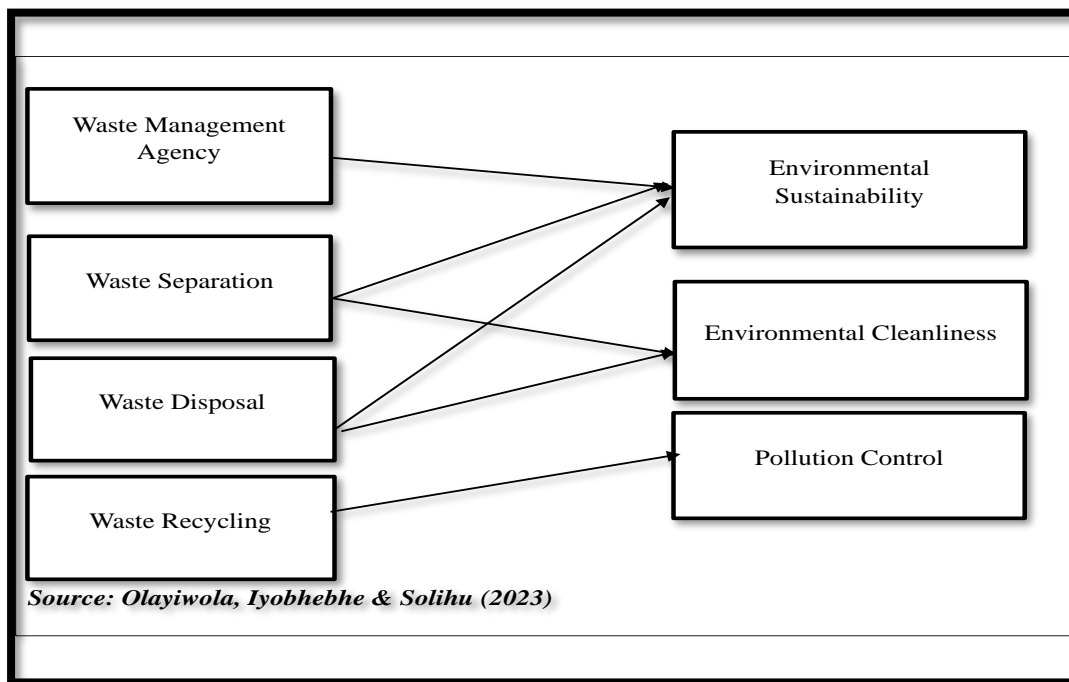
Abila & Kantola (2013) examined the issues surrounding municipal solid waste management in Nigeria. The article presented a comprehensive analysis of the difficulties associated with municipal waste management in Nigeria and proposed a theoretical framework for knowledge management that could potentially address the problem of municipal waste in urban areas across the country. The authors stated that implementing a knowledge management strategy and method is essential for promoting a paradigm shift toward enhancing waste management practices. Individuals, households, consumers, and waste management companies engage in inefficient waste management attributed to insufficient awareness of the benefits of proper waste management and ineffective enforcement of government regulations (Mihai et al., 2022). However, the

study identified obstacles to effective waste management practices in Nigeria, including cultural beliefs, insufficient participation, interference from packaging and product manufacturers, insufficient communication, diminished employee motivation, the absence of centralized waste collection receptacles, and limited collaboration with international organizations. The research suggested that refuse management strategies should incorporate technological and human elements.

Hypothesis IV: The operations of waste management agency, waste separation, waste disposal, and waste recycling does not influence environmental sustainability.

2.5 Hypothesized Model

Waste Management Administration and Environmental Sustainability



The research model illustrates the many components of the study, with each arrow representing a hypothesized link between the corresponding variables. The analysis showcases an inferred association between the independent factors, specifically waste management agency, waste separation, waste disposal, and waste recycling, and the dependent variables; environmental sustainability, cleanliness, and pollution control.

2.6 Gap in Literature

Waste management is an essential component of human activity, and in certain urban regions in Nigeria, solid waste management has become a notable environmental issue. Various approaches exist to manage solid waste, such as landfilling or incineration, which encompass waste reduction or reuse, recycling, and energy recovery. A significant disparity exists in waste management research between developing nations, exemplified by Nigeria, and industrialized nations, exemplified by Germany. The primary objective of this project is to enhance the global understanding of solid waste generation. Consequently, a thorough examination and evaluation of current literature and data are necessary to enhance the awareness of stakeholders involved in environmental management. This study aims to give stakeholders the necessary tools to effectively employ all available resources in addressing the increasing problem of solid waste production. Additionally, it seeks to offer policymakers a thorough understanding of solid waste generation in Lagos State. Lagos, a prominent economic hub in Nigeria, is currently witnessing a surge in population growth attributed to the substantial expansion of higher education institutions and a growing economy within the region. At the present moment of doing this study, there is a lack of documented evidence or analysis about pertinent data or statistics concerning solid waste management inside the city. Nevertheless, a notable disparity exists between the intended and current waste management conditions, and various constraints limit considerable regulatory systems. Hence, this research aims to analyze the waste management approaches employed in Lagos, Nigeria, and evaluate their implications for environmental sustainability.

3. DATA AND METHOD

The research strategy utilized in this study was descriptive; this choice was made because of its advantages, such as the ability to make conclusions about the variables being studied without exerting any influence on the respondents. Additionally, this approach allows for a thorough level of control over the measurements considered. According to estimations, the Ikeja local government region in Lagos is home to roughly 700 waste management administrators, both from the public and commercial sectors. The sample size was established using the Yamen sampling approach. 250 waste management administrators, comprising PSP operators, landfill administrators, and street sweepers, were polled for the study. A structured ethical form and questionnaire were sent to the target group to ensure voluntary participation and comprehension of responses. The survey employed a Likert scale of five points, ranging from Strongly Disagree to Agree, to gather results. A total of 250 questionnaires were distributed, from which 233 valid replies were obtained, meeting the requisite sample size for the study.

4. RESULTS

Table 1: Correlation Matrix for All Variables (N = 233)

	1	2	3	4	5	6	7
Operations of Waste management	1						
Waste Separation	-288	1					
Waste Disposal	.091	-335	1				
Waste Recycling	-194	-149	.098	1			
Environmental Sustainability	.048	.046	.034	-181	1		
Environment Cleanliness	-318	.089	.169	-316	-041	1	
Pollution Control	384**	.167	.068	.312**	-260	-107	1

***. Correlation is significant at the 0.01 level (2-tailed), 0.05 level (2-tailed).*

Environmental sustainability

Environmental sustainability and waste management agency operations were shown to be positively and non-significantly associated ($r = 0.048, p > 0.05$). Separating waste and promoting environmental sustainability were discovered to be favorably and non-significantly associated ($r = 0.046, p > 0.05$). Environmental sustainability and waste disposal were shown to be favorably and non-significantly associated ($r = 0.034, p > 0.05$). The relationship between waste recycling and environmental sustainability was discovered to be negative and non-significant ($r = -136, p > 0.05$). Environmental sustainability and pollution control were shown to be adversely and non-significantly associated ($r = -260, p > 0.05$).

Environmental cleanliness

Environmental cleanliness and waste management agency activities were shown to be negatively and non-significantly associated ($r = -0.318, p > 0.05$). Separating waste and maintaining a clean environment were discovered to be favorably and non-significantly associated ($r = 0.089, p > 0.05$). Environmental cleanliness and waste disposal were shown to be favorably and non-significantly associated ($r = 0.169, p > 0.05$). Environmental cleanliness and waste recycling were shown to be adversely and non-significantly associated ($r = -136, p > 0.05$). The relationship between environmental sustainability and environmental cleanliness was found to be negative and non-significant ($r = -041, p > 0.05$). Environmental cleanliness and pollution control were found to be adversely and non-significantly associated ($r = -107, p > 0.05$).

Pollution control

The correlation between pollution control and waste management agency operations was found to be negative and statistically significant ($r = 0.384, p > 0.05$). Separating waste and preventing pollution were discovered to be positively and non-significantly associated ($r = 0.167, p > 0.05$). The relationship between waste disposal and pollution was found to be positive and statistically significant ($r = 0.068, p > 0.05$). The study discovered a positive and non-significant relationship between waste recycling and pollution control ($r = 312, p > 0.05$). The relationship between environmental sustainability and pollution control was shown to be negative and statistically significant ($r = -260, p > 0.05$). Environmental cleanliness and pollution control were found to be adversely and non-significantly associated ($r = -107, p > 0.05$).

Hypothesis I

The operations of waste management agency do not contribute to environmental sustainability in LagosState.

Table 2: Regression Analysis

Model Summary	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin Watson	ANOVA	
						F	Sig.
1	.048 ^a	.002	-.002	.34776	1.699	.525	.470 ^b
Coefficients^a							
		B	Std. Error	Beta	T	Sig.	
	(Constant)	1.948	.139		14.028	.000	
	Operations of waste management agency	.052	.071	.048	.724	.470	

Predictors: (Constant), Operations of waste management agency

Dependent Variable: Environmental sustainability

The correlation coefficient of 0.048 depicted in Table 2 indicates that there is no significant relationship between the operations of waste management agencies and environmental sustainability. The R-squared coefficient of determination, which measures the proportion of the variance in the dependent variable that the independent variable explains, is 0.002. It indicates that the activities of waste management agencies have a negligible impact of 0.2% on environmental sustainability, with the remaining 99.8% attributable to the Error term. As the P value (0.470) exceeds the beta value (0.05), the ANOVA result indicates that the association is not statistically significant. This result validates the conclusion of the regression analysis that the activities of waste management agencies in the state of Lagos have a negligible effect on the promotion of environmental sustainability. This viewpoint is consistent with the findings of Gana & Dauda's (2014) study, which uncovered numerous waste-related issues in Lagos and their negative effects on ecological sustainability. The authors observed that refuse collection, incineration, and disposal practices in urban areas of Nigeria, such as Lagos and Abuja, are not conducive to environmental sustainability. The agency's waste management operations, including vehicle capacity, funding, frameworks, personnel, and role clarity, have not made a significant contribution to Lagos state's environmental sustainability.

Hypothesis II

The separation and waste disposal practices have no effect on environmental cleanliness in Lagos State.

Table 3: Regression Analysis

Model Summary	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin Watson	ANOVA	
						F	Sig.
1	.229 ^a	.053	.044	.42941	1.758	6.37	.002 ^b
Coefficients^a							
		B	Std. Error	Beta	T	Sig.	
	(Constant)	1.494	.164		9.134	.000	
	Waste separation	.130	.054	.164	2.407	.017	
	Waste disposal	.148	.045	.224	3.292	.001	

Dependent Variable: Environmental cleanliness

Predictors: (Constant), Waste separation and Waste disposal

The R-value of 0.22 in Table 3 indicates a moderately positive correlation between environmental hygiene and waste separation and disposal. The R-squared value of 0.053 indicates that waste disposal and waste separation have a minimal impact of 5.3% on environmental sanitation. In this instance, the association between the variables is negligible or nonexistent. The fact that the P value of 0.002 is less than the beta value of 0.05 is further evidence of a correlation, as determined by the ANOVA results, where the P value of 0.002 is less than the beta value of 0.05. The null hypothesis (H0) is rejected, indicating that the inability of households in Lagos State to segregate and dispose of refuse has a substantial

impact on environmental sanitation. This finding is consistent with the research of Kirunda (2009). The author conducted research concerning household participation in waste management. The study concluded that there is evidence of insufficient public participation in solid waste administration. Therefore, ineffective garbage collection on the part of locals may be traced back to a lack of public involvement in waste management; as a result, trash was disposed of in a haphazard fashion, and people are generally aware of how their trash is handled.

Hypothesis III

There is no positive and statistical significance between waste recycling and pollution control practices.

Table 4: Regression Analysis

Model Summary	R	R Square	Adjusted R-Square	Std. Error of the Estimate	Durbin-Watson	ANOVA	
						F	Sig.
1	.068 ^a	.005	.000	.41518	1.915	1.08	.301 ^b
Coefficients^a							
		B	Std. Error	Beta	T	Sig.	
	(Constant)	1.812	.144		12.588	.000	
	Waste recycling	.074	.071	.068	1.037	.301	

Dependent Variable: Pollution control

Predictor (Constant), Waste recycling

Table 4 reveals that R=0.068 which indicates a weak or non-existent link between pollution control and waste recycling methods. The R-squared value of 0.005 implies that waste recycling methods account for approximately 0.5 percent of pollution control; the Error component in equation accounts for the remaining 99.5 percent. This illustrates that there is no degree of determination for the variables. Additionally, because the P value of 0.301 is more than the beta value of 0.05, the ANOVA result indicates that no correlation exists. This confirms the regression result that there is no statistically significant relationship between the two variables. As a result, H0 is accepted whereas H1 is rejected, demonstrating that there is no statistically significant association between pollution control and waste recycling. However, Adongo et al., (2014) refuted this conclusion in their works, stating that a lack of proper waste recycling practices results in the burning of plastic waste and other non-biodegradable materials, this contributes to the discharge of hazardous gases into the atmosphere, thereby affecting the ozone layer and its protective properties. Additionally, this poor waste recycling system costs the government socioeconomic benefits, as these procedures could have created jobs. Additionally, Singh et al. (2018) reported that improper sewage and hydro waste recycling produces in water pollution that is consumable. Singh et al. (2018) claimed that improper land filling has resulted in pollution of both surface and ground water, as described in the Ministry of Health Handbook (1995).

Hypothesis IV

The operations of waste management agency, waste separation, waste disposal, and waste recycling influence environmental sustainability.

Table 5: Regression Analysis

Model Summary	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson	ANOVA	
						F	Sig.
1	.183 ^a	.034	.017	.34452	1.708	1.976	.099 ^b
Coefficients^a							
		B	Std. Error	Beta	T	Sig.	
	(Constant)	2.293	.273		8.392	.000	
	Operations of waste management agency	.024	.076	.022	.314	.754	
	Waste separation	.015	.046	-.024	.322	.748	
	Waste disposal	-.006	.036	-.011	-.157	.875	
	Waste recycling	-.156	.062	-.172	2.522	.012	

Predictors: (Constant), Waste separation, Waste disposal, Waste recycling

Dependent Variable: Environmental sustainability

Table 5 reveals that there is no correlation between environmental sustainability and waste management agency operations, waste separation, waste disposal, and waste recycling, as indicated by the $R=0.183$. The R-squared value of 0.034 implies that waste management agency operations, waste separation, waste disposal, and waste recycling contribute only 3.4 percent to environmental sustainability; the remaining 96.6 percent is accounted for by the Error component of the equation. Additionally, the ANOVA result reveals that there is no correlation between the variables, as the P value (0.301) exceeds the beta value (0.05). Additionally, because the P value is greater than the standard value of 0.05, H_0 is accepted and H_1 is rejected, indicating that there is no statistically significant relationship between environmental sustainability and the extent to which waste management agencies operate, waste separation, waste disposal, and waste recycling. This corroborates Onumiyan's results (2017). He carried out a study titled "An Assessment of Waste Management in the Greater Lagos Area: A Case Study of the Lagos State Waste Management Agency." Despite frequent environmental cleanliness in the Lagos metropolitan zone, the study discovered that the level of filth on the streets remained tremendous. According to survey respondents, LAWMA disposes of waste once a week, and waste management personnel occasionally fail to come on time, resulting in waste accumulation in the environment.

5. CONCLUSIONS

As a result of the established outcomes, the study found that the state has not managed and administered waste. As a result, a healthy environment is mainly out of reach for the state. Although numerous techniques have been implemented to accomplish the stated objectives, these efforts are insufficient to ensure the requisite clean and sustainable environment wanted by the state. It is consequently critical for policymakers to take the required steps to institutionalize and optimize environmental cleanliness operations. According to the study's stated aims, the following conclusions were reached:

The study's first purpose was to determine the extent to which waste management agency operations affect environmental sustainability in Lagos State. The study discovered that most respondents indicated a lack of human and capital resources necessary for the proper execution of waste management tasks. As a result of this, it was determined that the state lacked the essential waste management resources to effectively implement the government's waste management policy. In terms of relationship, waste management agencies and environmental sustainability in Lagos State have a negative and insignificant link.

The study's second purpose was to ascertain the relationship between families' inability to separate and dispose of waste and its effect on the cleanliness of the Lagos State environment. The findings indicated that most respondents also disagreed with the questionnaire's waste disposal, separation, and cleanliness notions; however, there is a strong correlation between waste sorting and disposal and the state's environmental cleanliness.

The third purpose of the study was to investigate how ineffective waste recycling practices contributed to the contamination of the Lagos State environment. This conclusion is congruent with the previous, as most respondents strongly disagreed with the identified constructs. As mentioned in the first objective, there is no statistically significant relationship between the pair-wise variables.

The study's fourth purpose was to determine the extent to which waste management agency operations, waste separation, waste disposal, and waste recycling can forecast environmental sustainability. The regression analysis demonstrates a substantial association between environmental sustainability and the level of waste management agency operations, waste separation, waste disposal, and the effectiveness of waste recycling.

6. RECOMMENDATIONS

The government should make a concerted effort to ensure that sufficient staff and capital resources are available to support the state's ideal waste management activities. This was because the data suggested that the state government is lagging the curve in this area. Not only that, widespread awareness of waste disposal and recycling, as well as a critical investment in human and capital resources, are critical for the state's effective waste management and administration, as the analysis demonstrates that the variables have no significant effect on the state's environmental cleanliness.

To bolster the state's waste management system, the state government should encourage local governments and wards to adopt waste recycling programs and projects they believe will be successful in their communities. Additionally, the state may sponsor award-winning competitions to identify which wards are the cleanest and dirtiest. This would motivate wards to consistently improve their waste management procedures.

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Waste management agency employees should be assisted in attending and participating in relevant short courses (seminars), workshops, and conferences to improve their skills and knowledge in waste management and environmental cleanliness, as well as to develop the technical expertise of wastemanagers. This increases exposure and enables the acquisition of new knowledge and skills necessary to maintain the states' clean environmental goal.

7. STUDY LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

One weakness of the study is the restricted scope of data collection, which was limited to a single local government region in Lagos state. It is important to note that the study's findings may have yielded different results if data had been obtained from a broader range of local government districts. The study investigated seven variables: five dependent variables and two independent variables. However, it is suggested that future research should consider exploring additional predictors, such as constructed landfills and household engagement. This study aimed to investigate the waste management administration's function in promoting environmental sustainability in Lagos State, Nigeria, specifically in the Ikeja Local Government Area. Based on the findings and conclusions of the study, it is advised to investigate the following areas further. A comprehensive investigation into trash management and administration across the state is warranted. This will enhance the representation of the relatively small sample size of 233 participants in the study. It is recommended to employ a strong inferential analytical method, such as panel analysis, to effectively capture and analyze the structural variations in waste exposure among the local governments within Lagos state.

REFERENCES

- [1] Adedigba, A. A. (2022). *Towards integrated sustainable solid waste management in Nigerian cities* (Doctoral dissertation, Northumbria University).
- [2] Aderogba, K. A., & Afelumo, B. A. (den 2 January 2012). Waste dumps and their management in Lagosmetropolis. (M. Institute, Red.) *International Journal of Learning & Development*, 2(1), 2164-4063.
- [3] Adetokunbo O. L and Herbert M.G (2003): *Solid waste disposal*. Short textbook of published healthmedicine for the tropics. (4th Ed.) Kinson press Lagos.
- [4] Adewole, T. (2009). Waste management towards sustainable development in Nigeria: A case study ofLagos state. *International NGO Journal*, 4(4), 173-179.
- [5] Adewuyi, T.O.; Idoro, G.I.; Ikpo, I.J. (2014). Empirical evaluation of construction material waste generatedon sites in Nigeria. *Civ. Eng. dimension*. 16, 96–103
- [6] Agbede, O. A. an Ajaigbe, W.O. (2009). Solid waste management in south western Nigeria. In Ekara,
- [7] E.G. and Ekpene, I. (Eds). *International journal of environmental issues.Development, universalconsortia*. 2(1 & 2), 92-97.
- [8] Agunwamba, J. C. (2001). Analysis of socioeconomic and environmental impacts of waste stabilization pond and unrestricted wastewater irrigation: interface with maintenance. *Environmental management*, 27(3), 463-476.
- [9] Ahmed, S. A., & Ali, M. (2004). Partnerships for solid waste management in developing countries: linkingtheories to realities. *Habitat international*, 28(3), 467-479.
- [10] Alam, R., Chowdhury, M., Hassan, G., Karanjit, B., & Shrestha, L. (2008). Generation, storage, collectionand transportation of municipal solid waste - A case study in the city of Kathmandu, capital of Nepal.*Waste management*, 28, 1088- 1097.
- [11] Almulhim, A. I. (2022). Household's awareness and participation in sustainable electronic waste management practices in Saudi Arabia. *Ain Shams Engineering Journal*, 13(4), 101729.
- [12] Ameen, H. A., & Dohuki, M. S. S. (2023). Effect of Leached and Co-Composted Organic Fraction of Municipal Solid Waste with Bulking Agents on Soil Properties and Sweet Pepper Plant Development Under Calcareous Soil. *Communications in Soil Science and Plant Analysis*, 1-17.
- [13] Atilola, O. (2012). Different points of a continuum? Cross sectional comparison of the current and pre- contact

International Journal of Novel Research in Interdisciplinary Studies

Vol. 10, Issue 4, pp: (28-41), Month: July – August 2023, Available at: www.noveltyjournals.com

psychosocial problems among the different categories of adolescents in institutional care in Nigeria. *BMC Public Health*, 12(1), 1-11.

- [14] Ayeni, A. O., Hymore, F. K., Mudliar, S. N., Deshmukh, S. C., Satpute, D. B., Omoleye, J. A., & Pandey, R. A. (2013). Hydrogen peroxide and lime based oxidative pretreatment of wood waste to enhance enzymatic hydrolysis for a biorefinery: Process parameters optimization using response surface methodology. *Fuel*, 106, 187-194.
- [16] Ayeni, A. O. (2017). Increasing Population, Urbanisation and climatic factors in Lagos State, Nigeria: Thenexus and implications on water demand and supply. *Journal of global initiatives: Policy, Pedagogy, Perspective*, 11(2), 69-87.
- [17] Ayinde, I. A., Otekunrin, O. A., Akinbode, S. O., & Otekunrin, O. A. (2020). Food security in Nigeria: Impetus for growth and development. *J. Agric. Econ*, 6, 808-820.
- [18] Babayemi, J. O., & Dauda, K. T. (2009). Evaluation of solid waste generation, categories and disposal options in developing countries: a case study of Nigeria. *Journal of Applied Sciences and Environmental Management*, 13(3).
- [19] Bao, J. (2011). *Assessing the potential effectiveness of environmental advertising: The influence of ecological concern and ad type on systematic information processing*. Marquette University.
- [20] Bel, G., & Fageda, X. (2009). Factors explaining local privatization: a meta-regression analysis. *Public Choice*, 139(1), 105-119.
- [21] Bryman, A. (2004). Qualitative research on leadership: A critical but appreciative review. *The leadership quarterly*, 15(6), 729-769.
- [22] Ebreo, A., Hershey, J., & Vining, J. (1999). Reducing solid waste: Linking recycling to environmentally responsible consumerism. *Environment and Behavior*, 31(1), 107-135.
- [23] EEA, E. E. A. (2007, July). Calculation and analysis of a hybrid energy input-output table for Germany within the Environmental-Economic Accounting (EEA). In *the 16th international input-output conference* (pp. 2-6).
- [24] Egeberg, M. (2010). The European Commission. *European Union politics*, 3, 125-40.
- [25] Fan, Q., Abbas, J., Zhong, Y., Pawar, P. S., Adam, N. A., & Alarif, G. B. (2023). Role of organizational and environmental factors in firm green innovation and sustainable development: Moderating role of knowledge absorptive capacity. *Journal of Cleaner Production*, 411, 137262.
- [26] Gamba, R. and Oskamp, S. (1994) Factors influencing community residents' participation in commingledcurbside recycling programs. *Environmental and behavior*, 26, 587-612.
- [27] Gana, A. J., Dauda, N., (2014). An Investigation into Waste Management Practices in Nigeria (A Case Study of Lagos Environmental protection Board and Abuja Environmental protection Board). *West African Journal of Industrial & Academic Research* Vol.12 No.1 December, 112-126.
- [28] Hermans, C. M., Haytko, D. L., Matulich, E., & Shanahan, K. J. (2009). Instant messenger friends? Social relationship behavior differences between two countries. *International business & economics research journal (IBER)*, 8(4).
- [29] Hoque, M. M. M., & Islam, S. (2018). Temporal changes of physical parameters of solid waste during barrel composting. *Journal of environmental science and natural resources*, 11(1-2), 153-157.
- [30] Idowu, O., Omirin, M., & Osagie, J. (2011). Outsourcing for Sustainable Waste Disposal in Lagos Metropolis: a Case study of Agege Local Government, Lagos. *Journal of Sustainable Development*, 4(6), 116-131.
- [31] Ifegbesan, A. (2009). Exploring secondary school students' understanding and practices of waste management in Ogun State, Nigeria. In *International journal of environmental education*. 5(2), 201-215.
- [32] Igbinomwanhia, D. I. (2011). Status of waste management. *Integrated Waste Management*, 2, 11-34.
- [33] Kalu, C; Modugu, W.W.; & Ubochi, I. (2009). Evaluation of solid waste management policy in Benin metropolis, Edo state, Nigeria. *African scientists*. 10 (1), 1-7.

International Journal of Novel Research in Interdisciplinary Studies

 Vol. 10, Issue 4, pp: (28-41), Month: July – August 2023, Available at: www.noveltyjournals.com

- [34] Kamaruddin, S. M., & Muhammed, I. (2022). Solid Waste Management and Disposal Practice in Bauchi City, Nigeria: Pengurusan Sisa Pepejal dan Amalan Pelupusan di Bandar Bauchi, Nigeria. *GEOGRAFI*, 10(2), 1-23.
- [35] Khatib, I. A. (2011). Municipal solid waste management in developing countries: Future challenges and possible opportunities. In Kumar S. (Ed.), *integrated waste management (Vol. II, pp. 35-51)*.
- [36] Kofoworola, O. F. (2007). Recovery and recycling practices in municipal solid waste management in Lagos, Nigeria. *Waste management*, 27(9), 1139-1143.
- [37] Kühling, J. G., & Pieper, U. (2012). Management of healthcare waste: developments in Southeast Asia in the twenty-first century. *Waste management & research*, 30(9_suppl), 100-104.
- [38] Kwenda, P. R., Lagerwall, G., Eker, S., & van Ruijven, B. (2022). Identifying the Leverage Points in the Household Solid Waste Management System for Harare, Zimbabwe, Using Network Analysis Techniques. *Sustainability*, 14(19), 12405.
- [39] Lawal, M., Alwi, S. R. W., Manan, Z. A., & Ho, W. S. (2021). Industrial symbiosis tools—A review. *Journal of Cleaner Production*, 280, 124327.
- [40] Longe, E., Longe, O., & Ukpebor, E. (2009). People's perception of household solid waste Management in Ojo local government Area in Nigeria. *Iran Journal of Environmental Health Science and Engineering*, 6(3), 201-208.
- [41] Magutu, P. O., & Onsongo, C. O. (2011). Operationalising municipal solid waste management. *Integrated waste management Journal*, 2, 1-9.
- [42] Manfredi, S., Tonini, D., Christensen, T. H., & Scharff, H. (2009). Landfilling of waste: accounting of greenhouse gases and global warming contributions. *Waste Management & Research*, 27(8), 825- 836.
- [43] Mihai, F. C., Gündoğdu, S., Markley, L. A., Olivelli, A., Khan, F. R., Gwinnett, C., ... & Molinos-Senante, M. (2022). Plastic pollution, waste management issues, and circular economy opportunities in rural communities. *Sustainability*, 14(1), 20.
- [44] Moore, S. A. (2012). Garbage matters: Concepts in new geographies of waste. *Progress in Human Geography*, 36(6), 780-799.
- [45] Nathanson, M. B. (1996). *Additive number theory: Inverse problems and the geometry of sumsets* (Vol.165). Springer Science & Business Media.
- [46] Ndubuisi-Okolo, P., Anekwe, R., & Attah, E. Y. (2016). Waste management and sustainable development in Nigeria: A study of Anambra State. *European Journal of Business and Management*, 8(17), 2222-1905.
- [47] Narayana, S. (2009). Municipal Solid Waste Management in India: From Waste Disposal to Recovery. *Waste Management*, 29, 1163-1166.
- [48] Obabori, A. O.; Ekpu, A. O. O. and Ojealoro, B.P. (2009). An appraisal of the concept of sustainable environment under Nigerian Law. *Journal of Human Ecology*, 28(2): 135-142.
- [49] Ogwueleka, T. (2009, July 15). Municipal Solid Waste Characteristics and Management in Nigeria. *Iranian Journal of Environmental Health, Science and Engineering*, 6(3), 173- 180.
- [50] Olubori, J. O. (2011, June). Cities and adaptation to climate change—solid waste management in Lagos State. In *Resilient Cities 2011 Congress Bonn, Germany* (Vol. 4). 78 – 85
- [51] Oteng-Ababio, M. (2011). Missing links in solid waste management in the Greater Accra Metropolitan Area in Ghana. *GeoJournal*, 76(5), 551-560.
- [52] Pattnik, S., & Reddy, V. (2010). Assessment of municipal solid Waste Management in Puducherry (Pondicherry). *India. Resources, Conservation and Recycling*, 54, 512-520.
- [53] Raudsepp, M. (2001). Some socio-demographic and socio-psychological predictors of environmentalism. *Trames*, 5(55/50), 3.

International Journal of Novel Research in Interdisciplinary Studies

 Vol. 10, Issue 4, pp: (28-41), Month: July – August 2023, Available at: www.noveltyjournals.com

- [54] Redclift, M. S. (2001). Computed tomography scan versus ventilation-perfusion lung scan in the detection of pulmonary embolism. *The Journal of emergency medicine*, 21(2), 155-164.
- [55] Remigios, M. V. (2010). An Overview of the Management practices at Solid Waste Disposal Sites in African Cities and Towns. *Journal of Sustainable Development in Africa*, 12(7), 233-239.
- [56] Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students*. Pearson education.
- [57] Siddiqua, A., Hahladakis, J. N., & Al-Attiya, W. A. K. (2022). An overview of the environmental pollution and health effects associated with waste landfilling and open dumping. *Environmental Science and Pollution Research*, 29(39), 58514-58536.
- [58] Singh, J., Saxena, R., Bharti, V., & Singh, A. (2018). The Importance of waste management to environmental sanitation: A Review. *Advances in BioResearch*, 9(2).
- [59] Sharholly, M., Ahmad, K., Mahmood, G., & Trivedi, R. (den 12 April 2007). Municipal solid waste Management in Indian Cities- A Review. *Waste Management*, 28(2008), 459- 467.
- [60] Smaldone, D. (2007). The role of time in place attachment. In *Proceedings of the 2006 Northeastern Recreation Research Symposium* (pp. 47-56).
- [61] Troschinetz, A. M., & Mihelcic, J. R. (2009). Sustainable recycling of municipal solid waste in developing countries. *Waste management*, 29(2), 915-923.
- [62] Veeken, A. H. M., Hamminga, P., & Mingshun, Z. (2005). Improving sustainability of municipal solid waste management in China by source separated collection and biological treatment of the organic fraction. In *Innovative environmental management & sustainable development* (pp. 164-172).
- [63] Yoda, R. M., Chirawurah, D., & Adongo, P. B. (2014). Domestic waste disposal practice and perceptions of private sector waste management in urban Accra. *BMC public health*, 14(1), 1-10.
- [64] Zhang, D., Keat, T. S., & Gersberg, R. M. (2010). A comparison of municipal solid waste management in Berlin and Singapore. *Waste management*, 30(5), 921-933.