International Institute of Social Studies

Erasmus

Plastic Waste Management

Understanding the Challenges of Mitigating Plastic Waste Pollution in Lagos, Nigeria

A Research Paper presented by:

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(Nigerian)

in partial fulfilment of the requirements for obtaining the degree of
MASTER OF ARTS IN DEVELOPMENT STUDIES

Major:

AGRARIAN FOOD AND ENVIRONMENTAL STUDIES
(AFES)

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The Hague, The Netherlands
December 2024

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Acknowledgment

I would like to express my deep appreciation for the support of my Supervisor, Helena Perez Nino, for her immense guidance and constant willingness to help whenever I am stuck during this research. I am also thankful to my second reader, Wendy Harcourt, for her directions in bringing this study to a meaningful conclusion. I want to thank all the participants involved in this research for agreeing to share their ideas to make this study meaningful. My sincere appreciation to my colleagues and friends for their unwavering academic support and words of encouragement throughout my academic year and this research.

Dedication

I dedicate this study to God Almighty, without his grace and mercy, which have given me the strength, knowledge, understanding and courage to achieve this milestone in life. Secondly, I want to dedicate this study to my mother, Mrs. Mary Adebayo, for her unending love, and to my sister, Abimbola Adebayo Oderinde, for all her support from the beginning of this academic journey. Thirdly, I am dedicating this study to my family and friends, Oluwanimilo Adisa, for her words of assertion, and steady belief in my ability to achieve this degree. To Bhadmus Ademola, thank you for allowing God to use you to write an unforgettable chapter in my life. To Olayinka Layiwola, Folu Arodudu, thank you both for the constant academic advice and teachings. Finally, I bestow this study to my Late father, Mr Michael Adebayo, even though you left so early, I hope you are proud of my growth so far.

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List of Acronyms

LAWMA	Lagos Waste Management Authority
PSP	Private Sector Partnership
LGA	Local Government Area
CDA	Community Development Association
LG	Local Government
KAI	Kick Against Indiscipline
GDP	Gross Domestic Product
NGO	Non-Governmental Organization
IMO	International Marine Organization
UNEP	United Nations Environmental Programme
LSRDB	Lagos State Refuse Disposal Board
PET	Polyethylene Terephthalate
UNESCO	United Nations Educational, Scientific and Cultural Organization

Abstract

This paper explores plastic waste management. It aims to develop our: -understanding of the challenges of mitigating plastic waste pollution which is one crucial environmental struggle in Lagos, Nigeria.

This paper aims to intensely understand these challenges with a proposed question: "In what ways have the operations of the Lagos Waste Management Authority and the attitudes of the residents influenced plastic waste pollution in Lagos State". This study was conducted through a comprehensive analysis encompassing four dimensions: causes of ineffectiveness of LAWMA, operational practices adopted to mitigate plastic waste pollution, the attitude of individuals towards plastic waste disposal and possible solutions to this persisting problem in Lagos state.

The study was carried out through a survey and semi-structured interviews across Kosofe, Alimosho, and Surulere local government area.

The research findings revealed that the operational practices of LAWMA are not effective enough to mitigate plastic waste pollution due to the organization's lack of infrastructural facilities, lack of funding, late collection practices, and lack of effective environmental sanitation. These and, other problems have curtailed the success of the objectives for a clean environmentally sustainable Lagos. The study also discovered that individual users are major contributors to plastic waste pollution in Lagos due to their carefree attitudes towards plastic items usage and disposals which constitute environmental degradation. In conclusion, various factors such as overpopulation, illegal plastic waste disposals, poor managerial practices by LAWMA, and lack of effective environmental policies are the challenges of mitigating plastic waste pollution in Lagos State.

Relevance to Development Studies

The topic of this paper is relevant to Development Studies as it addresses pressing issues of plastic waste pollution that affects both developed and developing countries. This challenge is associated with environmental and socioeconomic problems affecting mostly the rapidly urbanizing areas of the developing world like Lagos. Lagos, Africa's largest urban centre is faced with momentous challenges in managing plastic waste due to various reasons such as lack of infrastructural facilities, lack of functional environmental policies, growing population, lack of funding, lack of technical facilities and many more. All these issues relate with the themes in development studies, which often promote sustainability, environmental justice, green transitions, and development policies.

This study supports the developmental global pursuit of climate change mitigation, public health, social justice and environmental sustainability. Mismanagement of plastic waste includes open burning, unmanaged landfills that release toxins that can harm the soil, groundwater, and air pollution, and harm done to marine wildlife, unrecycled plastics and indiscriminate disposal of plastics, which affects both the ecosystem and the public health. Therefore,

this study resonates with development studies because it advocates for long-term environmental resilience, and sustainable urban development to make the planet liveable for current and future generations.

Keywords

Plastic waste; Pollution; Sanitation and public policy; Environment; Waste Disposal; Mitigate; Waste Management.

Chapter 1

INTRODUCTION

1.0 Chapter Overview

This chapter introduces the study. It contains the study's background; identifies the research's problem, objectives, research questions and discusses the significance and rationale for the study. The chapter lays out the scope of the study to understand the extent and limits set out in this research work. To conclude, a chapter summary provides a concise overview of the chapter.

1.1 Background to the Study

Plastic waste is a global issue that endangers human health and ecosystems while producing extensive pollution. It exacerbates climate change, environmental degradation, biodiversity loss and serves as a contributing factor to the triple planetary crisis. Between 2000 and 2019, the amount of plastic garbage generated around the world reached about 353 million tons. Expectedly, about two-thirds of this garbage is made up of plastics that have a lifespan of less than five years (OECD, 2022). Dibia et al (2023) corroborate that most disturbances from materials such as plastic, nylon and bottles contribute to environmental challenges and affect the well beings of the people. The Federal Environmental Protection Agency (2018) complements this by ascertaining that about 40% of plastic garbage generated in Nigeria ends up in the environment, resulting in damage to the ecosystem and the blue economy. In fact, Lagos State generates about 15,000 metric tonnes of plastic waste daily which blocks waterways, reduces air quality and poses a significant health risk to the residents (The Punch, 2024). Despite the consequences of plastics around the globe, its production keeps increasing over time due to a linear economy model of the "take-make-consume-throw away" model (Agberemi, 2020). Okolo et al (2022) argued that plastic quickly became a material of choice for packaging purposes due to the consequences of low weight, high strength and low cost, leading to the large volume of waste being thrown or disposed on land and into the sea daily. However, this led to plastic waste pollution that constitutes a serious challenge in both developing and developed economies.

The existence of plastic waste pollution is a complex issue associated with the growth of the economy and the prevalence of the capitalist system in most developing countries. For example, over 50% of plastic production done globally is of single usage application (Ayeleru et al 2020). As stated by Nwafor and Walker (2020), the increasing rate of plastic production is expected to double in the next two decades due to the growth in the world. If plastic production doubles, then environmental degradation will escalate at all levels, from the initial material extraction level to the final level of disposal. This may increase the plastic emissions in the environment and thereby lead to an intense environmental degradation and damage of the ecosystem (Schwarz et al, 2023). In the solid waste stream, it appears that about 10% of plastic is present, which amounts to 200mt (Metric Tons) of plastic waste produced by the world as of 2002 (Lebreton, 2019). The United Nations, in

the 1970s, through the International Marine Organisation (IMO), established the MARPOL 73 convention, due to the significance of plastic pollution, majorly marine plastics, to prevent pollution from ships. This effort was complemented by the resolution of 2022 adopted by the United Nations Environment Programme (UNEP) to end plastic pollution. Most regions in sub-Saharan Africa are experiencing rapid urbanization and industrialization in recent years. Owing to this rapid social transformation there is a marked increase in imported plastic materials worth about 172mt of polymers and plastics between 1990 and 2017 (Abdellatif et al 2021). The use of plastics in developing countries ranges from plastic shopping bags, plastics for packaging foods and food items, plastics for drinking water and soda consumption packages, housing, and industrial use.

Nigeria is one of the world's most populated developing economies, with an estimated average consumption of 2.5 million tonnes of plastic waste annually, according to the Nigerian Economic Summit Group report of 2023. Lagos State contains Nigeria's commercial capital, houses the headquarters of most local and multinational companies, air and seaports and is the most populous city in West Africa, generating an average of 870,000 tonnes of plastic waste annually, with potential for increase. These figures or rates are a major cause for concern, with no direct measures to curb the increase. To amend the impeding problem, the Lagos State Government created a waste management institution in 1977 called the Lagos State Refuse Disposal Board (LSRDB), this institution was responsible for waste collection, and disposal of refuse generated in the state. After fourteen years, the institution had its name and responsibilities modified to Lagos State Waste Management Authority (LAWMA). The name was changed due to the additional operations added to the organization which oversaw the collection, transportation, disposal of all types of waste, and the management of all government-approved landfills in the state (Nyakuma and Ivase, 2021). Furthermore, the agency manages and establishes the rules for the gathering, moving, treating, disposing and generally handling of solid waste produced by various sources within the Lagos areas, including homes, markets, industrial sites, offices, schools, highways, medical, and laboratory wastes; commercial waste collection and disposal; clearing; disposing of abandoned scrap cars; and construction sites (Kofoworola, 2007; Oyelola et al, 2008).

Accelerated urbanization and rising population started affecting Lagos during the 1970s oil boom when people migrated to seek for job opportunities (Amidu, 2017). This leaves the state to deal with a huge volume of waste daily. It progressively became impossible for the government to handle all the waste operations alone (Dumbill et al, 2020). After several debates on whether to grant a private institution role in the state environmental clean-up, former Lagos State Governor, Babatunde Fashola, launched the Private Sector Partnership (PSP) to assist the public institution in the collection of commercial and domestic waste. Private Service Providers (PSP) or Private Sector Partnership (PSP) in 2007 handled the proper billing of garbage collection services as part of its regulatory and supervisory roles. In accordance with expected waste collected, the PSP was divided into two sections, commercial and a household branch. LAWMA then collects the revenue centrally and remits the agreed-upon amount of 60% of the garbage collection charged to individual PSP accounts (Oresanya and et al, 2018).

However, in 2017, another governor took over, and LAWMA was put in charge of all operations including that of the PSP, so the private owner withdrew (Adebola, 2017). In addition, the advocacy campaign of LAWMA on the environmental cleanliness, and Lagos State of Universal Basic Education Board (LASUBEB) also agreed to include waste management in the primary schools' curriculum in Lagos State to educate the younger generation on environmental

sustainability (Olasunkanmi, 2021). The operational practices of LAWMA collapsed. Waste became daily environmental struggle with almost every street dealing with the stench from illegal waste dumping, mountains of landfills along with unstable collection time, and lack of disposal infrastructures led to plastic waste pollution (Okolo et al, 2022). According to the research done by Dun and Bradstreet in 2024, there are more than 35 plastic-producing companies in Lagos state. With this number of plastics-producing companies, it is obvious that consumer demand is high in Lagos due to the high population living in the state. To enhance plastic waste management in Lagos State, there is a need to research the challenges of mitigating plastic waste pollution in Lagos State, Nigeria.

1.2 Statement of the Problem

Globally, about 400 million tonnes of plastic are produced every year, with a surge projection of 2.5 times the current amount by 2050 (UNTCAD, 2023). This has resulted in about 158 million tonnes of global plastic waste in 2022, with the potential for an increase (UNEP, 2023). Nigeria has an estimated average of 2.5 million tonnes of plastic waste annually, according to the Nigerian Economic Summit Group report of 2023. It is appalling to say that the state that holds the economic hub of the country, with diverse inhabitants newly arrived and established which is evolving and bridging the gap between traditional and urban communities' (wrecks with endless environmental pollution from plastic waste. However, its evolution is leading to abundance of plastic waste, environmental degradation and health concerns associated with plastic pollution. The existence of plastic waste obstructs natural processes and habitats, exposing vulnerable communities to environmental degradation and flooding. These concerns stem from the high demand for single-use plastic packaging, indiscriminate littering/ dumping, and potentially inadequate waste management systems. Figure 1.1 illustrates the substantial adverse influence of plastic packaging on the environment.

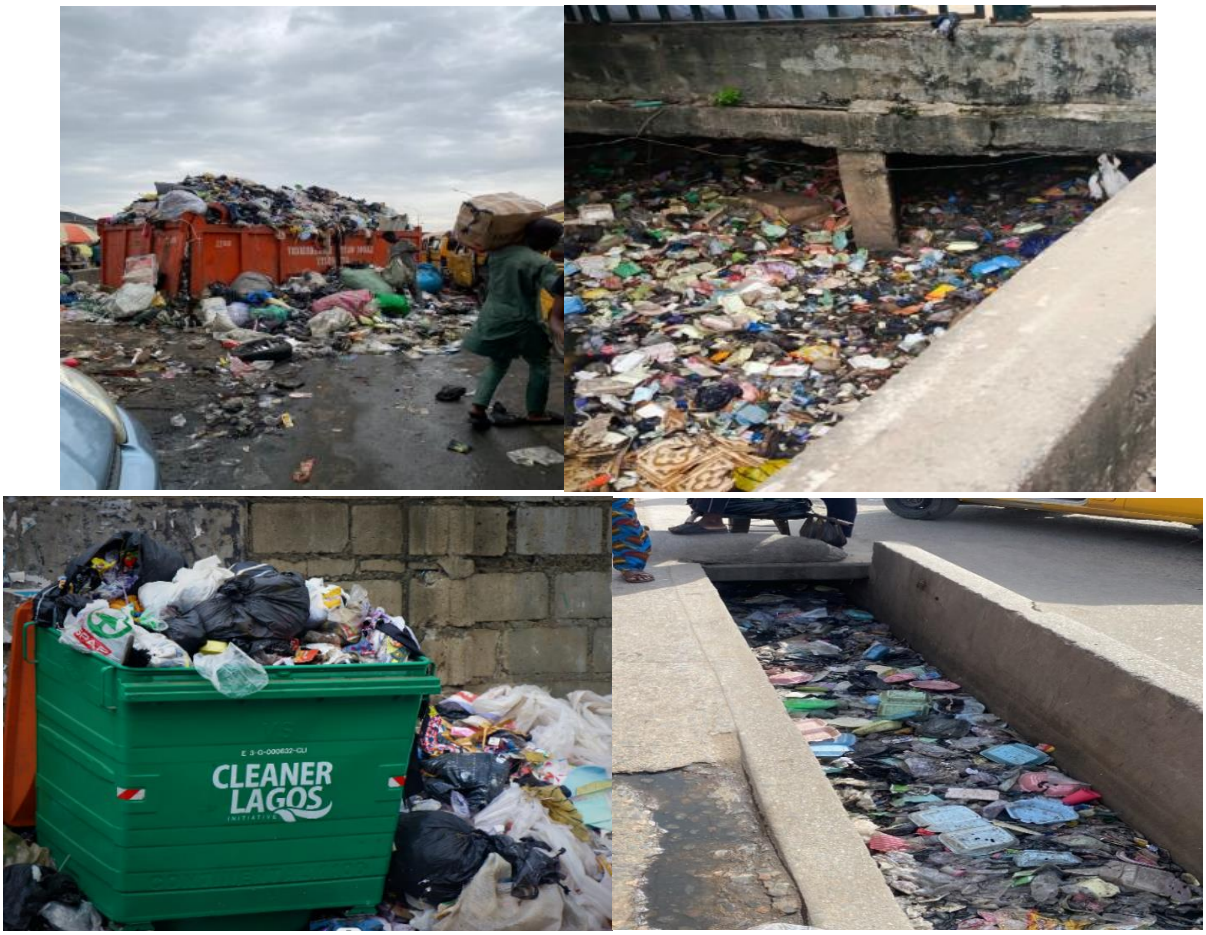


Figure 1.1: Pictures of LAWMA double dino bin, blue bin, clogged canal and drain

Source: Research Assistant (09/2024)

According to the Lagos State Government's Official website (2024), Lagos is Nigeria's largest city by population with about 16.5million inhabitants as at 2024 (Macrotrends, 2024) and a city that plays an essential role in the nation's Gross Domestic Product (GDP) due to the various industrial capacity it holds (Lagos State Government's Official website, 2024). With these attributes, it is disturbing to see that Lagos deals with a pressing environmental issue of plastic waste due to the high use of plastic products and the largest plastic polluter in the nation. Egbane, (2022) reported that an estimated 30,000 people die every year in Lagos due to pollution, and Adetunji (2024) reported that out of 8,400 tonnes of waste generated daily in Lagos, 15(%) percent are plastic waste, with the habit of indiscriminate discarding of used plastic by the residents, destroying the ecosystem in various ways. It is imperative that people start taking responsibility for their waste, considering the havoc their actions may cause to the biosphere (Gibson et al, 2015). Gondal et al (2023) argued that plastic waste and plastic breakdown processes released into the water caused water contamination as well as contamination of the air which is harmful to the ecosystem and its inhabitants. Therefore, resolving plastic waste pollution will have a significant effect in reducing ecological pollution in Lagos State, and reducing sicknesses associated with pollution that leads to deaths. This study will focus on plastic waste management, to understand the challenges of mitigating plastic waste pollution in Lagos State.

1.3 Objectives of the Study

i. To identify the causes of ineffectiveness in LAWMA practices in mitigating plastic waste pollution in Lagos State.

ii. To analyse the operational practices adopted for managing plastic waste pollution by LAWMA in Lagos State

iii. To identify possible solutions to the ineffectiveness of LAWMA practices in mitigating plastic waste pollution in Lagos State.

iv. To examine the individual's attitude towards plastic waste disposal on how it contributes to environmental degradation in Lagos State.

1.4 Research Questions

In what ways has the operations of the Lagos State Waste Management Authority and the attitudes of the residents influenced plastic waste pollution in Lagos State? The following sub-questions have been designed to examine Plastic Waste Management: understanding the challenges of mitigating plastic waste pollution in Lagos State.

i. What are the operational practices adopted by LAWMA for mitigating plastic waste pollution in Lagos State?

ii. What are the causes of the ineffectiveness in LAWMA practices in mitigating plastic waste pollution in Lagos State?

iii. How do the attitudes of individuals towards plastic waste disposal contribute to environmental degradation in Lagos State?

1.5 Significance of the Study

The study of Plastic Waste Management: Understanding the challenges of mitigating plastic waste pollution in Lagos State will provide empirical evidence on the operational practices adopted by LAWMA for mitigating plastic waste pollution, causes of ineffectiveness in LAWMA practices in mitigating plastic waste pollution, attitude of individuals has in plastic waste disposal contributes to environmental degradation and possible solutions to the ineffectiveness of LAWMA practices in mitigating plastics waste pollution in Lagos State. The findings will assist policymakers in Lagos State to understand the best possible way to mitigate the negative effect of plastic waste pollution, formulate effective regulatory policies, clean Lagos and ensure a health-free Lagos State. The study will also serve as a model for other states that have similar challenges, in the management of plastic waste pollution. The Federal government could find this research useful to better understand where to collaborate with Lagos State in finding lasting solutions to plastic waste environmental menace and other waste pollution in Lagos State and Nigeria in general. The research will be useful for

further research in waste disposal management, pollution management and other environmental research studies. The study will provide information on how poor waste management is affecting relationships of the environment and the overall well-being of the people in Lagos State.

1.6 Scope of the Study

The study of Plastic Waste Management: Understanding the challenges mitigating plastic waste pollution in Lagos State will specifically focus on operational practices adopted by LAWMA for mitigating plastic waste pollution, on the causes of ineffectiveness in LAWMA practices in addressing plastic waste pollution, on how the attitudes of individuals about plastic waste disposal contributes to environmental degradation and on possible solutions to the ineffectiveness of LAWMA practices in mitigating plastics waste pollution in Lagos State. The study will not only focus on the staff of LAWMA to deduce information on their operational practices but also gather information from the citizens, to evaluate their behaviour towards plastic waste disposal in Lagos State, contributing to plastic waste pollution. The study is limited to the period between 2019 and 2023 to provide for reasonable timeframe for the study. The study focused on plastic waste collection procedures from citizens, in all areas covered by LAWMA operations. This will provide evidence as to what causes changes in the cleanliness of some places in Lagos when compared with some other places. The research helps to provide empirical evidence on whether political, social, economic, or other factors influence collection of plastic waste by LAWMA, causing differences in the cleanliness of some parts of Lagos State and pollution in others. The study will focus on only plastic waste collection that is causing plastic waste pollution.

1.7 Rationale and Justification for the Study

Plastic waste pollution has remained a critical concern for both public health and environmental researchers, and beyond. Due to fast expanding population (Ichipi et al, 2023), increasing rate of urbanization (Nnebue et al, 2023), producers' inadequate investments in environmentally friendly initiatives, the politicization of the waste collection process (Salvaire, 2020), among other issues, plastic waste pollution keeps increasing in Nigeria, especially in Lagos State. Nigerian Economic Summit Group report of 2023 revealed that an average of 2.5 million tonnes of plastic waste is generated annually in Nigeria, with Lagos State having an average of 870,000 tonnes, more than any other state in Nigeria (Olaoti, 2024). With the largest tonnes of plastic waste generated, the largest population in Nigeria from other states, and more than 35 plastic-producing companies (Dun and Bradstreet, 2024), and the presence of sea and airports, headquarters of registered companies in Nigeria, as well as the largest economy in West Africa (Auwalu and Bello, 2023), there is much concern about the possibility of an increase in plastic waste pollution in Lagos State. However, the creation of the Lagos State Waste Management Authority (LAWMA) in 1991 from the old Lagos State Refuse Disposal Board (LSRDB), was meant to improve waste collection and reduce the negative effects of indiscriminate waste disposal in the Lagos State environment. Yet not all places within Lagos State are safe from plastic and other waste pollution (Oludele, 2023), creating an argument about whether political, social, economic, and other factors are responsible for

differences in the cleanliness of the operation of LAWMA in Lagos State. Therefore, this study will examine the challenges facing the mitigation of plastic waste pollution in Lagos State.

1.8 Research Study Guideline

This study is divided into six chapters. The study discussed background to the study, research problem, research questions and objectives, scope, significance, rationale and justification of the research in the first chapter. The reviewed of the related literatures, including the concepts, theories and empirical studies were done in the second chapter. This enables the identification of gaps in the literature for the study. The research explained the research philosophy, research design, research strategy, research approach, study's population, sampling procedure and sample size, method of data, collection and analysis in the third chapter. The fourth chapter provides an overview of the data collected, including both a presentation and an analysis of the first-hand material. The detailed information on discussions of findings to provide empirical evidence from data collected and its convergence or divergence from the existing literature were disclosed in the fifth chapter. Finally, a summary of the study as well as recommendations were captured in the sixth chapter.

1.9 Chapter Summary

This chapter provided the useful information on the challenges of plastic waste pollution and how it has become a global issue. It explained some of the causes of plastic waste pollution in Lagos State and raised some important questions to that effect. The chapter also highlighted the reasons for the study and provided a guide to the research work.

Chapter 2

Chapter Overview

This chapter further elaborates the discussions on the challenges of plastic waste management in Nigeria. The previous chapter discusses briefly the background information to the study and how LAWMA has been conducting its activities to manage plastic waste pollution in the country. Hence, this chapter moves on to review the related literatures on waste management across various countries.

2.0 Literature Review

The academic literatures on plastic waste were reviewed with a special focus on conceptual, theoretical and empirical dimensions of analysis as well as looking for conceptual framework and literature gaps. The conceptual review entails the concept of plastic waste and its composition, methods of plastic processing, causes and consequences of plastic waste in Lagos State, operational practices of LAWMA and possible solutions to ineffective management of plastic waste pollution. Theories relating to management were also reviewed. These include political ecology theory, behavioural change theory and reasoned action theory. Finally, several empirical studies were reviewed on the related research work.

2.1 Conceptual Review

2.1.1 Plastic Waste: Concepts and Composition

Plastic is a durable, lightweight and sanitary material that can be shaped in several ways and utilized in several applications for both short-term and long-term purposes (Hopewell et al, 2009). Plastic does not deteriorate like metals do. Instead of biodegrading, most of the plastics photodegrade, which causes them to gradually crumble into tiny pieces known as microplastics. As a result, they are frequently found in apparel, electronics, building, and packaging of food and water (Uche, 2023).

I will explain that plastics are long-term undegradable material that turns into a visible persisting waste issue, posing a continuous harmful pollution to the environment, humans and non-human species. Yet, we are dependent on these materials for our various daily uses.

Plastics constitute a notable share of human waste globally, despite the measures to reduce its growth as part of Sustainable Development Goals 3, 6, 7, and 13, which prioritize health, clean water, sanitation, clean energy, and climate action (Shen et al, 2020). According to recent estimates, up to 300 million tonnes of plastic garbage are created worldwide per year; of these, almost 90% are disposed of as single-use waste rather than being recycled or reused (Sofi et al 2020). This is equivalent to 6,000 shiploads of garbage leaving the oceans and ecology. As a result, it has been

proposed that plastic wastes could act as a geological marker of the Anthropocene epoch in millions of years to come (Bigalke et al, 2019). In essence, materials or products consisting of polymers derived from naturally occurring hydrocarbons like natural gas or crude oil are plastics (Adeniran et al, 2022). The widespread usage of plastics in common consumer products has displaced the use of metals, glass, wood and ceramics in recent times. This trend has been aided by the low cost of plastic technology. After the expiration of their useful lives, plastics decompose into non-biodegradable pollutants that, if improperly disposed of, represent serious risks to environmental security (Adeniran et al, 2022). This is particularly true in communities with inadequate waste management practices, where solid waste is neither reused nor recycled.

Plastic waste is the accumulation of plastic items (plastic bottles, bags, etc.) in the environment that negatively impacts humans, wildlife, and wildlife habitat (Hopewell et al, 2009). It also includes many plastics that are not recycled and wind up in landfills or, in the developing world, thrown into unregulated dumpsites or littered on the streets. The real indicator of the environmental pollution caused by plastic is not the amount of waste it produces, but rather the ability to dispose satisfactorily; it is when the litter consistently lags that plastic waste becomes an irritation (Bawa et al, 2012). Thus, it is easy to agree with the perspectives of Uche (2023) on the rank of African nations as one of the highest garbage creators due to the densely populated cities that are unable to recycle solid waste.

Plastics are reasonably priced, frequently utilized for packaging, and comprise products meant to be used just once before being recycled or thrown away (Brink et al., 2016). Grocery bags, food packaging, bottles, straws, containers, cups, and plastic made silverwares are a few of them. They can either be thermoplastics or thermosets (UNEP Report, 2018). Thermoplastics are a class of plastics that can be repeatedly reshaped and frozen because they melt when heated and solidify when cooled. They are also mechanically recyclable, which is a useful waste management technique. The structural organization of thermoplastics, including chemical bonding and the degree of their characteristics and functionality, can be used to classify them. Polyethylene Terephthalate (PET) which is the major type of thermoplastics is currently used in textile industries and bottle packaging. As stated by Evode et al (2021), PET is made for industrial processes but a large proportion of it ends up in the environment. Karger-Kocsis, (2012) restates that polypropylene is the thermoplastic polymer that is employed in packaging tape, crisp bags, lunch boxes, straws, bottle caps, food containers, clothing, supplies, and surgery tools among others. On the other hand, a class of plastics known as thermosets changes when heated (UNEP Report, 2018). The synthetic materials help to create a three-dimensional linkage by going through a variety of physicochemical transformation processes under various heat treatments. This is an irreversible process of metamorphosis. These thermoset molecules cannot be reformed or remelted after the heating process (Mullins, Liu et al, 2018; Das et al, 2020). Hence, the plastic waste produced by companies constitutes a large volume of pollution in the environment which results in environmental issues that calls for the attention of individuals, companies and government.

2.1.2 Methods of Plastics Processing

The term "plastic processing" describes the sequence of operations that convert polymers or plastic raw materials into finished goods that have the power to alter the quality of human existence in several ways, including development, health, and finances (Alam et al. 2016; Evode et al, 2021).

Plastics are mostly used in food and beverage manufacturing facilities. Adhesives are man-made substances that are added to plastics to enhance their properties, durability, and applicability. Plasticizers containing phthalates and bisphenols are examples of adhesives that can aid in the alteration processes. There are existing multiple techniques for converting polymers into superior plastics, which can be broadly categorized into three groups. First, the primary processing methods which involves transfer moulding, compression, extrusion blow, and injection, (Romo-Uribe et al, 2021; Asgher et al 2020). Second, the secondary processing methods entail thermoforming, calendaring and fabrication, coating, roto-coating, and casting (Ogila et al 2017; Landsecker et al, 2019) and finally, the tertiary processing method which emphasizes the drilling, welding, bending and cutting of plastics (Evode et al, 2021). In Nigeria, especially Lagos State, most of the processed plastic ends up as waste. As plastic producers increase production, high volumes of waste certainly end up in the rivers, landfills and oceans. Thus, if plastic manufacturing companies rise to 10%, plastic pollution will also increase by 10% (Willis et al, 2024)

2.1.3 Causes and Consequences of Plastic Waste in Lagos State, Nigeria

The Lagos State Ministry of Environment delegated specific roles of waste collection, transportation, and disposal to the LAWMA to achieve a sustainable environment and sanitation in the state. Although LAWMA has provided commendable services, but they are still lacking in many aspects as waste accumulation increases daily because of increased urbanization, population, and industrialization. Ali, et al (2021) pointed out that the constant activities of the waste pollutants rendered the efforts of LAWMA effectiveness in mitigating waste pollution in the State abortive. Aare et al (2024) believed that inadequate infrastructure and inconsistent enforcement aid plastic pollution and eventually contribute to the ineffectiveness of LAWMA practices. In the opinion of Oresanya et al (2018), inadequate funding, socio-cultural and socio-economic factors, politics, low technology, inadequate human capital, climate change and little or no public enlightenment and awareness are the major constraints hindering the progress of LAWMA in Lagos State. Onuminya et al (2017) argued that the ineffectiveness of LAWMA was because of the breakdown of waste evacuation trucks; non-payment of fees by the populace, lack of equipment, lack of manpower and cooperation from the residents and inadequate maintenance capacity to ensure proper waste management. Allen-Taylor (2023) also believed that the lack of sorting systems, insufficient vehicles, recycling processes, unsafe waste disposal techniques and administrative issues among others are the main causes of the ineffective operations of the agency. In addition, poor infrastructures, a lack of environmental education and awareness as well a lack of clear policy framework could worsen the plastic pollution in Lagos State, Nigeria.

The major causes of plastic waste in Lagos are complex and multivariant ranging from the population density, the pattern of consumption and failure in the responsibility and administration of managing waste collection among others. Lagos State is one of the most rapidly growing cities major commercial center with a population density of 6,871 residents per square kilometre (World Population Review, 2024). The city is important to its neighbouring states because of its seaport and manufacturing centers with high number of multinational companies (Phillips et al, 2007; Allen-Taylor, 2022). The current population of Lagos is 16,536,000, a 3.70% increase from 2023 (Macrotrends, 2024) within the 20 local government areas compare to other western cities in Nigeria such as Ibadan (Oyo State) and Oshogbo (Osun State) with an estimate of 3, 649,000 and

645,000 people. The population, urbanization, and industrialization of Lagos State are growing consistently. Thus, the state's garbage creation and management are significantly impacted by the size, density, and rate of population increase. This may help to explain the state's yearly production of approximately 870,000 tonnes of plastic garbage (African24tv, 2024). Hence, figure 2.1 depicts the different forms of plastic waste which characterize Lagos State, Nigeria

Figure 2.1: Common Forms of Plastic Waste Causing Environmental Problem in Lagos State, Nigeria
Source: Allen-Taylor, 2022

Lagosians drink a wide variety of soft beverages, sachet water, and plastic bottled water. Moreover, adding to the state's plastic waste problem is the use of plastic bags and other single-use plastic items like meal packs "*Styrofoam's"*, spoons, glasses, straws, among others (Allen-Taylor, 2022). If sustainable management practices are not put in place, it is reasonable to predict that plastic waste made of polyethylene will exceed the amount of municipal waste that is generated annually (Orsanya et al, 2018). Hence, due to the unique climatic and meteorological conditions in Lagos State, the city practices of disposing, dumping and tossing plastic garbage into the environment exacerbate plastic pollution, especially during the rainy season as depicted in figure 2.2. As stated earlier, the issue of plastic waste in the environment is worsened by the careless disposal of plastics, which leads to street accumulated trash and clogged drainage systems (LAWMA, 2015).

Figure 2.2: Various Forms of Plastics Pollution in Lagos State, Nigeria
Source: Allen-Taylor, 2022)

The Lagos State government waste disposal is organised around a (blue bin marked for recyclable material). This blue bin system should have promoted plastic waste separation and sorting, is limited, exacerbating the problem (Oresanya et al, 2018). With limited access to the blue bins, residents are left with no choice but to buy it separately from the Lagos State Waste Management Authority (LAWMA) at outrageous prices, ranging from 30,000 to 40,000 Naira (Allen-Taylor, 2022), without considering the average income of Lagos residents. However, because the residents have discovered alternative ways to dispose their waste such as sacs and bags rather than bins, this circumstance has deteriorated and does not encourage waste separation and sorting (LAWMA, 2022).

2.1.4 Operational Practices of LAWMA in Managing Plastic Waste in Lagos State, Nigeria

In addition to providing commercial waste services to the state, LAWMA, which was formerly referred to as the Lagos State Refuse Disposal Board (LSRDB), was tasked with the role of collecting and disposing municipal and industrial garbage. Environmental education, advocacy, and awareness are just a few of the measures this organization and the Lagos State Environmental Protection Agency (LASEPA) launched to tackle environmental concerns of plastic trash (LAWMA, 2022). The agency is statutorily tasked with enforcing, advocating and monitoring waste management rules. Yet, as the extent of the environmental issues increases, these attempts have shown to be futile to some extent for the obvious reasons. As pointed out by different scholars, managing plastic waste is a collective responsibility that requires individual, business, government and community efforts and commitments. The reports of Baroda Green Minds (2023), states that the implementation of plastic consumption reduction, effective recycling program, waste

segregation, exploration of waste-to-energy conversion and creation of awareness could make significant progress in achieving sustainable plastic waste management. Thus, there are several environmental restrictions that impact how to handle plastic waste in the environment because of its diverse sources, paths and persistence. These include regional waste action plans, worldwide general instruments on environmental protection and pollution as well as national or local product restrictions (Vince et al, 2017).

2.1.5 Possible Solutions to Ineffective Management of Plastic Waste Pollution

Currently, the most prevalent policies in Africa to curb plastic waste pollution are plastic bag bans or fees. Mauritania was the pioneer nation to implement this strategy. This rule was originally implemented in response to the findings that eating plastics was killing up to 70% of cattle (Larsen et al, 2017). Many African nations, including Senegal, Côte d'Ivoire, Mali, Ghana, Kenya, Ethiopia, Malawi, Mauritius, Tanzania and Uganda, have now enacted similar laws. Taxes have been implemented in South Africa and Cameroon (Larsen et al, 2017). Oresanya et al (2018) discussed the creation of a compost production factory, the promotion of waste-to-wealth initiatives, and the utilization of renewable energy as examples of how the 4Rs of effective waste management (such as reduction, reuse, recovery, and recycling) can be adopted to reduce plastic waste in various countries. While Iroegbu, et al (2021) see the inclusion of plastic education in national curricula and the revision of extended producer responsibility as the possible way of mitigating or reducing plastic waste, Nnebue et al (2023) advocated for the incorporation of plastic waste reduction policies in urban development plans and public education and awareness as the possible solutions to the ineffective management of plastic waste pollution across regions. However, Kang (2019) argued that some of the conventional solutions to plastic pollution such as the reduction in the amount of plastic usage; government policies to limit the use of plastic; banning of plastic bags and straws; and recycling is not best solution to remove plastic waste from the environment. He went ahead to propose the 'Ocean Clean Up Project' and 'Plastic Bank' as innovative and promising ideas to eliminate plastic from the environment and reduce the high level of pollution. Nubi et al (2019) also pointed out that educational campaign is best way to manage plastic waste pollution, and it is important for the involvement of some economic actors (such as representative of Manufacturers Association of Nigeria (MAN), research institutes and LAWMA among others) in policy decision making to encourage public acceptance of plastic waste management.

2.2 Theoretical Review

This study uses Political Ecology, Reasoned Action Theory and Behavioural Change Theory (BCT)

2.2.1 Political Ecology Theory

The term 'Political Ecology' was first advocated by Frank Thone in 1935. The theory attempts to provide alternatives in the interplay of the environment, political, social and economic factors. Thus, understanding environmental management in developing countries is the main goal of the political ecology approach. The theory also helps understand the ecological relationship between the planet, humans, non-humans and other species, advocating for a sustainable existence for all (Weir, 2015). To improve environmental governance, the theory educates organizations and policymakers on the intricacies of the environment and development. Political ecology includes decisions made by communities toward the environment concerning their political environment, social norms, and economic pressures (Rath et al, 2021). Social actors such as scientists, manufacturers, politicians, journalists, civil servants, and environmental activists must successfully "make" claims for environmental issues to be socially constructed (Rath et al, 2021). The theory specifically holds that no environmental issue arises in isolation from political and economic forces and that the consequences of environmental issues are distributed unevenly (Bryant et al, 1997). Those who make use of nature and those who do not are impacted differently. The power structure, institutional arrangements, administrative hazards, linkages, and many other issues exist beyond the obvious issues and will be revealed with thorough application of the political ecology.

In political ecology, these political institutions have an impact on the unequal distribution of resources, which leads to individuals becoming deprived and unable to utilize environmental facilities (Pelling, 2003). Additionally, Pelling contended that the lack of diverse approaches to amend the issue of plastic waste and the politicians' refusal to assist the populace contributed to the worsening of the circumstances. Once more, the environment deteriorated and there was economic and social disparity. The study conducted by Heynen et al. (2006) on environmental challenges emphasized the significance of taking social and political factors into account in waste management. It provides superior solutions to address real-world problems when the challenges are examined with political and societal aspects at play. This is because it helps to reveal the institutional implications of the interactions between the various players at the intersection of humans, society, and nature (Khan, 2013). However, political ecology theory is subjected to many criticisms. As pointed out by Biersack (2006), the theory lacks a 'grand theory', a meta-narrative and a comprehensive theoretical foundation. It also lacks engagement with power dimensions which leads to the risk of weakening resilience-based management goals and the analytical potential of resilience (Ingalls et al, 2016). Several studies such as the work of Rath et al (2021), Baba (2014) and Bryant (2008) have considered political ecology theory as relevant assumptions in waste management in different countries. As stated by these studies, the assumptions of political ecology explain the environmental issues by evaluating the economic-political causes and provide a suitable way out of the challenges. Hence, the theory is more suitable for plastic waste management because it emphasizes the power play and creates the awakening of ecological awareness that is necessary to curb the continuous environmental pollution via sanctions and policy implementations.

2.2.2 The Behavioural Change Theory

The behavioural theory emerged in the 20th century. The model was championed by the Watson (1924). According to the model, an increase in the awareness of environmental issues drives

people to adopt environmentally friendly attitudes and be accountable for environmental actions (Bamberg et al, 2007). This behavioural model has been criticized for being unrealistically simple and out of touch with reality (Siemer et al, 2001). However, it offers a fresh viewpoint on how environmental knowledge, awareness, and attitude relate to one another and how they can influence people to take action to control plastic garbage. That is, the success of garbage management depends on the willingness of the people to adopt a change of lifestyles such as disposal or consumption patterns within the environment. Thus, many environmental issues stem from a lack of public understanding and the negligence of the people on how to treat the environment they live. As stated by Mohamed et al (2006), one of the main objectives of (UNESCO) United Nations Educational, Scientific and Cultural Organization (1978) is education on environmental protection, which empowers individuals to actively participate in resolving environmental issues by applying knowledge and skills they have acquired.

The impact of public awareness and education on garbage management is demonstrated by the human behavioural change approach. This implies that the desire of the populace to embrace and modify their lifestyles will be a necessary condition for the success of any waste management system. But differently, shifting consumption or disposal habits necessitates a change in consumer attitudes. Hence, Akintunde (2017), Adeyanju et al, (2021) among others have considered this theory relevant to waste management across countries. They also contend that the inability to control pollution is a result of the general public's lack of understanding of environmental preservation. Lack of knowledge about environmental pollution's harmful impact on people's health and the ecosystem is the reason for the public refusal to assist the government in reducing waste pollution (Rahmani et al, 2021). However, some scholars and researchers contend that appropriate attitudes and behaviours regarding waste management depend on several factors together with the country's laws and regulations to support them (Van Rensburg et al, 2020; Adeyanju et al., 2021).

2.2.3 Reasoned Action Theory

According to this theory, action cannot be driven solely by well-intentioned environmental concerns (Ajzen et al, 1980). It goes on to say that behavioural intentions which can be utilized to forecast behaviour are influenced by attitudes and subjective norms (Schifter et al, 1985). The underlying tenet of this theory is that behaviour directly precedes behavioural intention (Fishbein et al, 2001). Reasoned action theory takes into consideration situations in which people have excellent intentions but are unable to carry them out because they lack confidence or control over their actions. This theory attempts to explain why; despite having the best of intentions, humans might not behave in a way that benefits the environment. These could be attributed to a lack of skill, confidence, competency, finances, behaviour, and prior experience (Schifter et al, 1985). In summary, this theory contends that preventing environmental pollution requires a combination of three elements (education, regulation and public awareness) rather than emphasizing only one of these factors (Rahmani et al., 2021). This means that, if the goal of a campaign is to raise awareness about plastic pollution, to encourage young people to refrain from using single-use plastics, people's attitudes will reflect how they feel about doing so (Oguge et al., 2021). One important finding of a study by Oguge et al, (2021) on the youths' attitudes and knowledge about plastic pollution in Nairobi, Kenya, was that youths' knowledge of the effects of plastic on the environment and humans was statistically significant when it came to practice and attitude variables.

In support of the theoretical assumptions, Sujauddin et al. (2008) among other experts, state that finance and education are other elements that impact trash management and generation. The arguments made by Salequzzaman et al (2018), who maintained that education is essential for encouraging sustainable development and enhancing people's ability to handle environmental and development challenges also supported their assertions. However, Pfeffer et al (2000), Morris et al (1999), and Asmawati et al, (2012) contend that providing groups or individuals with education or information does not always result in the right behaviour on their part or that of the organization. They acknowledge that while information is important, it is insufficient to motivate action. Hence, the ability to act on knowledge and knowing what to do are only loosely and imperfectly correlated (Pfeffer et al, 2000).

The stated theory concentrates on people's willingness to behave in an ecologically conscious manner. However, when it comes to managing plastic waste, it is assumed that developed countries handle plastic waste differently from developing ones. This could be due to people's overall attitudes toward waste and the environment and the fact that developed countries have more developed policies to address each garbage stream. It could also be that, developed countries have grown into being aware of the implications of environmental pollution.

Hence, this study rests on the assumptions of reasoned action theory because the model can lead to the development of relationship-based approaches for resolving a range of environmental issues brought about by varied human behaviours as presented by several researchers (Oguge et al., 2021; Salequzzaman et al, 2018). This approach also requires effective government action and legislation, together with a strong legal system that includes levies, taxes, and other penalties for noncompliance, to implement this strategy as advocated by the political ecology theory. These theories are applicable to the study because the management of plastic waste require that people need to be educated on the implications, and the need to protect themselves from the consequences of pollution. This also calls for the effective role of government in achieving the set objectives.

2.3 Empirical Review

Several empirical studies have been conducted on the challenges, causes and operational practices adopted for managing and mitigating plastic waste pollution of different regions or countries of the world. Some of the conclusions of these empirical findings are strictly based on the individual country specifics and factors influencing plastic waste management.

2.3.1 Evidence from Developed Countries

Kibria et al. (2023) investigated the obstacles and prospects of reducing pollution and managing plastic trash efficiently in different regions such as Europe, Central Asia, and North America among others. A thorough examination of various methods for handling plastic waste is provided, along with an outline of the difficulties in implementing a sustainable policy for managing plastic trash. From the study, it was found that lack of awareness and regulatory policy are the main drivers of plastic waste. Thus, plastic pollution adversely affects the environment and ecosystem. In addition to poisoning groundwater and reducing soil fertility, the growing amount of plastic garbage

also seriously harms nearby ecosystems and the marine environment. Furthermore, open dumping, landfilling, burning, and other traditional methods of managing plastic trash mostly contribute to environmental contamination instead of achieving sustainable waste management.

The impact of plastic waste management strategies on sustainable development goals was examined by Helm et al, (2023) between 2000 and 2020. They reviewed the effects of alternative products, recycling, waste-to-energy, plastic recovery, extended producer responsibility, bans, levies, and taxes. The results showed that it is imperative to consider the impacts of both plastic materials and management strategies to prevent unfavourable outcomes of plastic pollution mitigation efforts. Kang (2019) also sampled the United States and East Asian countries to evaluate the challenges to solving the problem of plastic waste. Conventional wisdom advocates for recycling but recycling alone is inadequate to address the growing problem for a variety of reasons. The reality of recycling is that plastic cannot be 100% recovered; a further reality is that current recycling procedures are inefficient. Consequently, the study concluded that technologies have the potential to concurrently address several social, political, and environmental issues.

2.3.2 Evidence from Developing Countries

Ferronato et al. (2024) examined how low-middle-income environments handle plastic garbage by taking samples from developing nations. Based on the data available and economic standing, seven countries were chosen, and each was subjected to an analysis aimed at gathering and evaluating the city-level initiatives. The therapy procedures or reduction measures were the main topic of the investigation. Hence, general remarks were made regarding the projects' suitability for achieving the Sustainable Development Goals. The study's findings highlight the following priorities: expand small- and pilot-scale initiatives; spread good practices in the low and middle-class environments; and forge partnerships with foreign partners to facilitate future city replications. It was found that the nations with the highest GDP among those examined were, Malaysia, Bolivia, and Colombia achieved over 80% collection rates, which raised recycling rates from 5% to 15%. When compared to results in other countries like Kenya, Burkina Faso, and Nepal, these results are favourable. It was therefore concluded that waste management has advanced across Asia, despite several obstacles.

To comprehend the problems of the current waste management systems in some nations, Huey Ng et al. (2023) examined the plastic issues and concerns in Southeast Asia. They also outlined the strategies currently used to combat plastic pollution and evaluated the joint efforts and commitments made by stakeholders, governments, the business community, social organizations, and individuals as the main actors in putting a stop to plastic pollution. Hence, it was established that Southeast Asia's primary source of serious environmental effects is the absence of advanced mechanisms for managing plastic garbage. Though most of the region's nations lack the infrastructure necessary for effective trash disposal, Southeast Asia is a hotspot for acquiring plastic waste from richer nations. Therefore, Southeast Asia should increase public awareness of the possible environmental risks associated with waste disposal while also developing policies to prevent unintended consequences.

Hira et al (2022) investigated the causes behind the regions' inability to reduce plastic trash with reference to South Asia and Sub-Saharan Africa (SSA and SA). To reduce the waste of plastics,

the research evaluates the difficulties in replacing natural resources and changing industrial processes. The study discovered that lax laws and enforcement had a detrimental impact on countries. The same problems currently plague regional and international initiatives to control non-recyclable plastics and packaging, coordinate laws, and lessen the trade in plastic waste. These initiatives are still in their infancy. Thus, suggestions were made for increased external financial and technical support for waste treatment, developing consensus among stakeholders and raising awareness among them, enacting regulations that lessen the convenience and cost differences between plastics and other materials, and pushing for the enforcement of environmental laws.

The Tamale Metropolitan Area was the focus of Kombiok, et al (2021) assessment of the factors influencing households' improper disposal of plastic garbage in Ghana. Three communities in Tamale, in Ghana's Northern Region, were the subjects of the study. Through interviews, direct field observations, and household surveys, data were gathered from 270 randomly chosen houses. Most respondents (63.3%) were found to utilize and dispose of their plastic waste "unsafely". The results indicated that household affluence and educational attainment were important predictors of improper plastic disposal. The study concluded that social elements like human behaviour are important parts of trash management that require consideration, in addition to institutional, technical, and economic factors that pose obstacles to the management of plastic waste. Thus, it was suggested that the best ways to address the unsafe disposal of plastics in the environment are strict enforcement of bylaws, promoting education, and providing alternatives to plastics that will reduce the need for plastics to be manufactured and imported.

Evode et al. (2021) evaluated the nexus between environmental sustainability and plastic waste management strategies. The study focused on the lifecycle of plastic products according to their various categories, such as polystyrene or Styrofoam (PS), polyvinyl chloride (PVC–U), polypropylene (PP), high-density polyethylene (HDPE), polyethylene terephthalate (PETE) and others. The study illustrated various methods that can be applied to treat plastic waste so that plastic waste is not negatively impacted by improper management. Through the recycling of raw materials and the reuse of plastics, these technologies save a significant amount of money while also protecting the lives of humans, animals, and the environment. Therefore, it is crucial to maintain environmental safety since doing so will enable everyone who lives in this ecosystem, be in a safe and healthy environment.

In Africa, Jambeck et al (2018) investigated the obstacles and potential resolutions to plastic waste. The research specifically concentrated on pinpointing the origins of the issue and exploring measures to address the mismanagement of waste. Considering the anticipated economic expansion, global population and plastic manufacturing, it is imperative not to overlook the African continent in relation to the discourse on marine litter and the seepage of plastic waste into the sea. Therefore, there exists a prospect for advancements in infrastructure to reduce plastic waste in the surroundings. With necessity often sparking innovation, it is certain that a multitude of innovative, cooperative strategies will be adopted to address this escalating environmental concern which has evolved in the modern-day tragedy of the commons.

2.3.3 Evidence from Nigeria

In Nigeria, the nexus between plastic pollution and the sustainability of the blue economy was evaluated by Nwafor (2024). Blue economy initiative focused majorly on the cleanliness and sustainability of the coastal, oceans resources. Using a thorough assessment of the literature, the study discovered that plastic pollution has a major impact on the growth of the blue economy, specifically on the fishing, tourist, and health sectors. Environmental problems including ocean acidification, land degradation, and water pollution are also brought about by pollution. It was also found that the primary barriers to combating plastic pollution in Nigeria include a lack of effective management techniques, weak laws, and little or no public awareness. As part of the recommendations, the author pointed out that the government should prioritize implementing strong policies and taking a holistic approach (such as efficient waste management) to lessen the impact of plastic pollution.

Aare, et al (2024) assessed Nigeria's approach to managing plastic pollution in a strategic way. They specifically investigated the legal tools (such as the National Environmental Standards and Regulations Enforcement Agency (NESREA); and the Harmful Waste (Special Criminal Provisions Act) that aimed to reduce plastic pollution, with an emphasis on the problems hindering its efficacy and possible solutions. Some of these problems include inadequate monitoring, limited resources, and loose compliance of the people which undermines the government's efforts. There are encouraging opportunities within the legal system to address these issues. Some of the opportunities include increasing compliance and discouragement of infractions by fortifying enforcement procedures with increased oversight and rigid sanctions. It was suggested that initiatives that combine government agencies, non-governmental groups, and business sectors can result in creative solutions and successful execution. Hence, through the resolution of issues, Nigeria can implement a more successful legislative approach to tackle plastic pollution, promoting a more sustainable and hygienic environment for both current and future generations.

By examining the current state of plastic pollution in the country, identifying effective urban planning initiatives and strategies from other nations, and analysing the role of urban planning in mitigating plastic waste pollution in Nigeria, Nnebue et al (2023) investigated how urban planning initiatives might be used to combat plastic pollution. According to the findings, the country produces an estimated 2.5 million tonnes of plastic waste annually. It was further established that despite the government's best efforts, trash reduction and recycling initiatives have not proven to be effective. Thus, the study suggested that there is a need for ecologically friendly urban design and the appropriate disposal of plastic waste in Nigeria highlighting the importance of urban planning perspectives in the fight against plastic pollution.

In Lagos, Nigeria, Chukwuone et al (2022) examined the factors that influence waste management behaviours and the degree of participation in reducing the number of plastics entering the ocean. According to the findings, the possibility of unlawful garbage dumping is greatly decreased by a few factors, including household size, participation in community cleanup events, receiving waste management information, paying a waste management charge, and having a dumpster nearby. The study suggested that to decrease unlawful garbage dumping, waste management information and dumpsters should be made available. Additionally, well-packaged information concerning plastic pollution should be used to mobilize individuals, particularly women and lower-class households that pay minimal waste fees.

Onuminya et al (2017) evaluated the activities of LAWMA in the Lagos Metropolis using questionnaires. The analysis revealed that 100% of the respondents are aware of LAWMA activities in Lagos State and that waste is evacuated weekly on average by means of a LAWMA truck. Many respondents, 180 (60%), assume that waste management has only been partially successful since waste builds up too long before evacuation occurs, creating an unclean environment that invites disease outbreaks and significant damage of the environment. The breakdown of waste evacuation trucks, according to study participants, is a major hindrance to LAWMA's ability to provide its services. Other issues include residents' refusal to pay collection fees, a shortage of equipment and manpower, inadequate maintenance capacity, and a lack of cooperation in ensuring proper waste management. Thus, it was suggested that to maintain a sustainable environment, the government should guarantee the routine maintenance of the trucks that LAWMA uses as well as public education, orientation, and awareness programs on proper waste handling through the mass media. Meanwhile, LAWMA should increase the frequency of waste collection in the state.

The study by Nubi et al (2019) focused on finding a solution to the problem of marine litter in coastal communities in Lagos State, Nigeria. Based on the challenges and its impacts, three groups of research questions were developed in this study. The study also utilized observational findings and interviews with different actors to gather relevant information for the research. Makoko and Ebute-metta clearly demonstrated the negative effects of marine littering caused by ineffective solid waste management, Victoria Island Bar Beach demonstrated the positive effects of a relatively solid waste management system with a multi-actor approach. This location was found to be relatively clean, thereby lowering the likelihood of littering into the marine system. This is attributed to the excellent awareness of the danger of marine systems and sound environmental waste management which distinguish this location from others. Generally, the major impacts identified were aesthetic impairment and health issues.

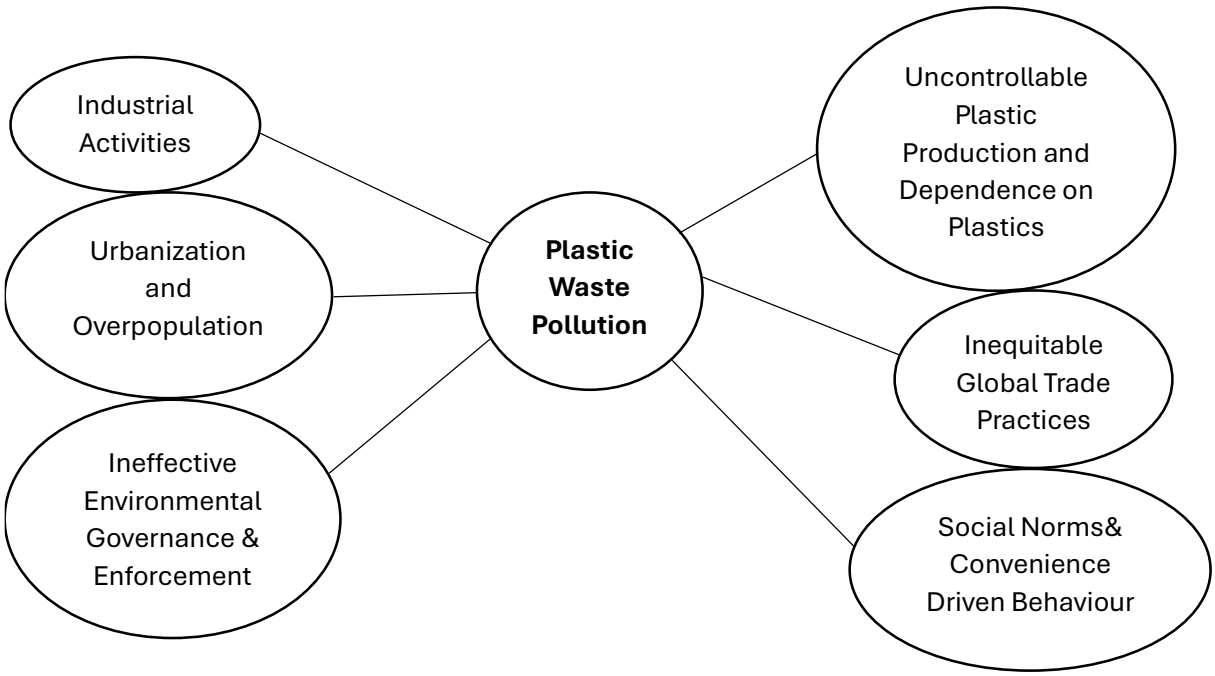


Figure 2.3: Various causes of Plastic Waste Pollution

2.4 Conceptual Framework

Several empirical studies have been conducted on the major causes of plastic waste and the possible way out of plastic pollution in various countries. While some studies attributed the reasons for LAWMA ineffectiveness to politics, inadequate human capital, inadequate funding, low technology, and lack of public enlightenment (Oresanya et al, 2018; Aare et al 2024), others see a lack of equipment and cooperation from the residence as well as poor maintenance capacity as the major constraints to the effective performance of LAWMA in Lagos State, Nigeria. The importance of public awareness and public cooperation in the reduction of plastic waste pollution was affirmed in the theory of behavioural change and reasoned action approach. Hence, the link between the causes, operations and possible solutions to plastic waste pollution is shown in Figure 2.3

2.5 Gap in the Literature

Several scholars have conducted extensive research in various developing nations, identifying various challenges related to plastic waste management in relation to the impact of climate change, politics, poor funding and lack of equipment on plastic waste management (Enete, 2010; Modebe et al, 2011; Adeyemo et al, 2013; Idehai et al, 2015; Allen-Taylor, 2023; Nwafor, 2024). However, there is no consensus or agreement on the main causes of increasing plastic pollution in Nigeria and the lasting solutions to the menace. These inconclusive findings created an avenue of renewed interest in the research of plastic waste management in developing countries, especially Nigeria.

There is very limited literature on plastic waste management, especially on LAWMA in Lagos State. The research on LAWMA (Omnuminya et al, 2017) now outdated and they did not focus on the LAWMA operational practices and the possible solutions to plastic waste pollution. Hence, considering the condition of the Lagos State with increasing production of about 870,000 tonnes of plastic garbage within the environment on an annual basis, there is a need to re-assess the causes of rising plastic waste and how the plastic waste pollution can be effectively managed in Lagos State, Nigeria. This will contribute to the existing body of knowledge.

2.6 Chapter Summary

This chapter reviewed extensively the existing studies on the management of plastic waste in different countries of the world. Specifically, the operations and causes of ineffective activities of LAWMA in Lagos State, Nigeria were reviewed. The chapter provides conceptual and empirical evidence on the challenges of plastic waste management in Nigeria and employs theoretical postulations to explain the behaviour of the government and private sector (individuals and companies) towards the environmental challenges. Hence, the next chapter explains the research methods. It presents how the study follows systematic techniques to collate and sort data, as well as the instrument of data analysis to validate the existing findings of the previous research.

Chapter 3

METHODOLOGY

3.0 Chapter Overview

This study adopts the research onion model developed by Saunders et al in 2007 (reviewed in 2019 and 2023). The framework includes the research philosophical assumption, approach, strategy, methodological choice, technique of data collection and analysis. It also provides information on the sample and sampling procedure, technique of data collection, analytical technique, limitation of the study as well as ethical consideration. Finally, chapter summary was also highlighted in this chapter.

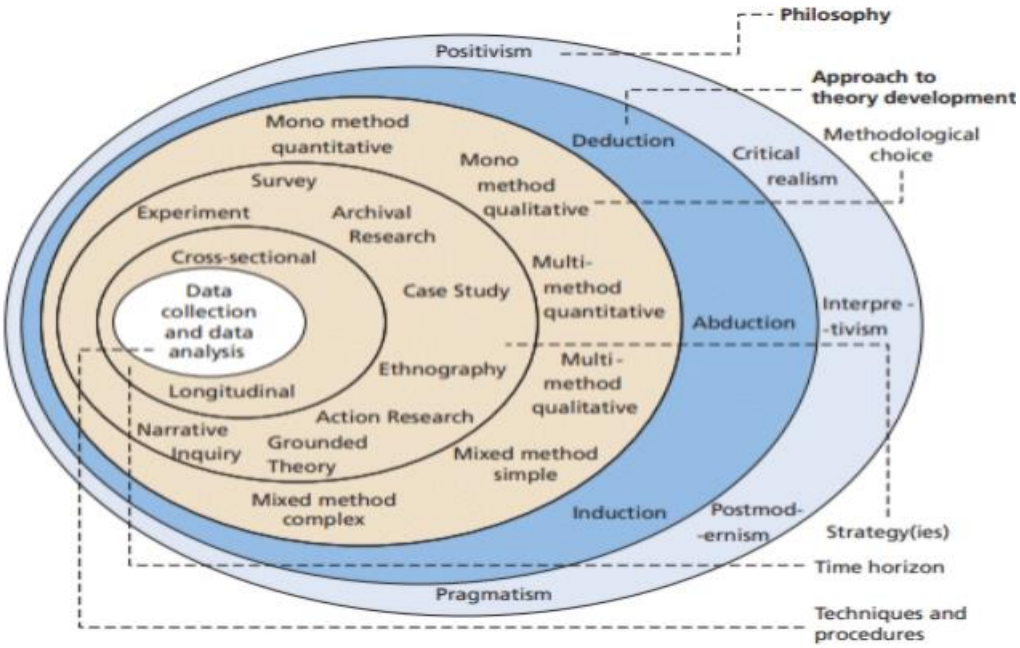


Figure 3.1: Research Onion Model adapted from Saunders et al (2019)

3.1 Research philosophy

Research philosophy is a set of presumptions and beliefs on the understanding of nature of reality (Saunder et al, 2019). It also seeks to make ontological and epistemological assumptions while evaluating the nature of reality. While objectivism or constructivism is used to investigate ontology (nature of reality), positivism, interpretivism, or pragmatism is employed to assess epistemology, which involves the assumption of knowledge of the study's area (Saunder et al, 2023).

Hence, this study employed the pragmatism epistemology assumptions. This is because pragmatism approach combined both positivist and interpretivist assumptions within the study's scope in accordance with the nature of research questions. The approach is justified on the premise that interpretivism assumption emphasizes on the research into human behaviour and action, and the positivism approach explains the disclosure of the truth of reality in a logical, systematic, and

rigorous manner. Thus, this study measures and observes human's action and the reality in a logical and methodological way to assess the challenges of mitigating plastic waste pollution in Lagos State.

3.2 Research Approach

The research approach elucidates the study's focus and goal. This approach can be inductive or deductive in nature. The deductive technique is employed in research where the goal is to examine established theories using actual data, while the inductive approach deals with the development of theories. Bell et al. (2019) pointed out that the deductive method is associated with epistemological premise, whereby the study formulates hypotheses based on accepted theoretical presumptions and subjects them to empirical validation. As a result, this study employed a deductive approach to produce empirical data that would support theories on plastic waste management and provide insight into the possible difficulties in reducing plastic waste pollution in Lagos State,

3.3 Research Design and Strategy

3.3.1 Research Design

As explained by Creswell (2009), a research design involves a plan or technique used in collecting data, analysing data and how the research questions will be answered. Saunders et al (2019) corroborate that research design helps to deal with a clear objective arising from the questions, data collation, and some ethical issues relating to the study. The research design can be of two categories, including qualitative and quantitative research design. Qualitative research design focused on comprehending complex and subjective phenomena which cannot be numerically measured. However, quantitative research is objective and numerical in nature and seeks to answer research questions. For this study, both qualitative and quantitative research design will be used because the study collected both numeral and non-numerical data from the research field. The method gives room for evaluating the process of plastic waste management and the challenges of mitigating plastic waste pollution in Lagos State.

3.3.2 Research Strategy

The methodological presumption underlying the overall study to be used is known as the research strategy. It concentrates on how the study's goals, questions and methods of collating data as well as obstacles that may occur during the data collection process (Muhaise et al. 2020). According to Saunders et al. (2019), research strategy includes survey research, experimental research, grounded theory, archival research, case studies, ethnography, and action research. In survey research, information on "what, where, how much," and "who" is gathered and analysed from people chosen as a sample from the public. While action research focuses on practical issues in real life, case studies concentrate on the investigation of a single social unit. Similarly, grounded theory seeks

to investigate the cause-and-effect relationship between two or more variables using experimental research that is inductive in nature. Hence, this study is based on a survey research strategy because it tries to explore the process of plastic waste management by understanding the challenges and possible ways of mitigating plastic waste pollution in Lagos State.

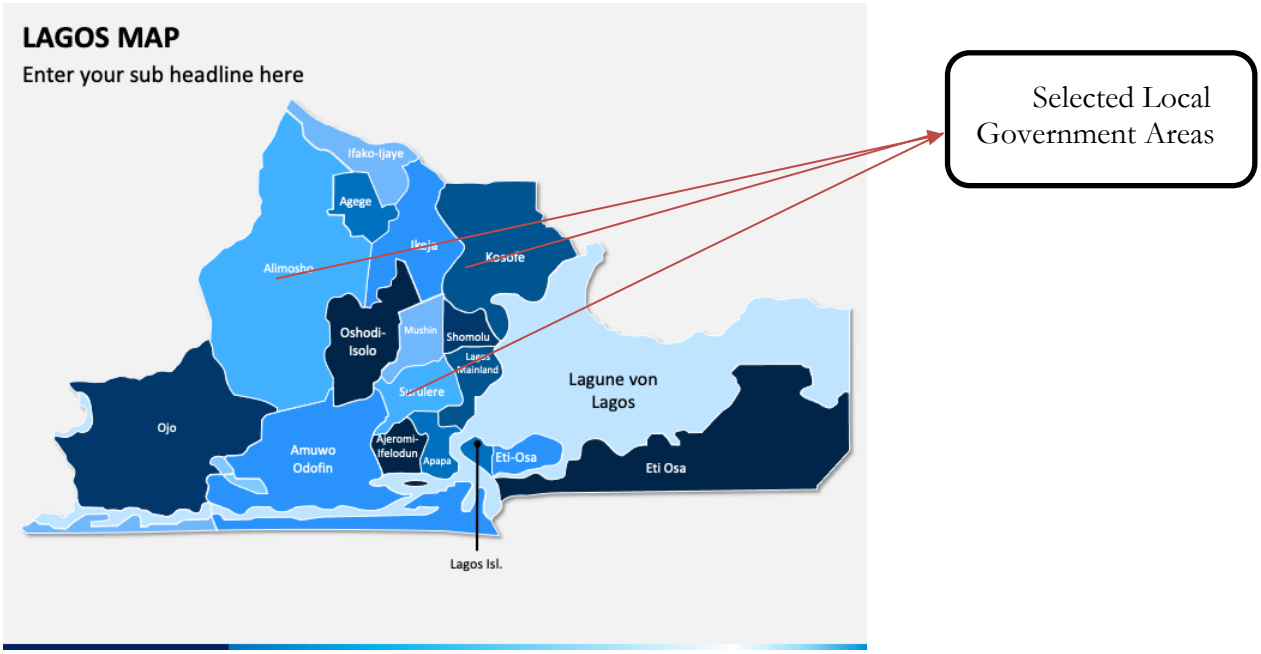
3.4 Methodological Choice

The selection of a methodology is centred on the data-gathering approach: qualitative, quantitative, or a combination of both, also known as mixed methods. According to Creswell (2013), a mixed method is one in which both quantitative and qualitative techniques are used for data gathering and analysis. A mono method, on the other hand, is based on one technique - either a qualitative or quantitative procedure for data collection and analysis. Depending on the research's philosophy, plan, and approach, both qualitative and quantitative data can be used (Saunders et al, 2019). Thus, this study employed a mixed method approach due to its involvement in gathering data via questionnaires and interview and analysing these data using statistical techniques to understand the challenges and causes of plastic waste pollution and management in Lagos State.

3.5 Time Horizon

According to Bells et al. (2019), research can be classified as cross-sectional (snapshot) or longitudinal (diary perspective) depending on when the data were collected. Cross-sectional studies gather information on a topic, item, or phenomenon all at once. It uses survey method and usually adopted to discuss the incidence of a certain phenomenon. However, longitudinal studies gather data for the study repeatedly over an extended period and have potential to examine a certain change and development. To achieve the goal of this study, a cross-sectional time horizon was used to gain snapshot of the citizens and officials of LAWMA in three local governments in Lagos State and the research was conducted from August to October 2024.

3.6 Study Area



Map 3.1: Map of Lagos State

Source: https://www.sketchbubble.com/en/presentation-lagos-map.html

The study selected is Lagos state, which was created on May 27, 1967, and the state commenced its administrative body on April 11, 1968, located in the south-western part of Nigeria. Lagos was formally the capital of Nigeria but was transferred to Abuja in December 1991. Lagos state has five administrative division, which has 20 LGs that consist of: Agege; Apapa; Alimosho; Ikeja; Ifako-Ijaye; Kosofe; Oshodi-Isola; Mushin; Shomolu; Eti-Osa; Lagos Mainland; Lagos Island; Ojo; Surulere; Ajeromi-Ifelodun; Badagry; Amumo-Odofin; Ikorodu; and Ibeju-Lekki, with Ikeja being the capital city of the state (Lagos State Government's Official website, 2024).

3.7 Sample and Sampling Procedure

Data were gathered from citizens in three sampled local government areas of which each one is selected from each senatorial district of Lagos State, including Lagos Central, Lagos East and Lagos West. The selected local governments are Surulere Local Government (Lagos Central), Kosofe Local Government (Lagos East) and Alimosho Local Government (Lagos West). The individuals targeted for this study are the residents and LAWMA officials which I hope to get a distinctive conclusion from. Since each member of the population has the same characteristics, the study uses the probability/random sampling approach. Surulere Local Government was chosen due to its housing of the most popular, busiest and crowded popular markets located there (Yaba thrift complex and tejuosho shopping complex setting due to) situated along ojuelegba road. Kosofe Local Government was chosen due to its housing of the most popular Mile 12 market, where most food items are distributed to various parts of Lagos State. Alimosho Local

Government was chosen as the largest local government in the State by population and area of coverage. The Fleet Coordinators, Waste Collection Supervisors and Sanitation Officers from LAWMA were interviewed. Nine residents were to be interviewed but the study could only get six interviews done due to the limited timeframe for this research and the unavailability of respondents. The resident's study was focused on Surulere where I was able to get more people and others from Alimosho. Four respondents from Surulere whom two are female traders, a female student and a male bank official while in Alimosho, both my respondents were male/self-employed and were above 25years of age. This study selected these set of respondents so that it can get adequate response from various perspectives. Also, 240 questionnaires were distributed across these three Local Government Areas and was shared 80questionnaires across the local governments.

In addition, there are several methods for determining sample size depending on whether the true population is known or unknown. According to Uakarn et al. (2021), the Krejcie and Morgan, Taro Yamane, Balls and Galls, and other formulars are appropriate for the studies in which the population under investigation can be determined using actual figures. Jacob Cohen, Cochran, and Samuel Green formulas, on the other hand, are the appropriate for studies in which the population under investigation is unknown. Therefore, the Cochran formula was used in this study to calculate the sample size. Uakarn et al. (2021) confirm that Cochran formula is even appropriate when it is impossible to forecast the actual. When the questionnaire is administered, the sample size based on the formula is 240 respondents, as shown below.

$$n = \frac{p(1-p)z^2}{e^2};$$

$$n = \frac{(0.1)(1-0.1)(2.58)^2}{(0.05)^2} = 240$$

Where n is the sample size; p is the population proportion (p=0.1); e is acceptable sampling error (e=0.05); z is the value at the reliability level or significance level. Reliability level of 99% or Significance level of 0.01, z=2.58

3.8 Technique of Data Collection

Depending on where the data comes from, the information gathered for a study could be primary or secondary. Primary data are those that are newly gathered by the researcher using a questionnaire, interview guide, recordings, experiments, and observation. In contrast, secondary data collection aims to gather information that has already been gathered and used in research but is still pertinent to the current study to address research concerns (Mazhar et al, 2021). Primary and secondary data are gathered for this research. Also, observational data was used in this research to complement other forms of data collection. The sampled respondents are given questionnaires to complete as the major source of data, and publications such as government reports, research reports, and journal articles provide secondary data. Using the selected Local government areas, the questionnaire was created following the study's objectives to gather data on the understanding of the challenges of mitigating plastic waste pollution in Lagos State. The questionnaire was also complemented with semi-structured interviews with the selected LAWMA official(s), to elicit information on challenges and possible methods of mitigating plastic waste pollution in Lagos State.

Each of these interviews lasted about 30- 40 minutes, it was done online via teams and whatsapp calls, and these interviews were conducted with the participant's consent for recording, taking key notes, and analyse anonymously. In collecting the data, research assistance was used in Nigeria to take study photos, travelled across selected LGAs to meet and request appointments with respondents, helped give introductory explanations as to why the study was needed. Apart from the Official Language (English Language), some interaction with the citizens (especially the market people) were done via native language such as Yoruba and Pidgin to retrieve authentic responses on the research topic. (All languages can be spoken by the author).

3.9 Method of Data Analysis

The method of data analysis varies depending on the kind of information gathered for the study, which in turn depends on the research design, philosophy, strategy, and technique. Statistical methods of descriptive or inferential statistics are often used to analyse quantitative research (numerical data analysis). However, some techniques such as content analysis, grounded theory, thematic analysis, systematic review, and narrative analysis are usually employed when dealing with qualitative research (Gravetter et al, 2019). Because quantitative data will be collected via questionnaires, this research employs descriptive and inferential statistical techniques. The use of descriptive statistical techniques (such as frequency distribution and percentage) aids in the researcher's simplification, organization, and summarisation of study data. It will display the degree to which respondents agreed with the questions raised in the research. Similarly, inferential statistics will support researchers in extrapolating meaning from the response pattern found in the data set. This includes, among other things, regression analysis, correlation analysis, analysis of variance, T-test, Z-test, Chi-Square, and other parametric and non-parametric tests. Hence, this study basically used mean, frequency distribution, and percentage.

3.10 Validity and Reliability of the Research Instrument

The reliability and validity tests of an instrument is very important when employing both qualitative and quantitative study. While the validity test assesses whether the findings can withstand examination and satisfy the predetermined objectives of the study, reliability test involves data testing, data stability and consistency (Golfashani, 2015). The research instrument which must undergo validity and reliability tests. On the other hand, the Cronbach Alpha reliability test was used to examine the consistency and utility of the questionnaire's components in gauging the challenges and possible ways of mitigating plastic waste pollution in Lagos State, Nigeria. As presented by Ursachi, Horodnic, and Zait, (2015), the acceptable criterion for reliability tests is 0.6 and above for an effective and relevant research.

3.11 Limitation of the Study

This study was limited by time and not been able to reach the initial targeted personnels from LAWMA for interviews due to repeated cancellation of appointments which resulted into running interviews with lower position personnels as stated. During the interviews, it was observed that some questions were ignored professionally, and some information(s) were not given by LAWMA officials. Hence, this could limit the richness of data collected. Finally, switching between languages during interviews just to ensure clarity and getting hold of people to fill the questionnaire during market days was a bit challenging. I was able to navigate through any development and solved it appropriately. Most of these limitations were easily observed due to the condition of the hectic environment in Lagos State.

3.12 Positionality

Growing up in an educated middle-class family in Lagos made me unconsciously treat waste and the environment slightly different. I can say that the case of plastic waste pollution has been a struggle over the years, leaving the city in a wreck of environmental disdain. I have constantly witnessed the havoc people constitute by trashing their used plastic items on the streets, illegally dumping unsegregated waste in the drains and canals, blocking the water ways. These acts may be attributed to lack of awareness of the people, class, education, financial status, lack of improper waste management actions from the agency in charge and the state government. In the past, I have been guilty of trashing used plastic items on the street couple of times but living in a clean, effective waste managed environment in Benin Republic for some years where you cannot randomly trash things on the road and every day, there was a sweeping machine to clean the road. This cautioned my social habit from living in my home country and when I returned. I observed that most uneducated and some educated people living in Lagos do not understand the detriment of an environment polluted with plastic. I was almost swept away by the overflow of a clogged canal in 2008 on my way back from school, but I never knew the cause because I was young and uninformed. In the past, discussing with people on their perspective on "why Lagos has never been free of plastic waste" always came with the response of "it is the government's problem to deal with".

Living in the Netherlands in past months has taught me a lot about individual waste disposal practices that I did not experience back home, and I have come to value the importance of living in a less evident waste-polluted environment, recognizing the connection between human behaviour, how improper waste management may contribute to this issue, and the intensity of the environmental impacts. My research stands to understand lack of infrastructural facilities shaping plastic disposal patterns, management patterns, state intervention, and plastic waste management practices in Lagos.

I addressed this study from an insider context and will be applying my acquired knowledge during my master's program on how human activities may contribute to environmental degradation and the need for an immediate sustainable attention. I approached this issue from a place of acquired knowledge and some of my study participants did not have that knowledge or understanding the depth of this research. I was committed to understanding the voices and experiences of the people of the selected local governments, identifying their ideas in navigating, and mitigating the

environmental challenges caused by plastic waste pollution. Nonetheless, I approached this research without any bias, welcomed and accepted different perspectives that emerged from this research by engaging in an instinctive conversation with participants.

3.13 Ethical Consideration

There are common codes of ethics in research. According to Kumar (2011), each moral conundrum that arises throughout the research process serves as the foundation for ethical behaviour since certain behaviours in research, regardless of the profession, are deemed immoral. Such activity, which harms people, misuses information, violates confidentiality, and introduces bias, needs to be avoided in all research processes. I took these ethical considerations into account during this research. The participants' informed consent was requested, and I ensure to handle the information that respondents supply with confidentiality and will only be used for this research. After the study is finished, the data will be deleted following the Data Protection Act (Adeoti, 2023). There will be no personal information, such as name, email address, phone number, contact information, or related data shared. When gathering data and in the analysis, I will not be biased or manipulate the outcome of the study. That is, the results will be reported, and recommendation will be provided in line with the findings.

3.13 Chapter Summary

This chapter explained the research onion model which was developed by Saunders et al in 2007. Thus, the research is based on the pragmatism epistemology philosophy because of the human behaviour and the reality of the challenges of reducing plastic waste pollution in Lagos State. The research design, population, sample and sampling technique, strategy and approach to the study were extensively discussed in this chapter. It also explains the methodology choice, time horizon, source of data collection and technique of data analysis.

Chapter 4

DATA ANALYSIS AND INTERPRETATION

4.0 Chapter Overview

This chapter presents the analysis of data collected through questionnaire administration and responses from interviews granted to sampled respondents. This section is divided in line with the goals of the research and in conjunction with the correspondent interview responses on each objective. At the end, a chapter summary was provided.

4.1 Response Rate and Analysis

It is essential to state that interviews were granted to officials of LAWMA within three Local Government Areas, six residents and questionnaires were administered to the citizens and as a result, Two Hundred and Forty questionnaires were distributed to the respondents. However, two hundred and twenty-two questionnaires were filled and retrieved. Twelve questionnaires were not returned while six responses were considered invalid during data sorting. The statistics are presented as follows:

Questionnaire	**Rate**	**Percentage**
Returned	222	92.5
Unreturned	12	5
Invalid	6	2.5
	240	**100**

Table 4.1 Response Rate and Analysis

Source: Author Compilation from Field Survey, (09/2024)

Thus, only two hundred and twenty-two (222) responses (representing 92.5%) were analysed using Statistical Package for Social Sciences (SPSS).

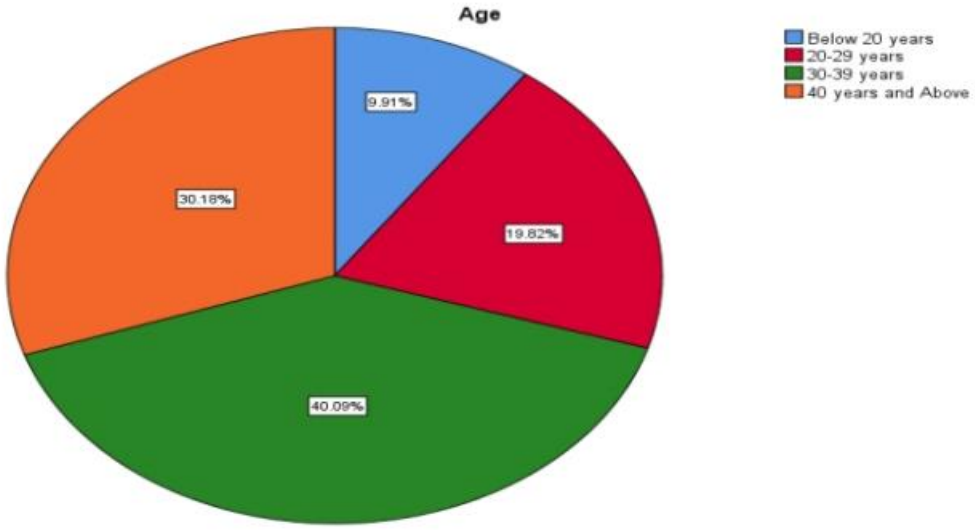
4.2 Socio-Demographic Characteristics of the Respondent

This section provides the analysis of socio-demographic features of the sampled respondents, to reveal their qualities of responses to the questions to achieve the objectives of the study. These are presented through bar charts, to show pictorial analysis of the respondents' demographics.

4.2.1 Age Bracket of the Respondents

The chart in Figure 4.1 shows the analysis of the age bracket of the sampled respondents. The result shows that respondents below the age of 20 years are 9.91 percent, respondents of 20-29 years old are 19.82 percent, respondents of 30-39 years of age are 40.09 percent while the respondents above 40 years are 31.08 percent. Thus, it can be easily inferred that most of the respondents are above 20 years of age, which give rooms for possible adequate knowledge and understanding of the study.

Figure 4.1: Pie Chart of Age Bracket of the Sampled Respondents.

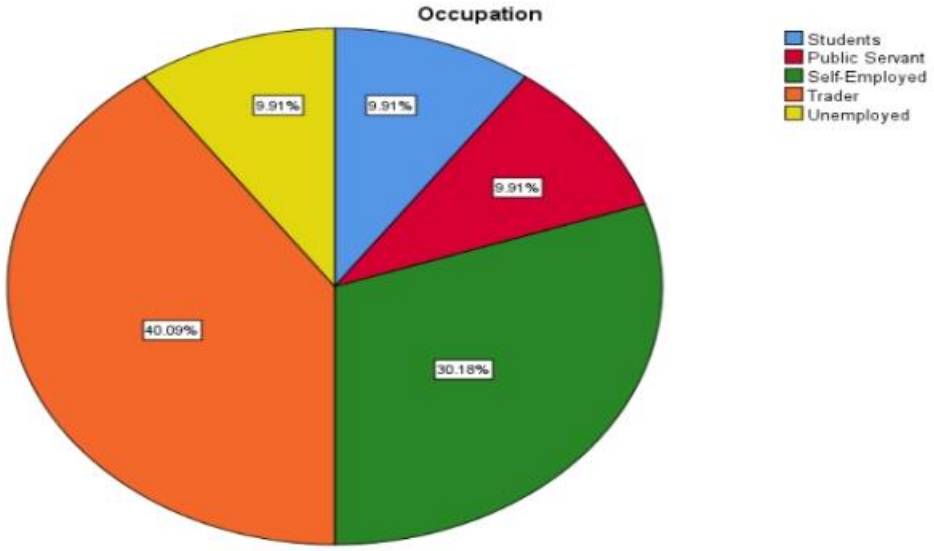


Source: Author Field Survey, (09/2024)

4.2.2 Occupation of the Sampled Respondents

The chart in Figure 4.2 shows the analysis of the occupations of the sampled respondents. The result on the chart shows that respondents who are students constitute 9.91 percent of the total respondents, public servants constitute 9.91 percent, self-employed constitutes 30.18 percent, traders entail 40.09 percent while unemployed persons are 9.91 percent. The result indicates that most of the respondents are traders and self-employed involve in trading and business, which shows that diverse opinions will be shared for this study.

Figure 4.2: Pie Chart Showing Occupation of the Respondents

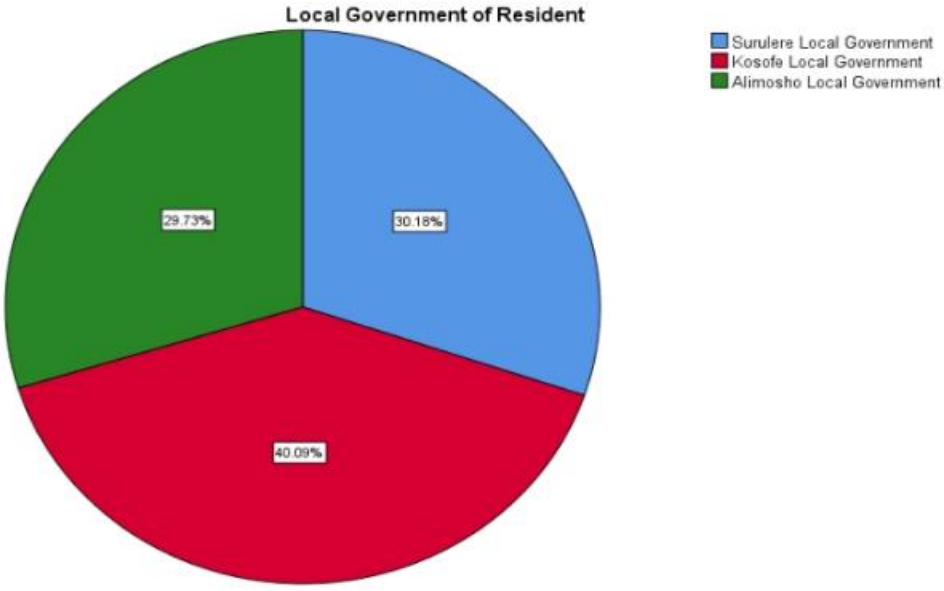


Source: Author Field Survey, (09/2024)

4.2.3 Local Government of Resident for Respondents

The chart in Figure 4.3 shows the analysis of the sampled residents of local government. The result shows that the residents of Surulere local government are 30.18 percent of the total respondents, residents of Kosofe local government are 40.09 percent while residents of Alimosho local government are 29.73 percent. Thus, the result revealed that the respondents are evenly distributed across sampled local governments, which gives a fair observation of the challenges of mitigating plastic waste pollution in Lagos.

Figure 4.3: Pie Chart of Local Government of Residence of Respondents



Source: Author Field Survey, (09/2024)

4.3 Causes of Ineffectiveness of LAWMA Practices in Mitigating Plastics Waste Pollution in Lagos State

Analysis of interview responses provided convergent and divergent views on the causes of the ineffectiveness of LAWMA practices in mitigating plastic waste pollution by LAWMA in Lagos State. In the interview conducted, one official said that –

> *"Citizen's attitude to waste disposal in their places of work, at home and on the streets is a major cause of and unclean Lagos. Cleanliness starts with our personal hygiene and orientation I believe, if you can not litter your house or office, then you should express same behaviour in public places".*

Another official said that –

> *"Some residents are difficult to manage, they find it convenient to dump trash in places that has a stationed signpost of* ***no dumping of trash here****, yet they do because it is free for them and they make sure they perpetrate this act at night when they can not be arrested".*

This extract affirms that one of the causes of ineffectiveness of LAWMA towards reducing plastic waste pollution in Lagos State is the attitude of citizens toward waste disposal and orientation even with signpost warnings. The interview further discovered that efforts of LAWMA in cleaning Lagos State will go unnoticed if the attitude of citizens contradicts the objectives of the agency. However, I agree with this extraction because these illegal dumping appear to be a convenient practice for Lagosians and I want to say that environmental sanctions need to be more effective for offenders.

In another extraction, it was revealed that

"the *government provided bin(s) for general waste and recyclable items but some of them get stolen by some residents in some areas".*

Having lived in Lagos, I must say I did not find this extraction surprising. However, if situations like this happen, then the agency should probably improve on the installation of these bins and make them uneasy to move. Also, lack of awareness and social construct encourage these attitudes in some parts of Lagos which are mostly the marginalized areas.

A resident stated that-

> *"I pay Lawma 3,500 naira monthly for waste collection but, I sometimes resort to informal waste collectors (Aboki) due to the inconsistency of collection I experience from Lawma regularly. However, I do not know the destination of the waste, but I do it anyway to save myself from all the mess of unsegregated waste. The agency even fails on delivery of purchases, nothing works in my opinion with Lawma, even in the country. Two years ago, I lived in a compound with eight flats which most of the residents were with families. We purchased the Blue Bin from Lawma because you will be fined if caught using the unofficial bin outside your residence, but we resorted into using an alternative bin (drum) purchased from the market because the delivery of the Blue Bin took about fourteen months before it was delivered. Tell me, how can we keep our compound clean or even separate our waste? I understand the implications of all types of waste, especially that of plastic. It is the major source of flood in Lagos but how is Lawma helping me do the right thing?".*

This extract revealed that LAWMA are not regular with the collection of waste from the residence despite receiving payment for the services, inefficiency of the blue bin distribution department is also hindering the willingness of the citizens to do the right thing. An agency that never fails to get remitted should not fail to deliver, but many have lost interest in the system because of the corruption in the operations of LAWMA and the state. Stevenson (2021) expressed that all political leaders, agencies and actors should be subjected to a public scrutiny on environmental governance. LAWMA claim to be ineffective with their environmental objectives due to the citizens attitudes, but they have refused to check their deficiencies in achieving these objectives.

Table 4.2: Causes of Ineffectiveness of LAWMA practices in mitigating plastic waste pollution in Lagos State.

S/N	Questions	SA	A	D	SD	Mean Value
1.	Poor waste collection and recycling infrastructure challenges the mitigation of plastic waste pollution in Lagos State.	66 (29.7%)	112 (50.5%)	22 (9.9%)	22 (9.9%)	3.00
2.	Irregular environmental sanitation causes plastic waste pollution in Lagos State.	67 (30.2%)	45 (20.3%)	66 (29.7%)	44 (19.8%)	2.61
3.	Popular usage of single-use plastic products such products such as plastic water, and plastic drinks, among others, hinders the mitigation of plastic waste pollution in Lagos State.	66 (29.7%)	111 (50.0%)	23 (10.4%)	22 (9.9%)	2.99
4.	Improper disposal of plastic waste in different areas affects the mitigation processes of plastic waste pollution in Lagos State.	45 (20.3%)	133 (59.9%)	44 (19.8%)	- -	3.01

Source: Author Field Survey, (09/2024)

Keys: SA: -Strongly Agreed; A: -Agreed; SD: - Strongly Disagreed and D: - Disagreed

This section provided the above result analysis of the data collected on the causes of the ineffectiveness of LAWMA practices in mitigating plastic waste pollution in Lagos State. Four assertions were raised to achieve the objective, on a four likert scale with an average mean value of 2.50. This means that any assertion that is above the average mean score causes ineffectiveness, and otherwise not. The result of the first assertion revealed that 29.7% of the sampled respondents strongly agreed, 50.5% agreed, 9.9% while only 9.9% of the respondents strongly disagreed with

the statement. The assertion has a mean value of 3.00, higher than the average mean of 2.50, which means that poor waste collection and recycling infrastructure is a cause of ineffectiveness in LAWMA practices to mitigate plastic waste pollution in Lagos State. On the second assertion, it was revealed that 30.2% of the sampled respondents strongly agreed, 20.3% agreed, 29.7% disagreed while 19.8% disagreed with the second statement. The assertion has a mean value of 2.61, higher than the average mean of 2.50, which means that irregular environmental sanitation is a cause of ineffectiveness in LAWMA practices to mitigate plastic waste pollution in Lagos State.

In the same vein, it was discovered 29.7% of the sampled respondents strongly agreed with the third statement, 50.0% agreed, 10.4% disagreed while 9.9% strongly disagreed with the third question. The assertion has a mean value of 2.99, higher than the average mean of 2.50, which means that popular usage of single-use plastic products such as plastic water, and plastic drink, among others is a cause of ineffectiveness in LAWMA practices to mitigate plastic waste pollution in Lagos State. Lastly, it was revealed that 20.3% of the sampled respondents strongly agreed with the fourth question, 59.9% agreed while 19.8% disagreed with the statement. The assertion has a mean value of 3.01, higher than the average mean of 2.50, which implies that improper disposal of plastic waste in different areas is a cause of ineffectiveness in LAWMA practices to mitigate plastic waste pollution in Lagos State.

4.4: Operational practices adopted for managing plastic waste pollution by LAWMA in Lagos State

Analysis of interview responses provided convergent and divergent views on the operational practices adopted for managing plastic waste pollution by LAWMA in Lagos State. In the interview conducted, one official said that –

> *"In Lawma, there are different practices to reduce waste pollution generally, not just plastic. But specifically on plastic, we had an initiative in 2020 called Lagos Recycle Initiative to tackle the challenge of plastic waste pollution and we also partnered with some registered private recycling agencies to make the operations easier. For other types of waste, we are already working on sensitizing the public on waste segregation by introducing the Blue Box Programme which will help abolish the previous way of containing waste".*

Another official mentioned that –

> "*A large truck called Double Dino Bin was one of the initiatives by Lagos State to combat general waste pollution. It was constructed and stationed on streets, at busy areas like markets and extremely populated community to collect waste, these infrastructures are rendered for free. We are working on a periodic rehabilitation of the Olasosun landfill in Ojota, so it can accommodate different types of waste and be conducive for the people".*

This assertion revealed that the waste management authority in conjunction with the Lagos state government provided a general approach to managing waste, not focusing on plastic waste alone, as all waste causes pollution and other environmental degradation that affects the biosphere, but can we think about the havoc caused by excess plastic usage in the state, knowing that Lagos is highly populated and surrounded by water. Therefore, it is important to tackle plastic waste intensely. No doubt, some streets may have these infrastructural facilities, but the question is, how often do LAWMA ***pick up?*** The olasosun landfill has been in existence since I was a child but all

I can remember on how rehabilitation takes place is through burning. Whereas, burning is not the solution, rather ***it is solving one problem to incur another***.

In another interview, a LAWMA official said that –

> *"Sanitation day was implemented to help achieve a clean Lagos, but some people will rather stay at home instead of participating in this practice. It is usually difficult to get people out to partake in this community based environmental sanitation done every last Saturday of the month and a market sanitation done every Thursday of the week between 7am-10am. Most people are of the theory that whatever is related to the government should be handled only by the government or its agencies. Another shocking observation is that this sanitation is suggested to be carried out men because it sometimes involves lifting and rigorous cleaning, but women and children are more active compared to the men. Days that low turn out is experienced means that women did not show up and when men do, they rather discuss football or country issues most of the hours which limits the output of the day for cleaning. To add to this, Lawma has over 2,000 trained sweepers employed to sweep every part of Lagos. We have partnered with some private recycling agencies working in some local governments".*

This extract discovered that there is a regular environmental sanitation practices and the presence of trained sweepers across all local governments in Lagos State, as part of practices in reducing pollution caused by waste. To my understanding on environmental sanitations, I can say that it has long gone into extinction, selected days are only observed, but my direct observations as a Lagosian show that majority of the market and residential people don't turn up for this. Most people will prefer to sit home till 10am, then set out for their daily activities. This is because of the lackadaisical attitude of the agencies in charge towards the objectives of the sanitation. Kick Against Indiscipline (KIA) was mandated to work with LAWMA by supervising the campaign on Lagos CLEAN UP, to arrest and fine offenders of this practice but for years now, it seems like the mandate is not well spelt to their employees, they are now focused on offenders crossing highways without using the pedestrian flyovers and arresting people trading on unapproved market areas. In the past when KIA was active, "citizens were scared because you dare not litter illegally", it was an operation no mercy.

LAWMA Partnering with private recycling companies is probably another means to syphon money through ridiculously high taxes. Some companies really kin about eradicating plastic waste still end up working with NGOs, doing volunteering programs to clean the drains, beaches, canals and sometimes provide recycling items bin flood and malaria prone areas to ensure them a sustainable environment.

A resident stated that

"There is a monthly environmental sanitation that prevents movement of persons and vehicles, the development was very effective in the past and I can relate that effectiveness with the level of commitment with the then Lagos State governor between 2007-2015. Lagos was reasonably better with waste management compared to this present governor. All he does is create initiatives that only remains on the table and rarely executed. Some are executed but you maybe find them in local government of interest. Most of the residential areas here in Surulere come together with their various community development associations chairman (CDA) with the idea to ensure a clean environment. We perform these clean ups in gutters (drains), sometimes we collectively go to unblock the canals, but the concern is and has always been that Lawma will not come to pick up the trash we remove, which they end up returning into where it was taken".

Environmental sanitation practices exist for residence and are usually conducted once a month in Lagos State, but it is not effective due to several incompetence. Additionally, the agency needs to do better, and the government need to check if LAWMA is performing is designated tasks to the public. It shows that people now gather voluntarily by CDAs interest to clean the environment, but they are discouraged by the unfunctional attitudes of LAWMA. Thankfully, the involvement of some plastic waste development NGOs is beginning to teach the public on the implications of illegal plastic waste disposal, engaging in **pick the trash campaign on the beach**, creating awareness, and others. Media houses are doing great with discussions on how people need to treat their plastic waste and how they can make money from it.

Table 4.3: Operational practices adopted for managing plastic waste pollution by LAWMA

S/N	Questions	SA	A	D	SD	Mean Value
1	Removal of illegal structures obstructing the free flow of water/rivers, canals, and drains by LAWMA is adopted for managing plastic waste pollution.	22 (9.9%)	133 (59.9%)	45 (20.3%)	22 (9.9%)	2.70
2	A sensitization program on proper disposal of waste across Lagos State by LAWMA is adopted for managing plastic waste pollution.	44 (19.8%)	111 (50.0%)	22 (9.9%)	45 (20.3%)	2.69
3	Partnering with private businesses or organizations to provide waste disposal facilities for proper waste disposal is adopted for managing plastic waste pollution by LAWMA.	22 (9.9%)	132 (59.5%)	22 (9.9%)	46 (20.7%)	2.59

4	Liaising with security agencies for the arrest of offenders of indiscriminate waste disposal in Lagos State is adopted for managing plastic waste pollution by LAWMA.	45 (20.3%)	111 (50.0%)	44 (19.8%)	22 (9.9%)	2.81
5	Certifying business premises and markets on environmental law compliance in Lagos State is adopted for managing plastic waste pollution by LAWMA in Lagos State.	89 (40.1%)	89 (40.1%)	22 (9.9%)	22 (9.9%)	3.10

Source: Author Field Survey, (09/2024)

Keys: SA:-Strongly Agreed; A:-Agreed; SD:- Strongly Disagreed and D:- Disagreed

This section provided the above result analysis of the data collected on the operational practices adopted for managing plastic waste pollution by LAWMA in Lagos State. Five assertions were raised to achieve the objective, on a four likert scale with an average mean value of 2.0. This means that any assertion that is above the average mean score is operational practice, but otherwise it is not. The results of first statement shows that 9.9% of the sampled respondents strongly agreed, 59.9% agreed, 20.3% disagreed while 9.9% with the assertion. The assertion has a mean value of 2.70, higher than the average mean of 2.0, which means that the removal of illegal structures obstructing the free flow of water/rivers, canals, and drains by LAWMA is adopted for managing plastic waste pollution in Lagos State. As regards the second assertion, it was discovered that 19.8% of the sampled respondents strongly agreed, 50% agreed, 9.9% disagreed while only 20.3% strongly disagreed with the statement. The assertion has a mean value of 2.69, higher than the average mean of 2.0, which means that a sensitization program on proper disposal of waste across Lagos State by LAWMA is adopted for managing plastic waste pollution.

Similarly, only 9.9% of the sampled respondents strongly agreed to the third question raised, 59.5% agreed, 9.9% disagreed while 20.7% strongly disagreed with the assertion. The assertion has a mean value of 2.59 which is greater than the average mean of 2, which means that partnering with private businesses or organizations to provide waste disposal facilities for proper waste disposal is adopted for managing plastic waste pollution by LAWMA. On the fourth assertion, 20.3% of the sampled respondents strongly agreed, 50% agreed, 19.8% disagreed while 9.9% strongly disagreed with the statement. The assertion has a mean value of 2.81 greater than the average mean of 2.0, which means that liaising with security agencies for the arrest of offenders of improper waste disposal in Lagos State is adopted for managing plastic waste pollution by LAWMA. Lastly, 20.3% of the sampled respondents strongly agreed to the fifth question raised, 50% agreed, 19.8% disagreed while 9.9% strongly disagreed with the statement. The assertion has a mean value of 3.10 exceeds the average mean of 2.0, which means that certifying business premises and markets on environmental law compliance in Lagos State is adopted for managing plastic waste pollution by LAWMA.

4.5 Possible Solutions to Ineffectiveness of LAWMA Practices in Mitigating Plastic Waste Pollution in Lagos State.

Analysis of interview responses provided convergent and divergent views on the possible solutions to the ineffectiveness of LAWMA practices in mitigating plastic waste pollution in Lagos State. In the interview conducted, an official of LAWMA stated that-

> *"More stringent punishment and fines on wrong disposal of waste, especially that of illegal disposal of plastic waste on the streets will be proposed and executed adequately".*

This affirms that there are penalties attached to this problem that are not effective enough and it prevents residents from adhering to rules of indiscriminate waste disposal. Therefore, it is imperative that there is stringent punishment to ensure a cleaner Lagos State.

It was also revealed by an official that-

> *"Government and Lawma can not do everything to ensure an effective waste management alone, especially when it comes to the issue of plastic waste, it involves everybody, particularly the people using it. Therefore, the individuals, private businesses, producers of plastics should support the objectives of Lawma".*

This quote affirms that the solution to ineffective plastic waste pollution can be through private businesses, producers, individual users and groups in providing facilities that will aid proper waste disposal in markets, offices, streets and all parts of Lagos. LAWMA should invest more on infrastructural facilities mainly on the streets, this may assist in a proper waste disposal and collection which will enhance the environmental cleanliness of Lagos State. In the same vein, the analysis of interview responses from some residents was quoted as:

> *"Lawma need better facilities, especially a sound working waste collection vehicles and regular payment of staff(s), this will aid frequent waste collection. A friend of mine works as a driver in Lawma and they had to go on strike to get their salary paid. Corruption leads to cheap labour which affects the output of operations".*

Another resident stated that –

> *"Everything should follow the circular economy of reuse, reproduce, recycle, reduce and recover, which can be beneficial to ensure a sustainable environment in Lagos. Also, the fact that we are laser focus on the usage of plastic items for almost everything is ridiculous. I was able to navigate through my excess use of plastic bottled water by switching to the use of dispenser tanks, which is more sustainable and even economical. All I do when it finishes is exchange the empty tank with a refilled one. This is how to practice* ***reuse****. Bokku supermarket has an amazing initiative of refusing to give free plastic bags to their customers after a purchase, but Lagosians are frowning against the idea because it is not convenient for them".*

This revealed that most vehicles used by LAWMA for waste collection lacks proper mechanical maintenance and sometimes breakdown on the road. It also reveals that the Lagos state government need to improve on the allocation of funds to LAWMA in other to ensure the adequate payment of staff(s) to make them more efficient.

The idea of circular economy will make a difference in the case of Lagos and the need to reduce the production of plastic items should be reviewed. The policy of not giving free plastic bags by Bokku supermarket would have been disagreed by me if I was still in my home country.

Lagos has supermarkets with numerous branches all over, so we can imagine the number of plastic bags that is disposed daily. When plastic bags are purchased, it will train people on how to reuse their plastics bags. Government should encourage the Bokku supermarket idea and incorporate it into the system for other supermarkets.

Another resident stated that –

"The government need to do better by finding a solution to the popular landfill in ojota, for a landfill to be in the centre of a major busy road is wrong in my opinion, but if it must be there, make it conducive. The smell from the landfill is unbearable especially during the raining seasons. The landfill is noy well regulated, most of these guys from the north that are homeless use the landfill as their defecating zone".

The government and LAWMA need to find a regulatory method to olasosun landfill. When it was created, the industrial civilization and population of Lagos was not what it is now. Therefore, the amount of waste the landfill takes is triple the size it takes two decades ago. For a better waste management, the olasosun landfill need to be technically reconstructed, managed or evacuated to a more secluded area that is out of sight.

Table 4.4: Possible Solutions to Ineffectiveness of LAWMA practices in mitigating plastic waste pollution in Lagos State.

S/N	Questions	SA	A	D	SD	Mean Value
1.	Investing in waste collection and recycling infrastructure is a solution to practices mitigating plastic waste Pollution in Lagos State	89 (40.1%)	88 (39.6%)	23 (10.4%)	22 (9.9%)	3.09
2.	Media program and special education on proper waste disposal is a solution to practices mitigating plastic waste Pollution in Lagos State	45 (20.3%)	111 (50.0%)	44 (19.8%)	22 (9.9%)	2.81
3.	Advocating on avoiding products with excess plastic packaging is a solution to practices mitigating plastic waste Pollution in Lagos State	45 (20.3%)	88 (39.6%)	44 (19.8%)	45 (20.3%)	2.60

4.	Advocating for using plastic packages that will be re-used is a solution to the processes of mitigating plastic waste Pollution in Lagos State	67 (30.2%)	89 (40.1%)	44 (19.8%)	22 (9.9%)	2.91
5.	Mandatory regular environmental sanitation including beach/river, canals, and drains cleanup is a solution to practices of mitigating plastic waste Pollution in Lagos State	22 (9.9%)	133 (59.9%)	45 (20.3%)	22 (9.9%)	2.69

Source: Field Survey, 2024

Keys: SA:-Strongly Agreed; A:-Agreed; SD:- Strongly Disagreed and D:- Disagreed

This section provided the above result analysis of the data collected to investigate the possible solutions to the ineffectiveness of LAWMA practices in mitigating plastic waste pollution in Lagos State. Five assertions were raised to achieve the objective, on a four Likert scale with an average mean value of 2.0. This means that any assertion that is above the average mean score is a possible solution, and otherwise it is not. The result of the first assertion indicates that 40.1% of the sampled respondents strongly agreed, 39.6% agreed, 10.4% disagreed while 9.9% strongly disagreed with the statement. The assertion has a mean value of 3.09, higher than the average mean of 2.0, which means that investing in waste collection and recycling infrastructure is a solution to mitigate plastic waste pollution in Lagos State. The analysis of second question shows that 20.3% of the sampled respondents strongly agreed and 50% agreed. However, 19.8% disagreed and 9.9% strongly disagreed with the statement. The assertion has a mean value of 2.81, higher than the average mean of 2.0, which means that media programs and special education on proper waste disposal a solution to practices of mitigating plastic waste Pollution in Lagos State.

In the same vein, it was discovered that 20.3% of the sampled respondents strongly agreed with the third assertion, 39.6% agreed, 19.8% disagreed while 20.3% of the respondents strongly disagreed with the statement. The assertion has a mean value of 2.60 which exceeds the average mean of 2.0, implying that advocating for avoiding products with excess plastic packaging is a solution to mitigating plastic waste Pollution in Lagos State. It was also found that 30.2% of the sampled respondents strongly agreed with the fourth question, 59.9% agreed, 20.3% disagreed while 9.9% strongly disagreed with the assertion. Hence, the assertion has a mean value of 2.91 which is greater than the average mean of 2.0. This implies that advocating for using plastic packages that will be re-used is solution to mitigating plastic waste Pollution in Lagos State. Finally, it was revealed that 9.9% of the sampled respondents strongly agreed with the fifth question raised, 59.9% agreed, 20.3% disagreed while 9.9% of the participants strongly disagreed with the statement. The assertion has a mean value of 2.69 is higher than the average mean of 2.0. This means

that mandatory regular environmental sanitation including beach/river, canals and drainage cleanup is one of the solutions to mitigating plastic waste Pollution in Lagos State.

4.6 Attitude of Individuals towards Plastic Waste Disposal Contributing to Environmental Degradation in Lagos State.

Analysis of interview responses provided convergent and divergent views on the attitude of individuals towards plastic waste disposal contributing to environmental degradation in Lagos State. In the interview conducted, a resident said that – "In the interview conducted, an official of LAWMA stated that-

> *"Improper waste disposal on the street, purchasing of bottled drinks and water in traffic are common attitudes of Lagosians that majorly cause plastic waste pollution. The Lagos State government have made several efforts to stop the selling of plastic bottled drinks in traffic just to stop drains, canals from been blocked, some sellers were even arrested when the policy was made but individuals still do not adjust. We have different awareness signpost on* ***why you should not litter*** *but people still disobey".*

This affirms the attitude of residents towards indiscriminate disposal of waste is the main factor contributing to environmental pollution in Lagos and they do not obey signpost instructions/warnings.

One of the residents stated that –

> *"The idea of people dumping trash in the drains when it rains need to stop. It is understandable that some people are not enlightened, and they probably got influenced by what they see in their environment or from their parents, but it is worrisome to see educated people doing the same. The disappointment in the corrupted government and its agencies could influence people's attitude. For instance, there is preference given to people lining in Bode Thomas compared to us that live in Ijesha. I believe it boils down to class and area standards. This has discouraged majority from using Lawma and opt for aboki or dump on the street since a Lawma truck comes once every two weeks to collect waste dumped on the pedestrian".*

It was revealed that some residents In Lagos prefer informal waste disposal to paying LAWMA for waste collection because of class differentiation experienced in waste collection pattern. This practice will only add more pressure to plastic waste mismanagement because, more people live in low-income areas. Therefore, the waste generated from there will be higher than the high-income areas. Irrespective of how the agency functions, it is important for us to know that whatever we give to the environment, it gives back, and community development can also help in terms of influencing the public rightly.

Another resident said that –

"As a single mother and a trader, I can not afford to buy Lawma bin that cost about 37,000 naira or even pay the monthly collection fee of 30,000 naira for a non-functional purpose, it is expensive for me. The government just fix practices to things without considering we the mercies. They should consider reducing the prices of the collection fee and probably give the Lawma bins for free. I use a small sac to keep my waste and trash them on the road at night or I send my son to avoid complains from some busybody (good people). The system is not helping at all; they are all thieves, and they feed on we the people. In my marketplace, I pay the market association for cleaning daily, but they still expect me to come clean on Thursdays. If things can be done correctly, maybe provide us with the big trucks (Double Dino Bin) for us to dump our waste, and it is collected weekly, then I may follow the idea of keeping Lagos clean. At least, I try reusing the plastic bottles I get from my neighbours for my groundnut and palm oil business, and I take some for recycling to get a token".

With this extraction, it is obvious that the prices of the blue bin and collection fees are ridiculously expensive, and it cannot be afforded by some certain people in the state. It also shows the reason why a lot of market people do not partake in the sanitation anymore. It is disheartening to see that a lot of individuals finds satisfaction in doing the wrong things at the expense of the safety of the ecosystem. Our daily actions are raising climatic issues that requires immediate attentions.

Table 4.5: Attitude of individuals towards plastic waste disposal contributing to environmental degradation in Lagos State.

S/N	Questions	SA	A	D	SD	Mean Value
1	Non-setting Up of waste bins at homes and workplaces, and lack of self-awareness of environmental issues by individuals are contributing to environmental degradation in Lagos State.	66 (29.7%)	110 (49.5%)	23 (10.4%)	23 (10.4%)	2.99
2	Not correcting oneself, neighbours or colleagues at the place of work on improper waste disposal is contributing to environmental degradation in Lagos State.	22 (9.9%)	110 (49.5%)	67 (30.2%)	23 (10.4%)	2.59
3	Not reusing Plastic storage containers, plastic bags and Plastic jars is contributing to environmental degradation in Lagos State.	67 (30.2%)	44 (19.8%)	88 (39.6%)	23 (10.4%)	2.69

4	Non-avoidance of single-use food and drink plastic containers and utensils is contributing to environmental degradation in Lagos State.	66 (29.7%)	89 (40.1%)	45 (20.3%)	22 (9.9%)	2.89
5	Indiscriminate disposal of used plastic bottled drinks or water in public buses, homes and streets is contributing to environmental degradation in Lagos State.	132 (59.5%)	45 (20.3%)	23 (10.4%)	22 (9.9%)	3.29

Source: Author Field Survey, (09/2024)

Keys: SA:-Strongly Agreed; A:-Agreed; SD:- Strongly Disagreed and D:- Disagreed

This section provided the above result analysis of the data collected to analyse the attitude of individuals towards plastic waste disposal contribution to environmental degradation in Lagos State. Five assertions were raised to achieve the objective, on a four Likert scale with an average mean value of 2.0. This implies that any assertion that exceeds the average mean score is an attitude of individuals toward plastic waste disposal, and otherwise is not. The first assertion shows the result of 29.7% of the sampled respondents who strongly agreed with the question, 49.5% agreed, 10.4% disagreed while 10.4% strongly disagreed with the statement. The assertion has a mean value of 2.99, higher than the average mean of 2.0, which means that the non-setting up of waste bins at homes and workplaces by individuals is contributing to environmental degradation in Lagos State. As regards the second statement, it was found that 9.9% of the sampled respondents strongly agreed, 49.5% agreed, 30.2% disagreed while 10.4% strongly disagreed with the assertion. The assertion has a mean value of 2.59 exceeds the average mean of 2.0. This implies that not correcting oneself, neighbours, or colleagues at the place of work on improper waste disposal is contributing to environmental degradation.

Furthermore, 30.2% of the sampled respondents strongly agreed with the third assertion, 19.8% agreed, 39.6% disagreed while 10.4% strongly disagreed with the statement. The assertion has a mean value of 2.69 which is greater than 2.0 confirmed that advocating for avoiding products with excess plastic packaging is a solution to practices mitigating plastic waste Pollution in Lagos State. The result of the fourth statement indicates that 30.2% of the sampled respondents strongly agreed, 59.9% agreed, 20.3% disagreed while 9.9% strongly disagreed with the question raised. The assertion has a mean value of 2.89, higher than the average mean of 2.0, which implies that non-avoidance of single-use food and drink plastic containers and utensils is contributing to environmental degradation in Lagos State. Similarly, 59.5% of the sampled respondents strongly agreed with last assertion, 20.3% agreed, 10.4% disagreed while 9.9% strongly disagreed with the statement. The assertion has a mean value of 3.29 which exceeds average mean of 2.0 established that indiscriminate disposal of used plastic bottled drinks or water in public buses and streets is contributing to environmental degradation in Lagos State.

4.7 Chapter Summary

This chapter presented the findings and the discussion of findings done through administered questionnaire and responses from interviews by the sampled respondents. The findings were based on the objectives of the study and was discussed accordingly with the help of the study theoretical frameworks.

Chapter 5

CONCLUSION AND RECOMMENDATIONS

5.0 Chapter Overview

This chapter will give detail of conclusions from the findings of the study, based on each objective if the study. It will also provide recommendations based on the findings from this study. At the end, a chapter summary will be provided.

5.1 Conclusion

The environmental challenge, currently faced by Lagos state with plastic waste pollution may have a critical consequence on the ecosystem. With plastic pollution, the living condition of the inhabitants of this state is not sustainable. According to Calmon et al (2022), the society we live in presently is congested and the ecosystem is in total 'burn out' which emphasizes the need for us to improve on our daily with environmental damaging activities. This study focused on plastic waste management, explored the ways in which LAWMA operations and individual attitudes influenced plastic waste pollution.

The study highlighted several challenges hindering the mitigation of plastic waste pollution in Lagos as: overpopulation, urbanization, people's attitudes, inadequate waste collection practices, lack of recycling facilities, low public awareness about sustainable plastic disposal practices, corruption of the waste management agency, class differences, lack of adopting the circular system economy, lack of community participation, lack of regulations and sanctions, lack of environmental sanitation, and lack of environmental agency body supervising illegal waste disposal. The findings proved that LAWMA and the Lagos State government is in urgent need of a comprehensive approach to address these issues and shift toward a more sustainable plastic waste management system and not just treat all types of waste the same. The study stated that residents in Lagos should learn to care for their environment, be responsible for their waste and not just rest the entire duty on Lawma. One of the major plastic waste reduction tactics by the state was the ban on the use of "styrofoams" that was the cause of blocked drains and canals. The study showed that the state does not function as it is expected, and the people are still very ignorant of the implications of plastic waste pollution.

The research expressed that LAWMA is performing to some extent, but the agency needs to re-strategize their operations towards addressing the set objectives and goals to the public and the environment by introducing effective initiatives, regulate the internal operations to perform effectively, implement more effective regulations on plastic use and disposal, promote environmental awareness programmes, education and media campaigns to foster public awareness, encouraging the use of biodegradable materials, incentivizing recycling can play an important role in reducing plastic waste pollution in Lagos, partner with public-private organizations and reduce tax rates to make them work better.

5.2 Recommendations

Based on the findings of the study, the following recommendations were made.

1. Partnering with private organizations and Non-Governmental Organizations that have environmentally driven objectives should be considered to tackle plastic waste pollution.
2. Provision of incentives to producers of new products done with plastic waste should be considered and encouraged by the government.
3. The government and LAWMA should invest more on basic facilities and infrastructures that will improve plastic waste disposal and management.
4. Government should adopt recycling policy such as waste to wealth and food.
5. Ban excess production and usage of plastic items
6. There should be an independent body, overseeing the operations of LAWMA.
7. Implementing effective policies and restructuring the objectives of "KICK AGAINST INDISCIPLINE" agency.

5.3 Suggestions for Further Studies

The study suggests that further studies can focus on how public-private partnership can improve the waste management operations in Lagos State, analysis of Lagos state environmental policy and its effectiveness in waste management, citizens participation in waste management, and contributions of local government administration towards effective waste management in Lagos state. These suggestions will contribute to literatures on waste management in Nigeria.

5.4 Chapter Summary

This chapter has provided the conclusion based on the research findings of this study. It has also provided recommendations that will ameliorate the challenges of mitigating plastic waste pollution in Lagos, Nigeria. The study also suggested possible areas for further research.

Appendix 1

Interview Guide

SEMI-STRUCTURED INTERVIEW GUIDE

(LAWMA OFFICIALS)

1. What strategies are adopted for managing plastic waste pollution by LAWMA in Lagos State?
2. What are the efforts put in place by LAWMA to reduce plastic waste pollution in Lagos State?
3. What causes ineffectiveness in LAWMA practices to mitigate plastic waste pollution in Lagos State?
4. Are there challenges facing LAWMA in reducing plastic waste pollution in Lagos State?
5. What are the possible solutions to those challenges facing LAWMA in reducing plastic waste pollution in Lagos State?
6. What are the residential practices that cause hindrances to the mitigation processes of waste pollution?

SEMI-STRUCTURED INTERVIEW GUIDE FOR LGs

(FOR RESIDENTS)

SECTION B

1. To what extent do you consider the environment polluted?
2. Do you think plastic waste is a pollution that affects the environment?
3. How concerned are you about the impact of plastic waste on the environment in your area?
4. How often do you dispose of your waste?
5. What medium do you use in disposing of your waste, is it through LAWMA, the informal waste collectors, or wherever is convenient?

a. If you use LAWMA, do you feel that there are enough facilities for plastic waste disposal and how often do they collect your waste? Is the fee attached equal to the services rendered?

b. Do you think LAWMA is operating effectively in regards of eradicating the problem of plastic waste pollution?

6. Do you know about the monthly residential environmental sanitation practices?

a. Do you participate in the sanitation practices in your area, if any?

b. What are your personal practices or actions to make a positive difference in addressing plastic waste pollution?

Appendix 2

Pictures from field work

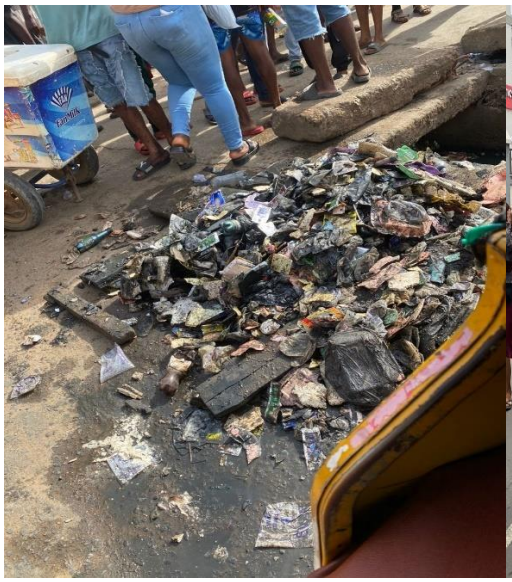


Figure 1: Uncollected cleared drains

Figure 1: Indiscriminate disposal of plastic items

Figure 3: Abandoned LAWMA collection truck

Figure 4: living behavior of individuals

Source: Research Assistant (2024)

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