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# Assessing the drivers of plastic pollution on the Lagos coastline: strategies for effective policy implementation and mitigation

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# Assessing the Drivers of Plastic Pollution on the Lagos Coastline: Strategies for Effective Policy Implementation and Mitigation.

By

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**Nigeria**

A dissertation submitted to the World Maritime University in partial fulfilment of the requirements for the award of the degree of Master of Science in Maritime Affairs

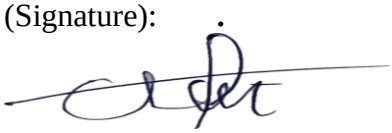
2023

# Declaration

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

(Signature): .



**.....**

(Date): **26th September 2023**

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# Abstract

**Title of Dissertation: Assessing the Drivers of Plastic Pollution on the Lagos Coastline: Strategies for Effective Policy Implementation and Mitigation.**

Degree: **Master of Science**

This dissertation examines the global issue of plastic pollution, with a particular focus on marine pollution caused by ships and the challenges faced in managing this problem. Despite regulations and conventions such as MARPOL Annex V and the EU Directive 2019/883, plastic pollution remains a significant issue, with approximately 11 million tons of plastic believed to be dumped into the ocean annually. The study highlights the role of port reception facilities (PRFs) in managing ship-generated waste and the challenges faced in their implementation, including inadequate infrastructure, financial limitations, and regulatory hurdles. The research also explores the increasing involvement of private businesses in African ports as a strategy to improve waste management. Furthermore, the study delves into the issue of Single-Use Plastics (SUPs), which constitute a major portion of plastic waste, and the policies aimed at reducing their use. The dissertation provides a comparative analysis of policies in Nigeria and China concerning the ban on single-use plastic bags and proposes effective implementation strategies for existing regulatory frameworks. The research aims to enlighten policymakers and the public about the problem of plastic pollution and suggest long-term solutions to this global issue.

Moreover, the analysis undertaken in this study draws upon a comprehensive review of secondary data derived from scholarly publications and articles authored by esteemed researchers and experts in the maritime domain. These individuals have extensively explored and proposed diverse solutions to address the pervasive problem of marine plastic litter.

**KEYWORDS**: Keywords: MARPOL Annex V, marine pollution, plastic pollution, port reception facilities (PRFs), ships, Single-Use Plastics (SUPs), waste management.

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# List of Abbreviations

1. AMCEN: African Ministerial Conference on the Environment
2. AMWN: African Marine Waste Network
3. CBD: Convention on Biological Diversity
4. EC: European Commission
5. ECOWAS: Economic Community of West African States
6. EPR: Extended Producer Responsibility
7. EU: European Union
8. FAO: Food and Agriculture Organization of the United Nations
9. GPML: Global Partnership on Marine Litter
10. IMO: International Maritime Organization
11. LASEPA: Lagos State Environmental Protection Agency
12. LAWMA: Lagos State Waste Management Authority
13. MEE: Ministry of Ecology and Environment
14. MPP: Marine Plastic Pollution
15. MSW: Municipal Solid Waste
16. NIMASA: Nigerian Maritime Administration and Safety Agency
17. NIWA: National Inland Waterways Authority
18. NMBM: Nelson Mandela Bay Municipality
19. NPA: Nigerian Ports Authority
20. OECD: Organisation for Economic Cooperation and Development
21. OSPAR: Oslo-Paris Convention for the Protection of the Marine Environment of the North-East Atlantic
22. POPs: Persistent Organic Pollutants
23. PRFs: Port Reception Facilities
24. RAPMaLi: Regional Action Plan for Marine Litter
25. Reuters: Reuters News Agency
26. SBMPL: Sea-Based Marine Plastic Litter
27. SDG: Sustainable Development Goals
28. SIDS: Small Island Developing States
29. SST: Sustainable Seas Trust
30. SUP: Single Use Plastics
31. UNEA-5: UN Environment Assembly
32. UNEP: United Nations Environment Programme
33. UNCLOS: United Nations Convention on the Law of the Sea
34. UNCTAD: United Nations Conference on Trade and Development
35. UNIDO: United Nations Industrial Development Organization
36. UNESCO: United Nations Educational, Scientific and Cultural Organization
37. WHO: World Health Organization
38. The World Bank Group: International financial institution

# CHAPTER ONE: INTRODUCTION

## 1.1. Background

Shipping has traditionally been the principal form of transportation for commodities, mail, and people across the world's seas (Schnurr & Walker, 2019). The transportation business underwent a dramatic transformation as a direct result of the advent of plastic. As a consequence of their low cost, high strength, and low weight, plastics quickly became a material of choice for a variety of purposes on board ships, particularly those related to packaging. As a result, enormous volumes of waste plastic are being thrown into the sea on a daily basis, either mistakenly or purposely. When it came to trash disposal, it was usual practice for ships to routinely dump their garbage, which often included plastics, into the water since it was an easy and inexpensive option.

As more and more plastics end up in the ocean, plastic pollution has become a serious problem globally. Plastic pollution has had far-reaching effects, negatively affecting marine life, ecological balance, and human health in certain regions, especially the coastal states (Thushari & Senevirathna, 2020). The addition of ship-based plastic pollution to the oceans and activities closely linked to shipping such as hull painting, abrasive cleaning, which produce a "cloud" of paint particles, and modern antifouling paints contain alkyd plastic polymers (Deville et al., 2023). Ships were a major contributor to the issue of marine plastic pollution for many years before the International Convention for the Prevention of Pollution from Ships, known as MARPOL 73/78 came into force.

Furthermore, it was not until the 1970s that people started to become aware of the effects that plastic pollution had on marine life and the environment in general. To tackle the issue of marine pollution, the United Nations, through the International Maritime Organization (IMO), established the MARPOL 73 convention, which focuses on preventing pollution from ships. One of its primary objectives was to mitigate and minimize the pollution generated by ships, with a special emphasis on reducing plastic waste (IMO, 2019).

In an effort to combat plastic pollution, several international organizations have taken significant steps. In November 2021, the International Maritime Organization (IMO) adopted a strategy to address marine plastic litter from ships. A few months later, in March 2022, the United Nations Environment Programme (UNEP) adopted a resolution to start work on an
international legally binding instrument to end plastic pollution. Simultaneously, discussions are underway to create a legally binding instrument under the United Nations Convention on the Law of the Sea (UNCLOS) 1982, aimed at conserving and sustainably using marine biological diversity in areas beyond national jurisdiction (UNCTAD, 2022).

## 1.2. Problem Statement

Approximately 11 million tons of plastic are believed to be dumped into the ocean annually. In 2023, the worldwide production of plastics was around 400 million tons. If we maintain the present rate of consumption, we can anticipate that production will likely double by 2040 and surge to 2.5 times the current amount by 2050 (UNCTAD, 2023).

In spite of the regulations enacted so far, there is still an issue with plastic pollution caused by ships today. On the other hand, the implementation of these conventions has resulted in a considerable cutback in the quantity of waste plastic that is dumped into our seas. MARPOL Annex V defines garbage as all types of food, domestic, and operational wastes, including plastics, cargo residues, incinerator ashes, cooking oil, fishing gear, and animal carcasses that are produced during a ship's normal operation. These items are expected to be disposed of regularly or occasionally (IMO, 2018). However, substances defined or listed in other Annexes to the Convention are excluded from this definition.

The MEPC.1/Circ.834/Rev.1 from 1 March 2018 guideline underscores the importance of port reception facilities (PRFs) in achieving the goals of the International Convention for the Prevention of Pollution from Ships (MARPOL), established in 1973 and modified in 1978 and 1997. The objective of MARPOL is to reduce and eventually eliminate intentional marine pollution caused by ships, which recent studies highlight challenges in effectively disposing of MARPOL wastes/residues on land.

In addition, EU Directive 2019/883 aims to improve waste management in European ports and reduce marine pollution by setting regulations for port reception facilities. It requires ports to provide accessible and available 24/7 reception facilities for various types of ship waste. The directive follows the "polluter pays" principle, holding ships responsible for the costs of waste disposal, discouraging illegal dumping. Member states must establish monitoring and enforcement mechanisms, with port authorities conducting inspections to ensure compliance. Implementation has led to better waste management practices, increased use of reception facilities, and reduced discharge of waste into the marine environment. The directive has had positive impacts, such as enhanced waste reception facilities in the Port of Rotterdam, promoting responsible waste management and sustainability in the maritime industry (Guidance for Ship Inspections under the Port Reception Facilities Directive. Directive (EU) 2019/883, 2023).

The implementation of port reception facilities guidelines within the member states of the International Maritime Organization (IMO) have encountered various challenges, resulting in its inadequate execution. Several factors contribute to this situation: Firstly, a notable obstacle is the lack of adequate infrastructure in many ports, particularly when it comes to managing hazardous waste. Insufficient financial

resources and a lack of technical expertise often contribute to this insufficiency (Ferronato & Torretta, 2019). For instance, a port in a developing country might lack the necessary equipment to handle and dispose of hazardous waste, such as oil or chemicals. This could be due to a lack of funding for such equipment or a lack of trained personnel to operate it. Furthermore, the ineffective management of waste will invariably lead to environmental pollution (Abdel-Shafy & Mansour, 2018). This refers to the improper handling, disposal, and treatment of various forms of solid waste, including household waste, industrial waste, waste from ships, and hazardous waste. When solid waste is mismanaged, it can have detrimental effects on the environment, including pollution of land, water, and air (Clean Management Environmental Group Inc, 2021). An example when solid waste is improperly disposed of in open dumps or landfills without adequate containment measures, it could lead to the potential contamination of soil and groundwater. Harmful substances from the waste can leach into the soil, affecting its fertility and potentially entering water sources, posing risks to human health and ecosystems. Improper incineration of solid waste can release toxic pollutants to the air, leading to air pollution and negatively impacting air quality. This can lead to respiratory complications and other health problems for nearby communities.

Secondly, financial limitations pose a significant challenge. The establishment and maintenance of suitable port reception facilities entail substantial costs. Developing countries, in particular, may struggle to allocate sufficient funds for this purpose. A small island developing state, for example, might struggle to secure the necessary funds to establish and maintain adequate port reception facilities. The high costs of such facilities, coupled with limited national budgets, can make it difficult for these countries to comply with IMO guidelines.

Thirdly, regulatory hurdles can impede the implementation process.
Plastic pollution in the ocean can occur accidentally due to incidents like ship collisions, grounding, or severe weather conditions. However, a major amount of plastic waste from ships also ends up in the sea due to preventable reasons. These include illegal disposal, mishandling of waste, insufficient onboard procedures and storage facilities, discharge of unprocessed wastewater, and the absence of ample facilities at ports for receiving plastic waste (Osmundsen, 2023). In some cases, domestic regulations may not align with the IMO guidelines, creating legal and bureaucratic barriers that hinder effective execution. In a country where domestic laws do not align with IMO guidelines, the implementation of these guidelines can be challenging. For example, if a country's laws do not recognize certain types of waste as hazardous, ports in that country might not be legally required to have facilities to handle such waste.

Ineffective enforcement can be caused by numerous factors one of which is corruption. In a country with high levels of corruption, enforcement of IMO guidelines can be problematic. For example, ship operators might be able to bribe officials to avoid using port reception facilities, leading to illegal dumping at sea.

Addressing these challenges necessitates international cooperation, sufficient funding, and the establishment of robust enforcement mechanisms. By overcoming these obstacles, the effective implementation of port reception facilities guidelines can be ensured. These guidelines are needed to optimize operations, comply with MARPOL regulations, and facilitate efficient, environmentally friendly disposal of MARPOL wastes/residues.

However, despite the above hurdles faced in the establishment of waste reception facilities in African ports, these facilities are now being used by port authorities to promote and formalize their environmental reform efforts in various ways (Barnes-Dabban, 2019). One method is to increase the participation of private businesses in port operations through concession agreements for the provision of waste reception facilities. This approach is evident in ports such as Lagos and Tema. In Lagos, the responsibility for providing waste reception facilities has been concessioned to a single private operator, African Circle, while in Tema, this responsibility has been concessioned to six different private operators. Similarly, the Port of Pointe Noire has recently granted a concession to Cortel Engineering and Environmental (CEE) Congo, although operations are not expected to start until early 2020. The increasing involvement of private businesses in African ports is based on the idea that the private sector has the necessary expertise and resources to improve operational and financial efficiency. Furthermore, much like multinational operators have contributed to environmental reforms in ports through the introduction of global environmental practices, private operators of waste reception facilities are also integrating environmental responsibilities into port operations.

In view of the foregoing, while African ports have not yet fully achieved environmental efficiency, there has been a noticeable departure from the previous norm that prevailed just over a decade ago. During that time, environmental considerations were largely absent in the planning, management, and operational approaches of these ports. However, the establishment of reception facilities in the ports has become a tangible demonstration of their commitment to environmental reform.

Research has disclosed that majority of plastics fall under the category of Single-Use Plastics (SUPs), which are designed for one-time use before discarding. These include items such as plastic bags, microbeads, straws, polystyrene items like cups and food containers, as well as sachet water wrappers (Xanthos & Walker, 2017). The plastic waste in question ranges from shopping bags, plastic sachet pure water bags, which get improperly disposed in drainage channels, or by the road side. Examining existing regulations and implementation strategies aimed at decreasing plastic waste, this thesis then proposes long-term solutions to this global concern of plastic pollution in coastal regions and from vessels

Furthermore, in an effort to combat the escalating issue of single-use plastic waste, the International Maritime Organization (IMO) came up with a strategy named "IMO strategy to tackle marine plastic litter from ships" during its 2021 Marine Environment Protection Committee (MEPC) meeting. The aim of this strategy is to reduce plastic waste from ships, including fishing vessels, and enhance waste management efficiency at port reception facilities (IMO, 2019). Despite these efforts, single-use plastic waste continues to be a significant contributor to marine pollution.

Policies have been established by various countries worldwide to address this problem. However, the lack of uniformity in these policies across different nations hinders their effective execution. The usage of the single- use plastics, such as disposable cups, utensils, and towels, remains prevalent on ships, despite the existence of policies and regulatory frameworks designed to discourage this.

In the light of the foregoing, dissertation will conduct an in-depth analysis and provide a summary of the elements that contributes globally to plastic pollution, as well as the inherent consequences of this impact. In addition, I will take a cursory look at the sources of plastic pollution in Lagos, Nigeria, the possibility for Nigerians to embrace the growing trend of alternatives to the use of single use plastic as practiced in developed countries. I will also do a comparative analysis between Nigeria and China's policies concerning single-use plastic bags ban. Additionally, I will enlighten policymakers besides the public about the problem of plastic pollution in coastal areas and bridge the gaps by proposing effective implementation strategies for the existing regulatory framework.

## 1.3 Research questions

a) What are the drivers of plastic pollution in Lagos state?
b) What is the existing regulatory approach towards single-use plastic items in Nigeria?"
c) What are the factors that will contribute to effective implementation of plastic pollution laws?

## 1.4 Aims and Objectives

**Aims**

1. To identify the key drivers of plastic pollution on the Lagos coastline.

2. To assess the current policies and regulations in place to mitigate plastic pollution in Lagos.

3. To propose practical strategies for implementing effective policies to reduce plastic pollution in Lagos.

**Objectives**

1. To review existing literature on plastic pollution and its impacts on the marine environment.

2. To conduct a survey of local communities and businesses on their plastic waste practices and attitudes towards plastic pollution.

3. To analyze the quantity of plastic found on Lagos beaches and in the water.

4. To evaluate the effectiveness of current policies and regulations aimed at reducing plastic pollution in Lagos.

5. To develop recommendations for new or improved policies and strategies for reducing plastic pollution in Lagos.

## 1.5 Significance of study

The research aims to examine the various initiative by the International Maritime Organization (IMO) to mitigate plastic pollution. In addition, the research will also highlight the gaps in the realization of the policy framework regulating plastic pollution in Nigeria and enactment of a law banning the use of plastic bags, which is one of the core contributors to plastic pollution in Nigeria. Furthermore, the research will analyze the compliance status of Nigeria with related international conventions, the gaps in the implementation process and proposing better ways to make the implementation of the laws more effective with a view to mitigating the adverse effect of plastic pollution in Nigeria.

## 1.6 Research Methodology

This research study utilized a comprehensive analytical approach with the primary objective of scrutinizing the current policies and international conventions that govern the disposal of single-use plastics from ships. The study was designed with the intention of not only analysing the prevailing trends in this area but also to address the challenges that were identified in the research questions. The data that was used in this study was sourced from a variety of resources. These included existing literature on the subject, international regulatory bodies such as the International Maritime Organization (IMO), the United Nations Environment Programme (UNEP), the Food and Agriculture Organization (FAO), and the United Nations Conference on Trade and Development (UNCTAD). Additionally, various reports, publications, and proceedings were also used as data sources, including those that pertained to relevant

maritime transport reviews. In order to analyse the data, the study employed qualitative analytical methods. The data that was ultimately selected for use in the study was chosen based on several factors. These included the relevance of the data to the study, the quality of the data, and the strength of the data in decisively determining the findings and results of the study.

## 1.7 Research Design

The foundation of my design will be constructed upon three distinct methodologies. The first of these is a qualitative approach, which will involve the utilization of secondary data sources as a tool to extract pertinent information required for this research. The second approach is an adaptive method, which will be employed in the research study. This method will involve the use of the analytical hierarchy process. The third and final approach will involve the use of information gathered from the aforementioned sources. This information will be used to determine which factors have a direct impact on the ineffectiveness of regulation on pollution in Nigeria. The aim of this comprehensive approach is to provide a holistic view of the problem at hand, thereby enabling us to devise effective solutions.

In view of the foregoing, because study and analyzing study data are all parts of the data gathering process. This research project will conduct an evaluation of the present legislative framework on pollution management, with a particular focus on single-use plastic policies in Nigeria. The data for this study will be collected from government agencies that are responsible for environmental issues, such as Federal Ministry of Environment, Lagos State Environmental Protection Agency (LASEPA), Lagos State Waste Management Authority (LAWMA). Also, supervisory agencies such as Nigerian Maritime Administration and Safety Agency (NIMASA), National Inland Waterways Authority (NIWA), Nigerian Ports Authority (NPA), and plastic production factories.

# CHAPTER TWO: LITERATURE REVIEW

## 2.0 Introduction to Marine Plastic Pollution

Marine plastic pollution has become a persistent global environmental problem, with significant implications for marine ecosystems, human health, and the economy. This literature review aims to provide an overview of the current state of knowledge regarding marine plastic pollution, including its sources, impacts, and potential mitigation strategies. By synthesizing existing research, this review seeks to identify key gaps in knowledge and highlight areas for future research and policy interventions.

This chapter will also offer an exhaustive analysis of existing literature related to the role of single-use plastics in the escalating global problem of plastic pollution in West Africa, with focus on the Lagos, coast line. It delivers an organized conception of marine plastic waste, emphasizing specifically on single-use plastic debris, and provides a summary of pragmatic research conducted on this subject. The review concludes with a call for more sustainable practices, including improved waste management, public education on the impacts of plastic pollution, and policies to reduce the production and consumption of single-use plastics.

## 2.1 Sources of Marine Plastic Pollution

Marine plastic pollution originates from various sources, including land-based activities, maritime industries, and ocean-based sources. The primary source of marine plastic pollution (MPP) is land-based coastal pollution, specifically within 50 km of coastlines (Carney Almroth & Eggert, 2019). This contributes approximately 9 million tons of plastic to the marine environment each year. Land-based sources, such as inadequate waste management systems and improper disposal of plastic waste, contribute a significant proportion of marine plastic pollution. Out of the thousands of different types of plastic polymers, six substances dominate the market and are commonly found as litter in the marine environment. These substances are polypropylene (PP), polyethylene (PE), polyvinylchloride (PVC), polyurethane (PUR), polyterephthalate (PET), and polystyrene (PS) (Carney Almroth & Eggert, 2019). Together, they make up around 80 percent of total plastics production.

In 2010, it was calculated that 275 million metric tons (MT) of plastic waste were generated in 192 coastal countries (Jambeck et al., 2015). Out of this, an estimated 4.8 to 12.7 million MT of plastic waste entered the ocean.

Through the analysis of global data on solid waste, population density, and economic status, researchers have estimated the amount of land-based plastic waste that enters the ocean (Deloitte, 2019). According to the Deloitte report 2019**, "*By compiling data from existing research literature for Europe, Asia, Africa, Middle East, the Americas and Oceania, we estimate that marine plastic pollution could have resulted in an economic loss of USD 6 to USD 19 billion for 87 coastal countries in 2018. Our conclusion is that beyond obvious ecological arguments, there is a strong economic and financial reason to address the marine plastic pollution challenge".***

From the findings of the aforementioned report, it was resolved that marine plastic litter has significant economic impacts on national economies, either through direct effects on core sectors or the need for additional resources to remove litter. However, many governments struggle to allocate sufficient resources to keep land-based water sources free of litter. This research provides a comprehensive assessment of the economic impacts of land-sourced marine plastic litter, offering a global perspective that can be compared between countries. The model presented in this paper can serve as a tool to evaluate solutions for preventing or intercepting floating plastic debris in land-based water sources, ultimately reducing waste entering the marine environment.

### 2.1.2 Heavy Reliance on Single-use Plastic

Most importantly the major focus of this research is on Single-use plastics (SUPs), which pose a significant threat to marine domain, necessitating pre-emptive policies to decrease mismanagement and consumption. Various strategies are available to manage SUPs and lessen their environmental impact (Baxter et al., 2022). Furthermore, the environmental issues associated with plastics are largely due to their long lifespan and our throwaway culture that depends on single-use items. The key to mitigating these problems is to limit the use of single-use items and encourage reuse, which will not only reduce plastic-related issues but also enhance resource efficiency and overall environmental health (Herberz et al., 2020). These include progressive policies like market-based policies, extended producer responsibility (EPR), deposit-return schemes, taxes or ban on SUPs, and public education and outreach.

Urban businesses in Africa heavily depend on single-use plastics for packaging food and beverages, as well as for retail purchases and product wrapping. The affordability, lightweight nature, and convenience of single-use plastics make them a preferred choice for businesses in street food vending, supermarkets, and restaurants (Matsuguma et al., 2017). Unfortunately, this heavy reliance on single-use plastics exacerbates environmental pollution, particularly in urban areas where proper waste management systems are often inadequate.

### 2.1.3 Health impact of Marine Plastic Pollution

Marine plastic pollution has wide-ranging ecological, economic, and human health impacts. Ecologically, marine organisms, including marine mammals, seabirds, fish, and invertebrates, are affected by plastic ingestion, entanglement, and habitat degradation (Research Gate, 2019). These impacts can disrupt ecosystems, alter food webs, and lead to population declines. Economically, marine plastic pollution affects industries such as tourism, fisheries, and coastal communities, leading to economic losses and reduced livelihood opportunities. Furthermore, microplastics can enter the food chain, potentially posing risks to human health through the consumption of contaminated seafood and water.

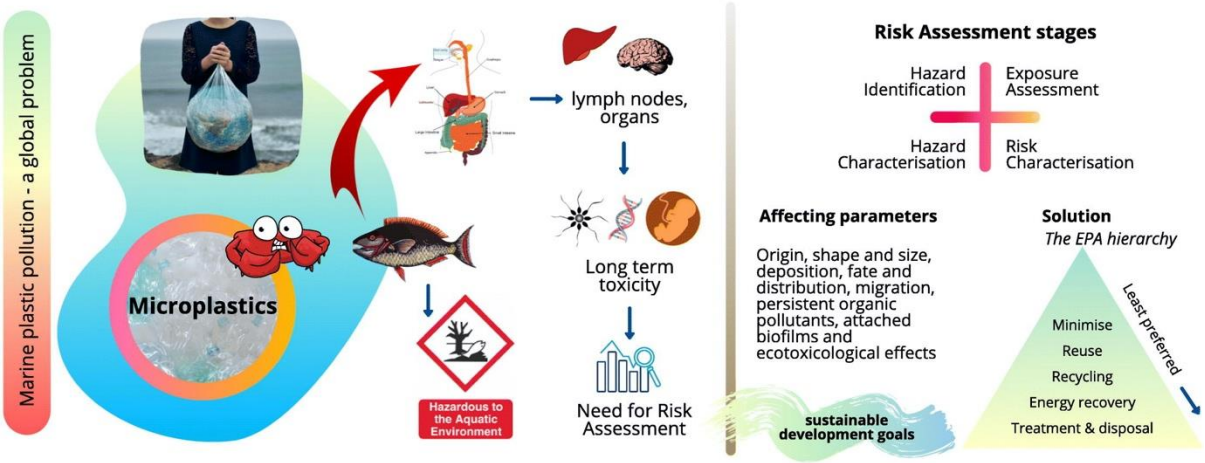


*Figure 1 Graphical abstract of the impact of marine plastic pollution*

*Source: ScienceDirect*

Plastic pollution poses a threat to human health in two main ways. Firstly, when animals consume plastic, and humans subsequently consume those animals, there is a risk of ingesting plastic particles. Secondly, plastic pollution in the environment can have indirect effects on human health (Halden, 2010).

According to research, plastics possess characteristics of contamination, absorption, and adsorption due to their chemical composition. The degradation process of polymers is slow, with estimates suggesting that a Styrofoam plastic cup takes 50 years to degrade, a plastic food container takes 400 years, a disposable diaper takes 450 years, and a plastic fishing line takes 600-1000 years to degrade (ScienceDirect, 2023).

Seafood has been consumed by humans since ancient times, as it is a valuable source of protein and offers numerous nutritional benefits, including high levels of Omega-3 fatty acids (Hosomi et al., 2012). However, the health of fish is being compromised by the rise of fish pathogens in the marine environment, leading to disruptions in the global fish supply and impacting fish health. Human activities have caused the marine

environment to be heavily polluted with microplastics (Smith et al., 2018). This contamination has led to the ingestion of microplastics by various wildlife species, including fish and shellfish. Since microplastics can carry elements from manufacturing and absorb substances from the surrounding environment, there are concerns about their potential physical and chemical toxicity. Although research on the toxicity and epidemiology of microplastics is still emerging, evidence is starting to emerge in this area. Consequently, the causes of fish diseases are mainly from bacterial and fungal pathogens, while factors like poor water quality contribute to large-scale fish mortality. Human activities play a significant role in aquatic pollution and its consequences (Immanuel Suresh et al., 2022).

While global initiatives have been launched to address marine plastic pollution, some African nations have taken a unique and unprecedented approach to tackle disposable plastic pollution. According to the *World Health Organization Africa June 2023 report titled "Tackling the health impact of plastic pollution in Africa,"* it is revealed that the United Nations treaty on Plastic Pollution is designed to address the global plastic pollution crisis and establish a comprehensive framework to mitigate its effects on the environment and human health. The treaty, which is still under development, aims to enhance waste management systems, increase financial aid, technology transfer, and capacity-building initiatives, especially in developing countries. It also seeks to improve plastic pollution management capabilities and encourage international cooperation and collaboration, including the sharing of best practices, scientific knowledge, and technologies. The ultimate goal is to enhance public health, protect the environment, and promote sustainable economies.

Similarly, the adoption of the Libreville Declaration on health and Environment in 2008, the World Health Organization (WHO) Regional Office for Africa and the United Nations Environment Programme (UNEP) have been working together to boost national efforts to reduce environmental health threats. They have jointly conducted several projects, including the Clim-HEALTH Africa project, which aims to predict, prevent, and manage the acute public health effects of climate change in Africa. Another project, the Chemical Observatories (CHEMOBS), developed a prototype for an integrated national health and environment observatory on chemical risks to human health and the environment.

Approximately 30 African countries have banned single-use plastic bags. However, the effectiveness of these policies needs to be enhanced as the capacity and mechanisms for monitoring and evaluating these solutions are either in their early stages or non-existent (World Health Organization (WHO), 2023). Consequently, the United Nations Treaty on Plastic Pollution, which was discussed recently in Paris and is expected to be finalized and adopted in 2024, is hoped to speed up the development and implementation of national and regional policies on plastic production, use, and waste management. These nations have started adopting policies and measures specifically aimed at reducing the use and impact of single-use plastics. This proactive approach demonstrates a commitment to environmental sustainability and recognizes

the urgent need to address the growing plastic pollution crisis. By implementing innovative strategies and regulations, African nations are making significant strides in curbing disposable plastic pollution and setting a global example.

Efforts to mitigate marine plastic pollution involve a combination of preventive measures, waste management strategies, and policy interventions. Preventive measures include reducing plastic production and consumption, promoting sustainable alternatives, and raising awareness about the issue. Effective waste management systems, including recycling, proper disposal, and improved infrastructure, are crucial in preventing plastic waste from entering water bodies. Policy interventions, such as plastic bag bans, extended producer responsibility schemes, and international agreements, play a vital role in addressing marine plastic pollution at a systemic level.

### 2.1.4 Gaps in Policy and Future Directions

Despite significant research on marine plastic pollution, several gaps in knowledge remain. These include understanding the long-term impacts of single-use plastic as a major cause of plastic pollution on the marine ecosystems, identifying the most effective mitigation strategies, and assessing the socio-economic implications of plastic pollution on vulnerable communities. Future research should focus on developing innovative policies for curbing heavy reliance on single-use plastics by exploring the social and economic dimensions of plastic pollution.

In the light of the foregoing, marine plastic pollution is a complex and multifaceted issue that requires urgent attention and concerted efforts from various stakeholders. This research will provide an overview of the sources, impacts, and mitigation strategies associated with marine plastic pollution. By addressing the identified policy gaps in major factor exacerbation policy in Nigeria and interventions, we can work towards a cleaner and healthier marine environment for future generations.

# CHAPTER THREE: AN OVERVIEW OF INTERNATIONAL AND REGIONAL LEGAL FRAMEWORK FOR MARINE PLASTIC POLLUTION

In this chapter I will be examining the international legal framework for marine plastic pollution, which comprises several conventions and agreements. The United Nations Convention on the Law of the Sea (UNCLOS) sets the overall legal framework for ocean activities, including marine pollution prevention. The International Convention for the Prevention of Pollution from Ships (MARPOL) prohibits the discharge of garbage, including plastics, into the sea. The London Convention and Protocol regulate waste dumping at sea. The Basel Convention, amended in 2019, regulates the transboundary movements of hazardous wastes, including plastic waste. The Stockholm Convention aims to eliminate or restrict the production and use of persistent organic pollutants found in some plastic waste. The Convention on Biological Diversity (CBD) includes provisions for conserving marine and coastal biodiversity, which can be impacted by plastic pollution. Various regional agreements, like the OSPAR Convention, also address marine litter. Lastly, the UN Sustainable Development Goals (SDGs), particularly SDG 14, aim to significantly reduce marine pollution by 2025. Despite these measures, debates continue on the need for a specific international agreement for marine plastic pollution. This study also aims to delve into the factors exacerbating plastic pollution in the West African region, with a specific focus on the significant reliance on single-use plastic. Single-use plastics, often used for packaging or disposable items, have become a pervasive part of daily life in Lagos, contributing substantially to the plastic waste that ends up littering the coastline. This exploration seeks to shed light on the extent of the problem, the reasons behind the heavy dependence on single-use plastics, and potential strategies for mitigating this environmental crisis.

## 3.0 MARPOL'S OBJECTIVE: The Role of MARPOL in Curbing Ship-Based Plastic Pollution

Marine plastic pollution has become a global environmental crisis, with ship-based plastic pollution being a significant contributor. The International Convention for the Prevention of Pollution from Ships (MARPOL) plays a crucial role in addressing this issue. The MARPOL Convention, established to prevent ship pollution, was initially adopted on November 2, 1973. However, it was not yet effective when a series of tanker accidents transpired in 1976-1977 (IMO, 2019b). This prompted the creation of the 1978 Protocol, which incorporated the original 1973 Convention. Numerous pivotal conferences have taken place concerning this matter, such as the International Conference on Marine Pollution in 1973, the International Conference on Tanker Safety and Pollution Prevention in 1978, and two Conferences of Parties to the International Convention for the Prevention of Pollution from Ships in 1994 and 1997.

A subsequent amendment was made to MARPOL to fully prohibit waste disposal, effective from January 1, 2013 (Serra-Gonçalves et al., 2023). This change underscores the continuous efforts to bolster environmental protection and reduce the effects of waste produced by ships on marine ecosystems. Annex V of the MARPOL Convention, enforced from December 31, 1988, is dedicated to preventing ship-generated garbage pollution. It provides guidelines for different types of garbage, specifying how and at what distances from land they can be discarded. The most notable feature of this Annex is the total ban it places on the disposal of all types of plastics into the ocean. Annex v Regulation 4 - Special requirements for disposal of garbage

***"(1) Subject to the provisions of paragraph (2) of this regulation, the disposal of any materials regulated by this Annex is prohibited from fixed or floating platforms engaged in the exploration, exploitation and associated offshore processing of sea-bed mineral resources, and from all other ships when alongside or within 500 m of such platforms.***

***(2) The disposal into the sea of food wastes may be permitted when they have been passed through a comminuter or grinder from such fixed or floating platforms located more than 12 nautical miles from land and all other ships when alongside or within 500 m of such platforms. Such comminuted or ground food wastes shall be capable of passing through a screen with openings no greater than 25 mm".***

Pursuant to Annex V – Regulation 8 for the Prevention of Pollution by Garbage from Ships

***"When a ship is in a foreign port, it can be inspected by authorized officers of that country under the provisions of this Annex. This inspection can occur if there are valid reasons to believe that the ship's captain or crew are not well-versed with crucial onboard procedures to prevent garbage pollution".***

**Regulation 8 - Port State control on operational requirements**

***(1) "In foreign ports, ships may be inspected by authorized officers of that country to ensure compliance with operational requirements outlined in this Annex. These inspections are conducted when there are reasonable suspicions that the ship's captain or crew lack knowledge of important shipboard procedures related to preventing garbage pollution".***

***(2) "In the circumstances given in paragraph (1) of this regulation, the Party shall take such steps as will ensure that the ship shall not sail until the situation has been brought to order in accordance with the requirements of this Annex".***

***(3) "Procedures relating to the port State control prescribed in Article 5 of the present Convention shall apply to this regulation".***

Furthermore, MARPOL requires ships to have a waste management plan that includes procedures for the proper segregation, storage, and disposal of garbage, including plastics. This ensures that waste is managed effectively on board, reducing the likelihood of plastic pollution being discharged into the sea. Onboard waste segregation systems help separate plastics from other waste streams, facilitating proper disposal and recycling.

## 3.1 Port Reception Facilities (PRFs)

MARPOL also emphasizes the importance of using port reception facilities for the disposal of ship-generated waste, including plastics. Annex V Regulation 7, states that ***"The Government of each Party to the Convention undertakes to ensure the provision of facilities at ports and terminals for the reception of garbage, without causing undue delay to ships, and according to the needs of the ships using them".***

Consequently, port states are required to provide adequate reception facilities to enable ships to offload their waste safely and legally. This discourages the disposal of plastics at sea and encourages proper waste management practices. The effectiveness of ships in adhering to MARPOL's discharge requirements depends on the availability of ample port reception facilities, in special areas (IMO, 2019c). MARPOL Annex V mandates that governments provide appropriate reception facilities at terminals and ports for the proper disposal of garbage, while minimizing delays for ships. This obligation is tailored to meet the specific needs of the ships utilizing these facilities. Regulation 8.3 permits Small Island Developing States (SIDS) to meet the requirement of providing sufficient port reception facilities via regional arrangements, taking into account their unique circumstances. Parties involved in such arrangements must develop a Regional Reception Facility Plan in accordance with the guidelines set by the International Maritime Organization (IMO).

MARPOL establishes a framework for enforcement through port state control and flag state responsibilities. Port state control authorities inspect ships to ensure compliance with MARPOL regulations, including those related to plastic pollution. Flag states are responsible for enforcing MARPOL regulations on ships registered under their flag. Non-compliance can result in penalties, including fines and detention of the vessel.

MARPOL has played a significant role in curbing ship-based plastic pollution. Its regulations and provisions have raised awareness and set standards for waste management practices on ships. Studies and reports indicate a reduction in plastic pollution from ships in areas where MARPOL is effectively implemented and enforced. However, challenges remain in achieving universal compliance and addressing the issue comprehensively. The global production, processing, consumption, and disposal of plastics have led to a worldwide problem of plastic pollution (Research Gate, 2019). To tackle this issue effectively, there needs to be a collaborative effort between governments, businesses, and international entities. Plastic pollution in the maritime environment impacts not just national marine areas

but also the deep seas, necessitating global cooperation. The absence of clear information about the additives and chemicals in plastic products can pose health risks and obstruct recycling processes. For recycling practices to be successful and sustainable, there must be transparency in the movement of plastic waste and the standards for recycling facilities.

MARPOL plays a vital role in curbing ship-based plastic pollution through its regulations, enforcement mechanisms, and international cooperation. It sets standards for waste management practices on ships and promotes the use of reception facilities for proper waste disposal. However, continued efforts are needed to strengthen MARPOL's implementation and address the remaining challenges. By enhancing enforcement, increasing awareness, and improving waste management infrastructure, MARPOL can further contribute to the reduction of ship-based plastic pollution and the preservation of marine ecosystems.

## 3.2 UNEP's objective

The UN Climate Change Conference in 2022 achieved a historic landmark by setting up a fund dedicated to loss and damage (Environment, 2023). In Uruguay, the Intergovernmental Negotiating Committee convened its inaugural meeting to develop a legally binding agreement on plastic pollution. Numerous governments pledged their commitment to creating a tool that considers the entire life cycle of plastics, safeguards human health and the environment, and focuses on the needs of the most affected countries. The meeting resulted in the agreement on two work streams: one to establish objectives, core responsibilities, and control measures, and the other to discuss implementation methods, financing, institutional arrangements, progress assessment, and stakeholder involvement. Furthermore, the UN General Assembly affirmed the universal entitlement to an environment that is clean, healthy, and sustainable. The year wrapped up with the UN Biodiversity Conference in Montreal, where a bold framework was endorsed to protect and restore biodiversity by the year 2030. Most remarkably, the year marked the golden jubilee of the UN Environment Programme (UNEP) and the commemoration of the Stockholm+50 conference. Also, the political declaration of UNEA 5.2, which saw a large number of in-person and online participants, highlighted the pressing necessity to halt the rapid increase of plastic pollution.

The United Nations Environment Programme (UNEP) recognizes plastic pollution as a global environmental issue that requires immediate action. UNEP emphasizes the need for international collaboration to combat this problem, which affects ecosystems, wildlife, and human health. Their approach involves reducing plastic production and consumption, improving waste management systems, fostering innovation in recycling and circular economy practices, and advocating for policies that promote responsible plastic use. UNEP's Global Partnership on Marine Litter (GPML) works to raise awareness, share best practices, and prevent plastic pollution in oceans. Education and awareness campaigns are also important to change consumer behaviour and promote

sustainable choices. UNEP's comprehensive strategy aims to address plastic pollution and promote a cleaner and healthier planet.

Furthermore, it is worthy to note that item 4 of the provisional agenda of the UNEP taking place in November of 2023 in Nairobi, work will commence on the Zero draft text, which is an international legally binding instrument on plastic pollution, and marine environment. The preliminary version of a proposed agreement aimed at addressing the global issue of plastic pollution (UNEP, 2023). The draft serves as a starting point for negotiations and discussions among member states and stakeholders.

The purpose of this instrument is to establish a comprehensive framework to prevent and reduce plastic pollution, particularly in marine environments. It recognizes the urgent need for action to tackle the environmental, social, and economic impacts of plastic pollution and emphasizes the importance of international cooperation and collaboration. In addition, this instrument is to provide a comprehensive and coordinated global response to the issue of plastic pollution, with the ultimate goal of protecting marine ecosystems, human health, and the planet's biodiversity.

### 3.2.1 FAO's objective

Data indicates that a small portion of agricultural plastics are collected and recycled, mainly in developed countries (Food and Agriculture Organization of the United Nations, 2021). In other regions, most plastics are either burned, buried, or landfilled, with limited record-keeping. The accumulation of mulching film residues in surface soils has been found to decrease agricultural yields. Concerns are growing regarding the formation and fate of microplastics derived from agricultural plastics, which can potentially harm human health and transfer through food chains. Larger plastic residues in aquatic and terrestrial environments can harm wildlife through entanglement and ingestion. Some plastic resins contain toxic additives that have endocrine-disrupting properties. Plastic fragments and microplastics are also known to disperse pathogens and toxic chemicals in oceans. Inappropriate disposal of agricultural plastics, such as burning or dumping in fire-prone areas, can release toxic emissions. The majority of plastics used in agriculture are derived from fossil fuels, contributing to greenhouse gas emissions. The global use of plastic films in terrestrial agriculture is estimated at 7.4 million tonnes, accounting for 2% of global plastic production. In the EU, plastic films make up 75% of all plastics used in crop and livestock production. Plastics used in fisheries and aquaculture contribute approximately 2.1 million tonnes per year. Overall, plastics used in agricultural production amount to nearly 3.5% of global plastic production.

According to FAO's 2021 report titled *"Assessment of Agricultural Plastics and Their Sustainability A Call for Action,"* there is a lack of knowledge and research on the quantities and environmental impact of plastics, including agricultural plastics, in terrestrial environments compared to marine environments. It further underscores that urgent research is needed to understand the effects of plastics on land-based

ecosystems, considering that the majority of agricultural activities occur on land. Microplastics are of particular concern as they can transfer through food chains and potentially harm organisms at the cellular level. Analysis of agricultural plastic products suggests several strategies for reducing their use and environmental impact, including adopting sustainable agricultural practices, using more durable or reusable alternatives, implementing extended producer responsibility schemes, promoting biodegradable polymers, setting standards and labelling, and redesigning business models. Policy frameworks and legislative measures should take a blended approach, implementing multiple measures simultaneously.

### 3.2.2 UNESCO's objective

UNESCO, the United Nations Educational, Scientific and Cultural Organization, plays a significant role in the fight against plastic pollution. Through its Intergovernmental Oceanographic Commission (IOC), UNESCO works to raise awareness about the impact of plastic pollution on marine life and human health, and promotes scientific research and innovation to understand and address the issue.

One of UNESCO's initiatives is the Global Partnership on Marine Litter, which aims to protect the world's oceans from land-based activities producing and discharging marine litter and microplastics. Moreover, UNESCO promotes policies and legislation to reduce plastic waste, supports sustainable waste management practices, and encourages the transition to a circular economy.

In October 2018, the Intergovernmental Oceanographic Commission (IOC) of UNESCO, the UN Environment Programme (UNEP), and the European Commission (EC) launched a coalition of aquariums to fight marine plastic pollution and raise ocean awareness about the impact of plastic pollution on marine life and human health, and promotes scientific research and innovation to understand and address the issue (Hub, 2018). It also announced at the fifth edition of the Our Ocean Conference, the coalition aims to have 200 aquariums raising awareness about plastic pollution by 2019. So far, 106 aquariums from 33 countries, including 67 from the EU, have pledged support. Participating aquariums will organize activities to raise awareness about sustainable ocean management and work to eliminate single-use plastic items. The coalition's actions aim to accelerate a shift towards a circular economy, aligning with SDG 12 (responsible consumption and production) and SDG 14 (life below water).

### 3.2.3 Efforts by Social Enterprises: Unplastify

Unplastify is a social enterprise, which is a type of organization that applies commercial strategies to maximize improvements in environmental and human well-being, rather than maximizing profits for external shareholders (UNESCO, 2023). While similar to non-governmental organizations (NGOs) in their focus on addressing

social or environmental issues, social enterprises differ in their use of market-oriented approaches. So, while Unplastify shares some characteristics with NGOs, it would be more accurate to refer to it as a social enterprise. The objective behind Unplastify is to reduce plastic pollution and change the way we interact with plastic. The organization aims to drive local action and systemic change through various initiatives. They work with schools, companies, and institutions to inspire and guide young change makers, assist businesses in redesigning their relationship with plastic, and support regulatory processes and public policies at both national and local levels. The ultimate goal of Unplastify is to accelerate solutions to plastic pollution and promote a more sustainable and responsible approach to plastic consumption and disposal.

In 2018, Agustina Besada crossed the Atlantic twice on a sailboat, collecting plastic waste samples and interviewing experts about potential solutions to plastic pollution (UNESCO, 2023). Upon returning, she and Rocío González founded Unplastify, a Buenos Aires-based social enterprise dedicated to reducing plastic pollution and changing our relationship with plastic. They initiated "Unplastify Challenges" for schools, companies, and institutions to drive local action and systemic change. The Educational Challenges aim to inspire and guide young change makers to reduce plastic use in their communities. The Company Challenges assist businesses in redesigning their internal and external relationship with plastic through employee involvement. The Government Challenges support regulatory processes and public policies at both national and local levels, fostering collaboration among various stakeholders.

### 3.2.4 Review of existing policies and approaches to address plastic pollution in Africa/West Africa

In Africa, the most common policy to combat plastic pollution is the ban or taxation of plastic bags. Countries like Rwanda, Kenya, Tanzania, Eritrea, and Morocco have implemented such bans, while others like South Africa have introduced levies on plastic bags. These measures are part of wider environmental strategies to promote sustainable consumption and production. However, challenges such as enforcement, finding affordable alternatives to plastic bags, and addressing other forms of plastic pollution persist. Therefore, a more comprehensive approach is needed, which could include expanding policies to other single-use plastics, improving waste management, promoting recycling, and encouraging the use of biodegradable materials.

Addressing land-based waste management in Africa requires solutions led by Africans, who understand their unique local challenges and opportunities (Jambeck et al., 2018). However, due to the transboundary nature of waste pollution, especially marine debris, it's crucial to work within regional frameworks. This allows for collaboration and coordination among African nations, leading to shared knowledge, resources, and best practices. Regional cooperation can also harmonize policies and regulations across countries, ensuring a unified approach to waste management.

Furthermore, such collaboration can attract international attention and support, potentially increasing funding and technical assistance. Therefore, while African-led solutions are essential, they are likely to be more successful when implemented within a broader regional framework targeting marine debris.

This type of regional collaboration is similar to the Regional Action Plan for Marine Litter (RAPMaLi) for the Wider Caribbean Region, which was initiated in 2007 by the United Nations Environment Programme's Regional Seas Program to address the growing issue of ocean litter (REGIONAL ACTION PLAN ON MARINE LITTER MANAGEMENT (RAPMaLi) FOR THE WIDER CARIBBEAN REGION, 2014). The Caribbean Regional Coordinating Unit of UNEP was responsible for compiling and developing RAPMaLi. This regional approach encourages problem-solving at national and local levels, acknowledging that unique regional characteristics require diverse solutions. The success of this approach is demonstrated by the increased participation of 20 countries in 2014, up from 14 in the original report. The action plan has been implemented through pilot projects in Guyana, Barbados, and Saint Lucia.

Similarly, the African Marine Waste Network (AMWN) was established in 2016 as a project of the Sustainable Seas Trust (SST), a charitable trust and NGO (Kandziora et al., 2019). Its main objective is to address the increasing problem of plastic pollution in the oceans, specifically focusing on African continental and island states. The AMWN operates as a collaborative effort involving various stakeholders from different sectors. While it is based in South Africa, its aim is to serve all African countries. The network is funded through international grants, government support, private sector contributions, and philanthropic donations.

In order to address the challenge of measuring litter in Africa, remote-sensing techniques, including the use of unmanned aerial vehicles (UAVs), have been tested. Initial surveys in NMBM (Nelson Mandela Bay Municipality) using UAV imagery helped determine if litter loads could be quantified (Marlin & Ribbink, 2020). Based on the findings, five sites were selected for further surveys in 2020, with ongoing monitoring planned to assess changes in litter loads.

The AMWN has also been developing a mobile application specifically designed for African conditions. This app aims to educate users about plastic waste and enable citizens, including those with limited education, to monitor litter. The data collected through the app will be stored on an African data server, ensuring accessibility and lower costs. The app will complement the Litter Monitoring Manual, ensuring consistent data collection.

To expand the network and connect stakeholders, the AMWN is implementing the 'Are you on the map?' project. This project includes three online interactive maps: a Waste and Recycle map showing recycling drop-off points and waste facilities, an industry map related to the AMWN, and a 'Clean up PE' map showcasing areas consistently cleaned by the public in NMBM. As the project grows, it will include

other African countries, facilitating the distribution of waste-related information among stakeholders.

In West Africa, the lives of people are closely connected to plastic products, reflecting the socio-cultural context of the region. The economy in West Africa is primarily informal, with a focus on the primary and service sectors (Adam et al., 2020). These sectors are predominantly made up of small, privately owned businesses. In towns and cities of West Africa, food hawkers and vendors commonly use single-use plastics (SUPs) as their main packaging and carrying material for food products.

Among the 16 West African countries, 12 have implemented measures to reduce single-use plastics (SUP). While 11 of these countries have chosen to ban SUP entirely, Ghana has taken a different approach by adopting a market-based strategy. In Ghana, an excise tax is imposed on imported semi-finished and raw plastic materials, rather than implementing a ban on plastics (Adam et al., 2020). The market-based approach to banning single-use plastics involves using economic incentives and disincentives to encourage more sustainable behaviour. This approach is based on the principle that market forces, such as supply and demand, can be leveraged to promote environmental sustainability. For example, the Governments can impose taxes or levies on single-use plastics to discourage their use. The increased cost of these items can motivate consumers and businesses to switch to more sustainable alternatives. For example, many countries have introduced a plastic bag tax, which has significantly reduced plastic bag consumption. Secondly, the Government may choose to use the "Deposit-Refund Systems". This involves charging an additional deposit on single-use plastic items, which is refunded when the item is returned for recycling. This system incentivizes consumers to recycle and helps to ensure that less plastic waste ends up in the environment.

### 3.2.5 Review of existing policies aimed at addressing plastic pollution in Nigeria: Focus on Lagos State

In May 2019, the Nigerian government passed the Plastic Bags Prohibition Bill to the National Assembly, aiming to ban the use, manufacture, and importation of plastic bags for commercial and household packaging. This legislation aligns with similar punitive measures seen in other African countries. A comparison was made between international legislative tools and the proposed Nigerian Bill, identifying limitations (Nwafor & Walker, 2020). As things stand currently, there is still no National legislation banning the use of SUP in the country. Also conspicuously missing from the Bill is a provision for market-based approach as seen in in the Ghana model.

In Nigeria, the absence of laws banning single-use plastics has led to their widespread use, causing significant environmental, health, and economic issues. Plastic bags and sachets are commonly used for packaging and carrying items, including food and beverages. Their improper disposal has resulted in environmental degradation, water pollution, and air pollution from burning plastic waste. Health risks include exposure

to harmful chemicals and increased risk of vector-borne diseases due to plastic waste accumulation. Economically, plastic waste can lead to flooding from clogged drainage systems, property damage, economic losses, and potential negative impacts on tourism. The essay emphasizes the need for effective plastic waste management measures, including laws restricting single-use plastics, education and awareness campaigns, and investment in recycling infrastructure. By addressing these issues, Nigeria can mitigate the negative impacts of plastic pollution and move towards a more sustainable future.

In Nigeria, plastic bags are legal and commonly used for packaging food that is sold for take-away. These bags are often thin and require double wrapping. Additionally, affordable clean drinking water is available in plastic sachets. As a result of the aforementioned trends, it is believed that a ban on plastic bags in Nigeria is unlikely until the population has access to clean drinking water (HOKKAIDO UNIVERSITY, 2013). However, efforts are being made to promote proper waste management through initiatives like Sanitation Day, which is supported by a local bank and the Lagos State Waste Management Authority.

However, in the past few years, Lagos state has taken some steps to aimed at mitigating the devastating effect of plastic pollution. For instance, Wecyclers and Recycle Points have collaborated with Lagos Waste Management Authority (LAWMA) to collect recyclable waste directly from consumers, including plastic bottles, bags, cans, glass bottles, paper, and cartons. They motivate clients to sort and collect their recyclable waste at home by offering points that can be exchanged for household items, food, or cell phone minutes. These initiatives create jobs, empower Lagos residents to convert waste into valuable resources, and the sorted waste is sold to larger recycling facilities.

Wecyclers and Recycle Points are two organizations in Nigeria that have collaborated with the Lagos Waste Management Authority (LAWMA) to address the issue of waste management. They have developed a system to collect recyclable waste items directly from consumers. These items include plastic bottles, bags, cans, glass bottles, paper, and cartons.

To encourage participation, they offer incentives to clients who sort and collect their recyclable waste at home. These incentives come in the form of points that can be redeemed for household items, food, or cell phone minutes. This not only encourages recycling and proper waste management but also provides a form of economic benefit to the participants.

These initiatives have multiple benefits. They create employment opportunities for residents of Lagos, as the collected waste needs to be sorted and processed. They also enable residents to see waste not just as something to be discarded, but as a valuable resource that can be transformed and reused. The sorted waste is then sold to bigger recycling facilities, further contributing to the recycling economy.

In summary, the collaboration between Wecyclers, Recycle Points, and LAWMA is a market-based approach to waste management that encourages recycling, creates jobs, and transforms waste into a valuable resource.

Similarly, the TakaTaka Solutions in Nairobi, Kenya, serves both residential and commercial clients by managing post-consumer waste. They ask clients to separate waste into organic and inorganic fractions for collection (Jambeck et al., 2018). The organic waste is converted into high-quality compost and sold to local farmers, while the inorganic waste is further sorted and either sold to recycling industries or used to create tumblers from recycled bottles. Due to their efficient operations, TakaTaka Solutions collects 10 tons of waste per day and recycles up to 95% of the collected waste.

The market-based approach is also quite effective in countries like Sweden where the country has introduced a tax on plastic bags, which has significantly reduced their consumption. This tax serves as an economic incentive for consumers to switch to reusable bags and encourages retailers to provide alternatives to single-use plastics. By using market forces to influence consumer behaviour, Sweden has successfully reduced the use of single-use plastics and promoted more sustainable alternatives. According to the directive on single-use plastics, Sweden aims to significantly reduce the consumption of cups and food containers in the coming years. The goal is to achieve a 50% reduction in consumption between 2022 and 2026 (Swedish Environmental Protection Agency, 2020).

It may interest to also note that, there is no clear-cut provision of the Lagos state environmental law that prohibits the use of single-use plastic in Lagos. Although section 185 of the Lagos State Environmental Management Protection Law 2017 states that *"a person shall not discharge or cause to be discharged into the environment any untreated waste or chemical substances listed in any Federal or State law in force except in accordance with regulation made under this Law or Federal Law"*. The provision lacks the intended bite as there are no Federal Legislations to leverage on.

### 3.2.6 Nigeria National Action Plan on Marine Plastic Litter

Nigeria is actively working on a National Action Plan to combat marine plastic litter, focusing on waste prevention, improved waste management, and promoting plastic recycling research and innovation. The country is also participating in the GloLitter Partnerships project as a Lead Partnering Country, which aims to assist developing nations in controlling Sea-Based Marine Plastic Litter (SBMPL) from shipping and fisheries sectors (Nigeria National Action Plan on Marine Plastic Litter, 2023). The project is funded by the Norwegian Government and implemented by the IMO in collaboration with the FAO.

The country assessment for SBMPL was conducted as part of the GloLitter project, revealing that marine plastic litter enters the environment through various land- and sea-based activities. Both microplastics (large plastic items) and microplastics (small plastic particles) persist in the marine environment, causing harm to marine life, biodiversity, and human health. Marine plastic litter also negatively impacts tourism, fisheries, and shipping. However, there is potential to reintegrate plastic materials into the economy through reuse and recycling.

The assessment identified several key issues, including inadequate data on monitoring waterways and ships' waste, low awareness among society about the dangers of marine litter, insufficient implementation of laws and regulations related to marine litter by enforcement agencies, a lack of a comprehensive maritime action plan, weak infrastructure and waste management programs for specific marine litter hotspots like beaches, and an increase in the demand and production of plastics.

In the light of the following, the lack of the ban of plastic bags for SUP, is directly connected, to environmental, health, and economic issues due to widespread use of single-use plastics. Improper disposal of these plastics results in environmental degradation, health risks, and economic losses. Although efforts are being made in Lagos to combat plastic pollution through initiatives like Sanitation Day and partnerships with organizations for waste collection and recycling, which similar approaches have been successful in Sweden and Kenya. Nigeria is also working on a National Action Plan to combat marine plastic litter and participating in the GloLitter Partnerships project. However, challenges include inadequate data, low awareness, poor law enforcement, lack of a comprehensive maritime action plan, weak infrastructure, and increasing plastic production/demand, and lack of alternatives to SUP.

# CHAPTER FOUR: "COMPARATIVE STUDY OF PLASTIC POLLUTION IN CHINA AND WEST AFRICAN COUNTRIES"

## 4.0 An Overview of Plastic Pollution in China

China's distinctive approach to addressing plastic pollution makes it an ideal reference point for this study. Despite its large population and rapid economic growth, China has implemented strict regulations and policies, including bans on certain types of plastic waste and restrictions on single-use plastics. The country has also launched waste management and recycling initiatives, such as the "National Sword" policy, to improve the quality of imported recyclable materials. Furthermore, China's investments in research and development have led to advancements in recycling technologies, waste-to-energy conversion, and the production of biodegradable plastics. Additionally, China has conducted public awareness campaigns to promote responsible plastic use and waste reduction. Overall, China's combination of regulations, technological innovation, and public engagement has significantly contributed to its efforts in combating plastic pollution.

China, was recognized as one of the world's largest producers and consumers of plastic products accounting for plastic waste of 26.74 million in 2019.

Additionally, China was once the world's largest importer of recyclable waste, accepting waste from countries like the United States and Australia. This was due to China's booming manufacturing sector, which required raw materials that could be obtained from recycled waste. The process was mutually beneficial: China got the raw materials it needed for its industries, while countries like the U.S. and Australia could dispose of their waste in a cost-effective and environmentally friendly manner (Katz, 2019).

However, China has been making significant strides in addressing the issues of plastic pollution (Sun et al., 2022). The country has implemented a series of measures to curb the use of single-use plastic and reduce plastic pollution originating from both land and sea. The first major step taken by China was the ban on single-use plastics. In 2018, China implemented a policy known as "National Sword," which banned the import of most types of solid waste, including various plastics and unsorted paper. This policy was a response to the environmental and health problems caused by the country's massive waste processing industry. China's recycling plants were often ill-equipped to handle the sheer volume of waste, leading to pollution and other environmental issues.

In 2017, China enforced import bans that greatly affected the worldwide waste trade. These limitations led to a drastic reduction in China's waste plastic imports by 92% and used paper imports by 56%. Simultaneously, the unit value of these two waste

types rose by 27% and 13% respectively, suggesting an improvement in the quality of imported waste. These effects were primarily due to intensive margins (Tran et al., 2021). These restrictions caused the waste flow to be mainly redirected to low- and middle-income countries in the East Asian and Pacific regions, as well as Europe and Central Asia. These areas saw a significant increase in imports, with waste plastic and used paper rising by 161% and 266%, and 101% and 77% respectively. The 2017 National Sword policy had a much larger impact than the Operation Green Fence, forcing shipping companies to deal with a shortage of products on return routes and prompting them to change their long-established practices.

The ban had a significant impact on countries like the U.S. and Australia, that had become reliant on China to process their recyclable waste. These countries were suddenly faced with the challenge of dealing with their own waste, leading to an increase in landfill use and waste incineration, both of which have significant environmental impacts.

However, in response to this challenge, these countries have had to rethink their waste management strategies. This has led to increased investment in domestic recycling infrastructure, as well as policies aimed at reducing waste generation in the first place. For example, some cities have implemented zero-waste city initiatives, which the Ministry of Ecology and Environment (MEE) spearheaded a project involving 18 other ministries, commissions, and local governments from pilot areas (Ministry of Ecology and Environment of People's Republic of China, 2022). The objective of this Work Plan was to integrate progressive urban management strategies for solid waste management into economic and social development. It aimed to develop a quantifiable index system, collate specific actions to create a model that can be replicated, and suggest ways to achieve a harmonious coexistence between humans and nature. This initiative was a testament to China's commitment and wisdom in contributing to the creation of a sustainable and beautiful planet. In response, some countries have introduced stricter recycling regulations, for some others like Australia, China's restrictions serve as a wake-up call, forcing them to be responsible for their own waste (Lasker, 2017).

In 2020, the National Development and Reform Commission (NDRC) of China also announced a policy to prohibit single-use plastics throughout the nation (Reuters, 2020), (Laney, 2021). The primary objective of this policy is to drastically cut down the volume of waste generated by the country. By the end of 2020, non-degradable bags were outlawed in major cities, and by 2022, the ban is expected to be enforced in all cities and towns.

## 4.1 The Evolution of Plastic Policies in China: A Tranquil Beginning in the Early 2000s to a Surge of Regulations Commencing in 2016

Before the early 2000s, China's approach to plastic pollution governance was in its infancy, with only 13 policies addressing plastic issues from 2000 to 2007. These policies were often vague and incorporated into broader environmental regulations like the Atmospheric Pollution Prevention and Control Law and Marine Environment Protection Law. It wasn't until 2007 that China began to explicitly regulate plastic consumption and use, starting with a targeted ban on the production, sale, and use of plastic shopping bags (Fürst & Feng, 2022).

In addition to these bans, China has initiated several recycling programs and is promoting the establishment of recycling facilities. The government has set an ambitious goal of achieving a recycling rate of 35% in major cities by the end of 2025. This initiative is expected to significantly reduce the amount of plastic waste that ends up in landfills and oceans.

Due to its high degree of industrialization and urbanization, China's waste management methods had a significant global impact. It is estimated to generate more plastic than any other nation, contributing to approximately one-third of the global total. Recent research indicates that China could be a significant contributor to plastic pollution in the oceans, mainly from rural and county regions. While more studies are required to validate these claims, enhancing the circularity of municipal solid waste (MSW) could significantly decrease plastic leakage (The World Bank Group, 2019). It is in the government view that the post-consumer plastics, which are common in the MSW stream, could be managed sustainably at their origin to avoid water or soil pollution. Recent structural changes that include material recycling in MSW management represent a positive move towards promoting circularity.

The World Bank Report of 2019 underscores the importance of managing China's landfill sites in a manner that protects groundwater resources and prevents the leakage of plastic waste into rivers and oceans. It stated that in most cases of brownfield site rejuvenation, the costs of clean-up exceed the distributed costs of initial pollution prevention - this is especially applicable to landfills, which are comparatively inexpensive to operate properly once established, further emphasizing that the closure of waste dumps will further reduce the risk of plastic contamination in water bodies.

### 4.1.2 "Strategies Implemented by China to Curb Ship-based Plastic Pollution

Maritime activities also contribute to plastic pollution in the oceans. Litter from ships, including fishing vessels and cargo ships, often ends up in the sea, either accidentally or through deliberate dumping (Leslie et al., 2017).
This is a significant issue, as these vessels often operate in international waters where regulations and enforcement can be lax. This can be done not only improving waste management systems on land and in rivers, but also enhancing regulations and enforcement in maritime activities, and developing better technologies to prevent and respond to shipping spills.

Addressing ship-based pollution, China has joined international efforts to minimize pollution from ships. The country has enacted regulations that mandate ships to dispose of their waste at port reception facilities instead of at sea, thereby reducing marine pollution. The "Regulations of Shanghai Municipality on the Prevention and Control of Ship Pollution" (Shanghai Regulation) and the "Regulations of Jiangsu Province on the Prevention and Control of Ship Pollution in the Yangtze River" (Jiangsu Regulation) were officially implemented on March 1, 2023 (Oasis P&I, 2023). These regulations, released by the Shanghai and Jiangsu MSAs respectively, aim to enhance measures against ship pollution.

Furthermore, China is investing in the research and development of biodegradable plastics and other eco-friendly alternatives to traditional plastics. This initiative not only reduces the reliance on conventional plastics but also promotes the use of sustainable materials (Zhu & Wang, 2020).

In conclusion, the above measures reflect China's commitment to mitigating plastic pollution and its acknowledgment of the substantial environmental challenges posed by single-use plastics. However, the success of these measures' hinges on their effective implementation and enforcement. It is crucial for China to ensure that these policies are adhered to, to achieve its goal of reducing plastic pollution by putting in place robust monitoring and evaluation system. Without a system to track progress and measure outcomes, it becomes challenging to identify areas of improvement or to gauge the success of the policy (Phulkerd et al., 2017).

### 4.1.3 "Unravelling the Key Contributors: An In-depth Analysis of Single-use Plastic as a Major Driver of Plastic Pollution"

Single-use plastics, due to their non-biodegradable nature, contribute significantly to environmental pollution. The rapid urbanization, population growth, and increased consumerism in West Africa have led to a surge in plastic waste generation, exacerbated by ineffective waste management systems. The disposal of these plastics often results in them ending up in unsuitable places like landfills and water bodies, posing a threat to marine life. The impacts of plastic pollution are multifaceted,

affecting both the environment and public health. Furthermore, plastic pollution has become a global concern, with single-use plastics being a significant contributor. This review focuses on the role of single-use plastics in plastic pollution in West Africa.

Single-use plastics, also known as disposable plastics, are used only once before they are thrown away or recycled. These include plastic bags, straws, coffee stirrers, soda and water bottles, and most food packaging. Studies have shown that these materials are a significant contributor to plastic pollution due to their non-biodegradable nature as an estimated 275 million metric tons of plastic waste was produced by 192 coastal nations, and of this, between 4.8 and 12.7 million metric tons ended up in the ocean in 2010 (Jambeck et al., 2015).

Additionally, around the world, a mere 9% of plastic waste undergoes recycling, whereas 22% is improperly handled of which Organisation for Economic Cooperation and Development (OECD) member states contribute to 14% of the total plastic leakage globally. This includes 11% of microplastics leakage and a significant 35% of microplastics leakage (OECD, 2022). The Outlook emphasizes the need for international collaboration to curb plastic pollution, which should involve aiding lower-income countries in establishing improved waste management systems to decrease their contribution to plastic leakage.


*Figure 2* ***Distribution of plastics handled by waste management category, post-disposal of recycling remnants and gathered litter, in 2019.***

***Source: OECD Global Plastic Outlook Database***

Furthermore, single-use plastics are prevalent in West Africa due to their convenience and affordability. However, their disposal poses a significant challenge. Studies have shown that these plastics often end up in landfills, water bodies, and other unsuitable places, contributing to environmental pollution and posing a threat to marine life (Adeniran et al., 2022).

The region's rapid urbanization, population growth, and increased consumerism have led to an increase in plastic waste generation (Nel & Peter, 2018). The lack of effective waste management systems further exacerbates the problem (Hoornweg, 2012). The impacts of plastic pollution in West Africa are multifaceted, affecting both the environment and public health. Plastic waste can block drainage systems, leading to flooding and the spread of waterborne diseases (UN Environment, 2018).
The 2018 World Environment Day consequently sparked a global movement against plastic pollution, impacting hundreds of millions of individuals across more than 190 nations with India taking the lead by promising to eliminate single-use plastics by 2022, setting a challenging standard for other countries. With pledges from 57 countries that account for over 60% of the world's coastlines, our Clean Seas initiative has become the most extensive worldwide agreement to fight marine debris (Environment, 2019).

The literature clearly indicates that single-use plastics are a significant driver of plastic pollution in West Africa. There is a need for more sustainable practices, including improved waste management systems, public education on the impacts of plastic pollution, and policies to reduce the production and consumption of single-use plastics (Kumar et al., 2021).

### 4.1.4 An Overview of Plastic Pollution In Key West African Countries

West Africa is a specific area within the larger continent of Africa, and it is made up of 16 countries. These include Benin, Burkina Faso, Cape Verde, Ghana, Guinea, Guinea Bissau, Ivory Coast, Liberia, Nigeria, Niger, Mali, Mauritania, Senegal, Sierra Leone, The Gambia, and Togo. These nations form the Economic Community of West African States (ECOWAS), a sub-regional political and economic organization.


*Figure 3 Map of Africa indicating the 16 member countries of Economic Community of West African States (ECOWAS).*

***Source: Researchgate, Uploaded by Tony Robert Walker***

A significant issue plaguing many West African cities is the lack of efficient waste management systems (Deme et al., 2022). This deficiency is a major contributor to environmental pollution and poses a serious threat to public health and safety. The absence of a well-structured and effective waste management system means that waste, particularly plastic waste, is not collected, sorted, or disposed of properly. Instead, it is often discarded carelessly, leading to a multitude of problems.

### 4.1.5 Examining Sigle-use Plastic as a Major Factor Exacerbating Plastic Pollution in West Africa: Case Study of the Lagos Coastline"

Approximately 80 percent of the plastics found in the ocean originate from land-based sources and mismanaged waste materials. These plastics enter the ocean through various pathways, including inland waterways, wastewater outflows, and transportation by wind or tides (Jambeck et al., 2015).

Between 1996 and 2014, Nigeria imported about 14.2 million tons of primary form plastics. Additionally, around 3.42 million tons of plastic products and about 5.55 million tons of product components were imported (Babayemi et al., 2018). Additionally, over a six-year period, approximately 194,000 tons of plastic toys were imported.

Studies have shown over the years that Accra in Ghana and Lagos in Nigeria are indeed major sources of plastic pollution in West Africa (Dasgupta et al., 2022). This is largely due to their large populations, rapid urbanization, and inadequate waste management systems (Adam et al., 2020). Both cities generate a significant amount of plastic waste, much of which ends up in the ocean, contributing to marine pollution. Efforts are being made to improve waste management and recycling in these cities, but it's a complex issue that requires significant resources and time to address effectively.

Furthermore, Lagos State, which is the second fastest-growing city in Africa and seventh worldwide, generates over 10,000 tons of urban waste daily due to its large population of over 21 million (Bakare, 2020). Despite the Lagos State Waste Management Agency's (LAWMA) efforts, managing municipal waste is a significant challenge. Issues include delayed collection of household waste, inadequate garbage disposal, unreliable transport infrastructure, and overloading of collection trucks. These problems have led to environmental concerns and calls for legislative compliance with modern waste transportation standards.
In addition, out of the 16 West African nations, 12 have implemented policies to reduce Single Use Plastics (SUP). However, 11 of these countries have opted for outright bans, with only Ghana adopting a market-based approach, specifically an excise tax on imported semi-finished and raw plastic materials, without implementing a plastic ban (Adam et al., 2020). This indicates that legislative bans are the primary policy tool used in West Africa for SUP reduction. The preference for legislative measures over other market-based strategies is a common trend across the African continent.

Research has shown that when plastic is heated or exposed, it releases harmful gases and that plastic also clogs drainage systems and occupies land space, leading to flooding and erosion, that has contributed a lot to the degradation of Nigerian roads (Kehinde et al., 2020). Lagos State in Nigeria is dealing with a substantial problem of plastic bag waste, which results in incessant yearly floods, the displacement of

thousands of people, and the spread of diseases such as malaria (Research Gate, 2019). Plastic bags, despite their adaptability, cost-effectiveness, and longevity, have become a significant source of environmental harm. To mitigate this issue, it's essential to encourage the use of greener alternatives like jute bags, woollen bags, and biodegradable plastics. As global trends move towards sustainability and Nigeria's plastic waste continues to increase, therefore it is crucial for the country to find alternatives to boost its economy. Therefore, there's a need to view plastic waste as a potential source of wealth (Kehinde et al., 2020).

The passing of the Stockholm Convention 2004, which is a global treaty designed to protect human health and the environment from persistent organic pollutants (POPs) offers a significant opportunity to enhance waste management in Nigeria and other developing nations (Babayemi et al., 2014). The POPs are chemical substances that persist in the environment, bioaccumulate in living organisms, and have harmful effects on human health and the environment. Article 5 of the Stockholm Convention specifically addresses the reduction or elimination of releases from unintentionally produced POPs. These are pollutants that are not intentionally produced but are released as by-products of industrial processes or combustion (STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS, 2008). Annex C of the Convention lists these unintentionally produced POPs, which include pollutants like dioxins and furans that are released from waste incineration and industrial processes. So, the phrase "Reduce or eliminate releases from unintentionally produced POPs that are listed in Annex C to the Stockholm Convention (Article 5)" refers to the commitment made by countries under the Stockholm Convention to take measures to reduce or eliminate the release of these unintentionally produced, harmful pollutants into the environment.

At the UN Environment Assembly (UNEA-5) in Nairobi, Heads of State, Environment Ministers, and other UN Member State representatives endorsed a historic resolution to end plastic pollution as Plastic production had dramatically increased from 2 million tonnes in 1950 to 348 million tonnes in 2017, creating a global industry worth US$522.6 billion (UNEP, 2022a). The capacity which is expected to double by 2040. The effects of plastic production and pollution on climate change, nature loss, and pollution could potentially lead to a catastrophic planetary crisis. They aim to establish an international legally binding agreement by 2024, addressing the entire lifecycle of plastic, including its production, design, and disposal (UNEP, 2022).

Some of the core functions of the Nigerian Maritime Administration and Safety Agency (NIMASA) duties are largely based on the IMO Conventions, which aim to protect the marine environment from pollution. Its Marine Environment Management Department enforces these conventions and the Marine Pollution Prevention Division (MPPD) implements strategies to prevent marine pollution from ships and land-based sources. Key conventions include MARPOL 73/78, London Convention 1972, Protocol 1996, Ballast Water Management Convention 2004, and Intervention

Convention 1969. National guidelines are created to ensure compliance with these conventions (NIMASA, 2007).

Current research suggests that the management of marine pollution in the ports of developing countries is hindered by insufficient administrative oversight and inadequate waste reception facilities. In Nigerian ports, the control of ship-generated waste and the provision of waste reception facilities are carried out by private firms, with no mandate for an activity review (Onwuegbuchunam et al., 2017).

Ship-source marine pollution poses significant challenges to Nigeria's seaports and coastal ecosystems. By addressing the causes, understanding the consequences, and implementing appropriate solutions, Nigeria can mitigate the environmental and socio-economic impacts of ship-related pollution. Strengthening regulations, improving waste management infrastructure, enhancing monitoring and enforcement, and fostering international cooperation are crucial steps towards ensuring sustainable maritime practices and protecting Nigeria's marine environment for future generations.

Côte d'Ivoire boasts one of the most rapidly expanding economies on the African continent. Pursuant to the report by the United Nations Environment Programme (UNEP), the plastics sector in the country provides employment to around 10,000 individuals across more than 40 factories, and indirectly supports an estimated 20,000 informal jobs. It is also reported that the nation imports approximately 300,000 tonnes of plastic each year, a significant portion of which is single-use products, in addition to the plastic that is manufactured within the country (UNEP, 2023). The detrimental resultant impact of plastic pollution on both land and sea environments led the government to place an embargo on the importation, manufacturing, utilization, and distribution of non-biodegradable plastic bags. This audacious initiative was designed to encourage the entire populace to cease the excessive use of plastic bags and instead, endorse the use of reusable bags and containers. In numerous establishments such as supermarkets, pharmacies, and bakeries, plastic packaging has lost its appeal) as industrialists, large-scale distributors, merchants, and consumers have embraced this environmental shift by incorporating alternatives to plastic bags into their operations and consumption patterns (Portail Officiel Du Gouvernement De Cote D'Ivoire, 2022).

As part of efforts to combat the issue of plastic pollution, on 16th September 2022, at the reconvened 18th session of the African Ministerial Conference on the Environment (AMCEN) concluded, environment ministers from all 54 African nations agreed on a set of resolutions and crucial messages to address climate change, nature loss, pollution, and waste (UNEP, 2022). This includes measures to eradicate the practices of open waste dumping and burning.

In conclusion, the approaches of China and West Africa in combating plastic pollution significantly differ. China, with its centralized government, has been able to implement sweeping reforms, such as the ban on non-degradable bags, and has

invested heavily in recycling infrastructure. This has resulted in a more comprehensive and effective response to plastic pollution. On the other hand, West Africa, the main policy instrument used to address the issue of plastic pollution is legislative bans. With its diverse range of countries and policies, has had a more varied response as seen in the case of Ghana that have employed the market-based approach. While some countries like Senegal and Rwanda have successfully banned single-use plastics, others like Nigeria are still grappling with the issue. This disparity in policy implementation and enforcement, coupled with inadequate waste management infrastructure, has hindered West Africa's overall progress in combating plastic pollution. Therefore, while both regions are making strides, their approaches and successes vary greatly due to differences in governance, infrastructure, and policy enforcement.

# CHAPTER FIVE: SUMMARY OF KEY FINDINGS

This research provides an overview of the international and regional legal framework for marine plastic pollution. It highlights several conventions and agreements, including the United Nations Convention on the Law of the Sea (UNCLOS), the International Convention for the Prevention of Pollution from Ships (MARPOL), the London Convention and Protocol, the Basel Convention, the Stockholm Convention, the Convention on Biological Diversity (CBD), and the UN Sustainable Development Goals (SDGs). Despite these measures, debates continue on the need for a specific international agreement for marine plastic pollution. The study also explores the issue of plastic pollution in the West African region, particularly the heavy reliance on single-use plastics in Lagos.

The research further delves into the role of MARPOL in curbing ship-based plastic pollution. It outlines the history of the MARPOL Convention, its objectives, and its regulations, particularly Annex V, which prohibits the disposal of all types of plastics into the ocean. It also discusses the requirement for ships to have a waste management plan and the importance of using port reception facilities for the disposal of ship-generated waste.

The study acknowledges the significant role of MARPOL in reducing ship-based plastic pollution but also highlights the need for continued efforts to strengthen its implementation and address remaining challenges. It calls for enhanced enforcement, increased awareness, and improved waste management infrastructure to further reduce ship-based plastic pollution and preserve marine ecosystems.

The study emphasizes the need for African-led solutions to waste management, but also highlights the importance of regional collaboration due to the transboundary nature of waste pollution. Examples of such collaborations include the Regional Action Plan for Marine Litter (RAPMaLi) for the Wider Caribbean Region and the African Marine Waste Network (AMWN).

In West Africa, 12 out of 16 countries have implemented measures to reduce single-use plastics (SUP). Ghana stands out for adopting a market-based strategy, imposing an excise tax on imported semi-finished and raw plastic materials.

In Nigeria, despite the widespread use of single-use plastics causing significant environmental, health, and economic issues, there is still no national legislation banning their use. However, initiatives like Sanitation Day and partnerships with organizations like Wecyclers and Recycle Points are making strides in waste management.

The review also mentions the TakaTaka Solutions in Nairobi, Kenya, and the tax on plastic bags in Sweden as successful examples of market-based approaches to waste management.
Nigeria is actively working on a National Action Plan to combat marine plastic litter and participating in the GloLitter Partnerships project. However, challenges include inadequate data, low awareness, poor law enforcement, lack of a comprehensive maritime action plan, weak infrastructure, and increasing plastic production/demand.

The research reveals the various policies and approaches adopted by African countries to combat plastic pollution. The most common policy is the ban or taxation of plastic bags, implemented by countries like Rwanda, Kenya, Tanzania, Eritrea, and Morocco. However, challenges persist, such as enforcement, finding affordable alternatives to plastic bags, and addressing other forms of plastic pollution.

Nigeria, with its large population, is classified as a middle-income country and is projected to become one of the world's largest generators of plastic waste. Therefore, successful management of plastic consumption and production in Nigeria would significantly benefit Africa and the world. United Nations Industrial Development Organization (UNIDO), funded by the Japanese government, has initiated a study on plastic usage in Nigeria, Egypt, and Kenya, which are among the leading economies in Africa (UNIDO, 2019).

Pursuant to the findings on the above United Nations Industrial Development Organization (UNIDO) publication titled Study on Plastic Pollution Value-chain in Nigeria, it is revealed that:

- There is a significant opportunity for businesses to introduce more environmentally-friendly products as a large number of residents are willing to pay a premium for such alternatives.
- Educational campaigns on the environmental impact of plastic waste have been effective, but there is still room for improvement, particularly in raising awareness about the global issue of marine plastic litter.
- The increased environmental consciousness among residents is a positive sign, but it needs to be matched with improved waste management infrastructure and services, especially in public spaces like marketplaces.
- The strong public support for legislation on plastic waste management indicates a readiness for regulatory changes. This support could be leveraged to push for the implementation and enforcement of comprehensive solid waste and plastic waste management policies in Nigeria.
- The findings also highlight the need for a designated authority to oversee plastic waste management, ensuring accountability and effectiveness in tackling this environmental challenge.

Circular economy efforts in Africa have gained momentum with the implementation of various measures to address plastic pollution, such as taxation and bans on single-use plastics (Weick et al., 2022). Egypt took a significant step in 2016 by implementing a National Action Plan for Sustainable Consumption and Production. Furthermore, during the United Nations Environment Assembly meeting in Nairobi in March 2022, 175 countries agreed to negotiate a new global treaty on plastic pollution, aiming to establish binding measures that cover the entire lifecycle of plastics.

Since Accra in Ghana and Lagos in Nigeria have been identified as significant contributors to plastic pollution in West Africa due to the large populations and rapid urbanization in the cities, inadequate waste management systems, have led to the generation of substantial amounts of plastic waste as result (Dasgupta et al, 2022). Unfortunately, a significant portion of this waste, which has found its way into the ocean, is exacerbating marine plastic pollution. While efforts are being made to enhance waste management and recycling in Accra, Nigeria is yet to have a policy in place for banning or imposing taxes on single-use plastics.

Indeed, countries like Ghana and Rwanda have demonstrated success in implementing bans on single-use plastics (SUPs). These bans have been instrumental in reducing the consumption and production of SUPs, thereby mitigating the negative environmental impacts associated with them.

In Ghana, the government implemented a ban on the manufacture, importation, and sale of SUPs in 2015, using the market-based approach. This move has led to a significant reduction in the use of plastic bags and other single-use plastic items. The ban has been supported by public awareness campaigns and enforcement measures, resulting in a noticeable decrease in plastic waste and improved environmental conditions.

Similarly, Rwanda implemented a ban on non-biodegradable plastic bags in 2008, becoming one of the first countries in the world to do so. The ban has been strictly enforced, and as a result, Rwanda has achieved remarkable success in reducing plastic pollution. The country has witnessed cleaner streets, improved waste management practices, and a shift towards more sustainable alternatives.

The success of these bans can be attributed to several factors. Strong political will, effective enforcement mechanisms, public awareness campaigns, and the promotion of alternative eco-friendly products have all played crucial roles. Additionally, the bans have stimulated the growth of local industries producing sustainable alternatives, creating economic opportunities and job creation.

## 5.1 Introducing Bans on Single-Use Plastics in Nigeria

Rwanda has been considered a successful case in terms of plastic bag management due to its strict ban on non-biodegradable plastic bags. The ban on non-biodegradable plastic bags in Rwanda has contributed to Kigali being recognized as the cleanest city in Africa (Global Initiative for Environment and Reconciliation, 2021). This achievement has had a positive impact on the tourism sector, with an estimated 1,219,529 international tourists visiting the country in 2019. As a result, the tourism industry has created approximately 89,607 jobs, showcasing the economic benefits of effective waste management and environmental conservation efforts.

Implementing a ban on single-use plastics in Nigeria, similar to Rwanda and Ghana, can help reduce marine plastic pollution and improve waste management. To achieve success, strong political commitment, investment in waste management infrastructure, and public awareness campaigns are crucial. Addressing challenges such as alternative product availability and affordability is important, and monitoring and evaluation mechanisms should be established for continuous improvement. By following these recommendations, Nigeria can make significant progress in protecting the environment and promoting sustainability.

## 5.2 Effective Implementation Through Awareness

Policies aimed at addressing plastic pollution may face challenges if they lack sufficient public support (March et al., 2022). Such policies often require strong enforcement, which can lead to discontent and noncompliance. In cases where public support is lacking, it is crucial to engage in targeted education, awareness-raising activities, and provide opportunities for ongoing involvement to ensure equitable and effective policies.

Awareness campaigns have proven to be effective tools in curbing marine plastic pollution in various countries (UNEP, 2021). Take 3 is an organization that collaborates with various stakeholders to raise awareness, reduce plastic pollution, promote waste reduction, prevent pollution sources, and encourage a circular economy. They are dedicated to partnering with Aboriginal and Torres Strait Islander organizations, individuals, and communities to achieve their goals.

In Australia the "Take 3 for the Sea" campaign encourages individuals to pick up at least three pieces of litter every time they visit a beach or waterway. This campaign has gained significant traction and has been successful in raising awareness about marine plastic pollution and promoting responsible waste disposal.

Since 2009, Take 3 has implemented education programs in schools, universities, surf lifesaving clubs, corporations, and communities across Australia. They have directly educated over 500,000 students and 100,000 community members (SDG, 2009). The

Take 3 community has grown to over 340,000 social media followers in 129 countries, who collectively remove over 10 million littered items each year.

Furthermore, in the United Kingdom, the "Refill" campaign encourages people to refill their reusable water bottles at designated refill stations instead of purchasing single-use plastic bottles. This initiative has gained widespread support and has contributed to a significant reduction in plastic bottle consumption. Likewise, in Canada, the "Great Canadian Shoreline Cleanup" is a national initiative that encourages volunteers to clean up shorelines and waterways across the country. This campaign raises awareness about the impact of plastic pollution on marine ecosystems and engages communities in taking action to protect their local environments. In New Zealand the "Sea Change - Tai Timu Tai Pari" campaign focuses on protecting the Hauraki Gulf Marine Park. It aims to raise awareness about the importance of reducing plastic waste and promoting sustainable practices to preserve the marine environment, while in Indonesia the "Less Plastic Waste, More Indonesia" campaign aims to reduce plastic waste and promote responsible waste management practices. It includes educational programs, community engagement, and policy advocacy to address the issue of marine plastic pollution in the country. These are just a few examples of countries where awareness campaigns have been successful in curbing marine plastic pollution. By educating the public, promoting behaviour change, and fostering community engagement, these campaigns have contributed to reducing plastic waste and protecting marine ecosystems.

In light of the foregoing, it is crucial for the Nigerian government to prioritize and enhance awareness regarding marine plastic pollution. This can be achieved through various strategies and initiatives.

Firstly, the government can invest in educational programs that target schools, universities, and communities across the country. These programs should aim to educate individuals about the detrimental effects of marine plastic pollution on ecosystems, wildlife, and human health. By raising awareness among the younger generation, the government can foster a sense of responsibility and encourage sustainable practices from an early age.

Additionally, the government can collaborate with non-governmental organizations, environmental groups, and community leaders to organize awareness campaigns and events. These initiatives can include beach clean-ups, public lectures, workshops, and exhibitions that highlight the impact of plastic pollution and promote sustainable alternatives.

Furthermore, the government can leverage traditional and digital media platforms to disseminate information and raise awareness on a larger scale. This can involve partnering with media outlets to broadcast documentaries, interviews, and public service announcements that emphasize the importance of reducing plastic waste and adopting eco-friendly practices.

To ensure the effectiveness of these awareness efforts, it is crucial for the government to allocate sufficient resources and funding. This can be done by including environmental awareness programs in the national budget and seeking support from international organizations and donors who are committed to combating plastic pollution.

By prioritizing and improving awareness in marine plastic pollution, the Nigerian government can empower its citizens to make informed choices, adopt sustainable behaviours, and actively contribute to the preservation of marine ecosystems.

## 5.3 Conclusion

The rise in marine environmental pollution caused by ships can be attributed to the increase in global shipping and the consumption of single-use plastics (Saliba et al., 2022). Authorities have started adopting measures to address the issue, but there are inconsistencies in international regulations on single-use plastic waste management (Edelson et al., 2021). To tackle these challenges, it is necessary to amend legal and regulatory frameworks, align national and regional regulations with international conventions, improve port reception amenities and monitoring facilities, strengthen legal enforcement and global supervision systems, and enhance awareness among crewmembers and shipping organizations.

As part of the global efforts to supress the menace of marine plastic pollution, the United Nations Environment Assembly resolution 5/14 has directed the Executive Director of UNEP to form an intergovernmental negotiating committee (INC). The INC, which started its work in the latter half of 2022, aims to complete its work by the end of 2024 (UNEP, 2023b).

The economic impacts of marine plastic pollution are substantial, with estimated losses of billions of dollars for coastal countries. However, many governments struggle to allocate sufficient resources to address the issue effectively. This research emphasized the need for improved waste management, public education, and policies to reduce the production and consumption of single-use plastics.

The heavy reliance on single-use plastics, especially in urban areas of West Africa, has further intensified the problem. Strategies such as market-based policies, extended producer responsibility, and public education have been identified as potential solutions to manage and reduce the environmental impact of single-use plastics. Also, Marine plastic pollution has wide-ranging ecological, economic, and human health impacts. It disrupts ecosystems, alters food webs, and leads to population declines among marine organisms. Economically, it affects industries such as tourism and fisheries, resulting in economic losses and reduced livelihood opportunities. Moreover, the ingestion of microplastics by marine organisms raises concerns about potential risks to human health through the consumption of contaminated seafood and water.

While global initiatives have been launched to address marine plastic pollution, African nations have taken unique approaches to tackle disposable plastic pollution. Efforts such as banning single-use plastic bags in Nigeria and adopting innovative policies will demonstrate a commitment to environmental sustainability and serve as a global example.

Mitigating marine plastic pollution requires a combination of preventive measures, effective waste management systems, and policy interventions. Future research should focus on understanding the long-term impacts of single-use plastics, identifying effective mitigation strategies, and assessing the socio-economic implications on vulnerable communities.

The potential to reduce single-use plastic pollution lies not only in awareness and education campaigns but also in the development of innovative solutions such as unmanned ships. However, these efforts must be complemented by the implementation of consistent measures and stringent regulations to effectively mitigate marine pollution from single-use plastics. This is crucial in order to protect marine ecosystems, socio-economic settings, and human health.

Addressing marine plastic pollution is a complex task that requires the collaborative efforts of various stakeholders, including governments, industries, and individuals. Each has a role to play in implementing sustainable practices, raising awareness, and developing innovative policies. By working together, we can strive towards a future with a cleaner and healthier marine environment for generations to come.

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