

MARITIME ENVIRONMENTAL VIOLATIONS COMMITTED WITHIN NIGERIA & ITS IMPACTS.

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BY

CHINEDU CHIDIA MADUEKWE

B.S. MARITIME TRANSPORTATION MANAGEMENT AND SECURITY
MINOR IN GEOGRAPHY

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APPROVED BY

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Vita

2016-Present B.A., Texas Southern University, Houston, Tx

Major Field Maritime Transportation Management and Security

Minor Field Geography

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Abstract

The maritime industry contributes its own fair share of pollution within Nigerian ports and communities by way of crude oil spills and inappropriate waste management facilities. This spills often occur on wetlands needed for commercial maritime activities and economic survival by local inhabitants. The inadequate disposal of ship waste by privately owned waste management facilities can lead to the encouragement of illicit disposal of waste and ballast into the sea before registering into ports and terminals. Such waste can introduce toxic and noxious liquids into waters affecting marine lifeforms and indirectly, local communities. As a result of such incident, a negative impact can be seen in public health, fishing communities, agriculture and economic benefits. A feasible solution to minimizing maritime environmental pollution would be to use an alternative power source for ships when stationed at port, creation of laws and emergency funds designed to protect the environment and develop government-controlled waste management reception facilities.

Chapter I

Introduction

Pollution is a disease that is often at times overlooked by many due to our personal biases and involuntary notion to often ignore it. The thought of pollution and the damages it brings not only to us as a whole but also to the surrounding natural environment is usually pushed out our minds as we go about our day contributing to its growth. As a civilization we ignore it because we believe that our little contribution to pollution, no matter how little does not affect the environment, thus leaving any evidence. The same can be said of the Maritime Industry operating within the boundaries of Nigeria. A country plagued with constant environmental hazards frequently overlooked for the sake of profit and commercial gain enjoyed both by foreign and domestic investors with little regard concerning the effects of waste and pollution on the land, ecosystem, and economy. The Nigerian Maritime pollution crisis doesn't only affect the port but also plays a part in greatly shaping the economies of neighboring communities within the proximity of the port. Lack of efficiency to enforce stricter maritime environmental rules and regulations is usually a result of major oil spills and the inadequacy of proper waste reception facilities in major city ports.

1.1 Background

A major cause of the ongoing pollution crisis relating to maritime activities is a direct consequence of weak administrative control over the ports, terminals, and ships. which results in major Oil spills being unchecked and the allocation of maritime waste reception facilities to third-party for-profit businesses. Fincial reparations offered to authorities often buy a blind eye giving both foreign and domestic investors a slap on the wrist indirectly supporting them. For instance, oil. Nigeria is one of the world's major exporters of oil. Ninety-five percent of the country's revenues are from oil exports. Its biggest customers being the United States and Europe. Oil attracts foreign investment into the country, creating infrastructures to better facilitate the flow of oil within the supply chain to be transported overseas. In 2008 and 2009, the Royal Dutch Shell's 55-year-old pipeline ruptured and spilled millions of liters of crude oil into the creeks and shores of the Niger River Delta. The spills from a ruptured Shell pipeline spewed thousands of barrels of oil over parts of the Bodo fishing community, a region rich in crude oil. The company decided on settling the affected community out of court, agreeing to clean up the oil spill and settle the occupants financially. Almost 10 years after the incident had been reported to have gotten worse, Shell finally agree to officially begin the first phase of the clean up within the contaminated fishing community.

A simple solution to overcoming Maritime pollution within Nigerian ports and water communities would be to ensure and promote stricter guidelines and penalties for companies to follow. This would create a system of accountability for corporations as well as domestic investors in respecting the environment they operate in. if Nigeria continues to be lenient, there would be no end to the frequent disregard for the natural environment.

1.2 Objectives

The primary purpose of this report is to educate my readers concerning some of the causes of environmental violations committed within Nigerian ports and waterways as well as illustrate various methods in which these violations could be minimized or completely subdued. The secondary purpose of this paper is to find and study the impacts and results of the maritime environmental violations within Nigeria and its people. This paper would focus primarily on using literature reviews to analyze the various categories of Maritime Environmental violations committed within the Nigerian region, Second this paper will search, find and recommend several methods by which environmental pollution due to maritime activities can be combated or minimized within the affected regions, with the goal of promoting a better more efficient alternative. This research paper will also provide the most feasible suggestion more suited to succeed within the specified regions. This paper will concentrate on studying and communicating the impacts of maritime associated pollution within the specified or surrounding community and how it has affected the natural environment consisting of the geography as well as the local biodiversity.

Nigerian ports and waterways are plagued with constant environmental hazards frequently overlooked for the sake of profit and commercial gain, there are often enjoyed both by foreign and domestics investors with little regard concerning the effects of waste and pollution on the land, ecosystem, and economy. Maritime pollution within Nigerian ports greatly affecting the developing economies. Certain violations that occur are often unnoticed but usually

carry out a devastating impact which creates a ripple effect around the affected community. By establishing efficient and controllable methods, Nigerian ports and authorities can effectively undertake the challenge of enforcing the rules in order to noticeably reduce the occurrence of these violations.

1.3 Significance

This study will provide students within an undergraduate level, who possess certain keen interests in Maritime transportation management and security, International Logistics, Maritime security and environment impacts a deeper understanding and knowledge regarding the impacts of maritime pollution in Nigeria. This paper will help students be able to identify the various types of violations committed within west African ports and waterways. In conjunction with being able to identify them, undergraduate students will learn several methods by which these violations can be resolved as well as form their own personal opinions and contributions. Students will also fully understand the significances of these violations upon the natural environment and better comprehend the impact it leaves within the surrounding community, Students will learn of the economic, environmental and social consequences.

1.4 Methodology

In order to create and produce my ideas to the best of my ability, I have decided in using credible literacy materials gotten from Texas Southern University as well as other libraries containing an accurate collection of valuable information which will be needed to write

this paper. In other to also expand my scope, I have accessed other online resources and respectable materials tailored to my background. Graphs and charts were used when necessary to give my readers a better view and understanding of the subject. The completed paper was reviewed and edited by a separate party in other to weed out deficiencies and mistakes.

1.4.1 TSU library catalog

Most of my sources were taken from the Texas Southern University online library, after conversations with the Librarian, she advised me on the advantages the online library brings. For example, digital libraries give you access to several contents that provide an enormous number of sources. Unlike traditional libraries which are limited by space and location, having books that consume a lot of space and people that walk around looking for materials, online libraries utilize the Internet and cloud storage to overcome limitations a physical library may hold. Online libraries also provide knowledge on the go, As long as students are connected to the Internet they can access digital libraries anywhere and at any moment using their technological device, this means students can use online books, images, videos, and all the other educational materials without having to go to the nearest library.

1.4.2 Google Scholar

Like other educational sources, Google Scholar provides a list of benefits to students who are looking to expand their knowledge and brightness. Some of the advantages Google Scholar provides is familiarity and simple to use set up, much like Google. Google Scholar also allows

users to search and find a wide variety of materials including articles and books. Some of the disadvantages one may come across in Google Scholar is although it is an extensive software it is not comprehensive, thus it should not be the only source you use in writing a research paper.

1.4.3 RefSeek

During my initial writing of this report Refseek was used to find some source or material for my topic which found useful to my topic, Refsec is relatively new to me as I haven't had to ever use it in any class I have taken but Refseek is a web search engine for students and researchers that aims to make academic information easily accessible to everyone. RefSeek searches more than one billion documents, including web pages, books, encyclopedias, journals, and newspapers. However, Refseek is currently in Beta and sure to drastically improve with the full release of the software. The advantage of Refseek is the comprehensive subject coverage without the excessive information other search engine offers. Increasing the effectiveness of the information given.

1.4.4 Internet Public Library

Some of my references were taken from the Internet public library, they provided me with a variety of text and sources I use towards my topic. The resources provided educated me on a series of subjects pertaining to my topic. The internet public library is a starting point for anyone involved in research on the Internet. It holds, many collections of reference, exhibits, magazines and serials, newspapers, online texts, and web searching. It has references that cover a

lot of academic subjects and provides a tutorial for people on the process of starting a reach topic.

1.4.5 ERIC

ERIC was used during the writing of this report, they are an Education Resources Information Center and they claim to be an online digital library of education research and information. They are sponsored by the Institute of Education Sciences part of the U.S. Department of Education. ERIC provides students with ready access to educational literature in order to support the use of educational research and information to improve practice in learning, teaching, educational decision-making, and research. The advantage of such a site would be the credibility it provides for its users. On the other hand, ERIC only provides educational material that were useful to my research.

1.5 Report Overview

The remainder of this report is organized as follows: Chapter 2 provides information regarding Nigeria's Maritime environmental pollution and the different pollutants. Chapter 3 introduces Countermeasures to minimize environmental pollution while Chapter 4 highlights the impacts of environmental pollution on the Nigerian people's health, economy, lifestyle and so on. Chapter 5 concludes the report with a summary.

Chapter II

Nigerian Maritime Environmental Problems

The Nigerian environmental problem is a highly complex situation influenced by many external and internal problems, highly contributing to an ecosystem challenged with multiple violations. The unavailability of adequate waste reception facilities run by the government and crude oil spills are one of the main causes of the maritime environmental pollutions afflicting Nigeria. Pollution is especially harmful to communities which are primarily involved by means of spills occurring within their land, the inhabitants are usually faced with financial and health implications severely impacting their livelihood. Poor waste reception facilities cause mariners to dispose of the garbage and waste irresponsibly, introducing toxic and noxious hazards to the water systems.

2.1 Pollution of Nigerian Ports and Terminals by Crude Oil

Many ports and waterways being utilized within Nigeria face an environmental problem. They allow themselves to become sustainable to certain environmental violations committed within or outside the port jurisdiction. This violation as previously stated is a direct result regarding a lack of authority from the port management and officials as well as other social contributions. For instance, A prime example of this is the ship waste control and reception facilities are outsourced to privately-owned companies with no strict requirements for an internal audit or one done by a governmental agency. This runs a risk of maritime waste operations being corrupted or tampered with for the sake of saving profit. Although this minimally eludes the fact

that most of Nigeria's environment disturbances come from oil spillages caused by the incompetence of major oil and gas companies, illegal refining activities, as well as a host of other activities, are the primary factors contributing to the maritime environmental violations. Due to a lack of authority and integrated security, the impression of weakness is giving, encouraging both foreign and domestic companies or entities to disregard the environment due to a lack of repercussion by the port or the national government.

For illustration, in 2008 and 2009, a Royal Dutch Shell's 55-year-old pipeline ruptured and spilled millions of liters of crude oil into the Niger Delta river affecting the Bobo fishing community. Although the company agreed to hold themselves liable to the disaster, they came to an out of court conclusion to settle the residents of the community whom had been affected. a sum of 80 million dollars. They furthermore agreed on cleaning up the oil spill and restoring the environment. Ten years passed as the environmental conditions worsened before the company officially started their long-awaited cleanup of the oil spill. During the 10-year period in which shell disregarded the community, the contamination of the water lead to human death, extermination of marine life and agriculture.

With the UN providing an estimate of nearly 30 years before the cleanup can be finished, many within the community and around argued for stricter penalties towards shell but none were issued due to the simple fact that about 90% of the Nigerian economy is heavily dependent on oil and gas exports. The region is in fact known "according to Nigerian academics, writers and environment groups, that oil companies have acted with such impunity and recklessness that much of the region has been devastated by leaks. In fact, more oil is spilled from the delta's network of terminals, pipes, pumping stations and oil platforms every year than has been lost in the Gulf of Mexico, the site of a major ecological catastrophe caused by oil that has poured from a leak

triggered by the explosion that wrecked BP's Deepwater Horizon rig"(Vidal, 2010). But unlike the BP incident which cost the lives of 10 workers the amount of Oil spills occurring within the Niger Delta region hasn't had an international coverage and outcry by major news outlets although it arguably has cost more lives and held a greater impact.

With little information being provided to the public concerning the true depth and magnitude of the oil spills that occur within the region, there is a highly uneducated majority even within the country that simply do not understand the impact talk less of the violations committed concerning the area. Insufficient utilization of the water costs the Nigerian maritime community to suffer as maritime commerce and activity along the riverbanks are unutilized thus reducing efficiency. The situation facing the Niger Delta region can help us understand better the true cost of drilling for oil in today's modern environment.

The Royal Dutch Shell transnational oil corporation wasn't the only leading oil and gas global company to admittedly spill oil within the Niger Delta region. On May 1st, 2010, an oil pipeline from the ExxonMobil Corp facilities in Akwa Ibom state, another region within the Niger Delta, ruptured and spilled affecting the local surrounding communities, farming, fishing and drinking water. With "more than a million gallons of crude oil was spilled into the delta over seven days before the leak was stopped" (Shackle, 2010). Exxon's contribution to the already contaminated regions highlights a pattern many oil companies exhibited while operating within the banks of the Niger Delta. Lack of care and professionalism due to minimal consequences by the Governmental agencies and maritime authorities.

Naturally, this gives foreign Oil and Gas companies operating within Nigeria an unusual advantage and political leverage to choose and administer their responsibilities according to their own choosing. Some compare this to a child stealing candy from a sweets jar, then decided how

he or she would like to be punished. The oil industry who carry out highly frequent maritime activities through the main ports of Nigeria, dominate themselves ruling with freedom. Typically, when pushed to settle neighboring communities affected by offshore oil spillage, they choose to pay a fine costing them little to nothing, a minuscule portion barely affecting their revenue.



Figure 1. Men walking in an oil sleek creek

(Source; Faul Michelle,2017)

2.2 Pollution of Nigerian Ports and Terminals by Inadequate Waste Control Facilities

Within the Nigerian ports and terminals, Violations committed directly to ports concern the execution of maritime waste facilities created to dispose of ship waste, garbage and noxious substances which can be accumulated by the crew, the cargo or simply the engine and mechanical system on board the ships. In order to prevent pollution from ships, it is important

ships coming into the port follow the exact correct procedures in maintaining and handling garbage, solid waste or any substance that may pose an environmental threat to the port.

“Between the years 2008 and 2011, there were around 32% and 18% increases in the quantities of garbage and oily waste handled respectively in Nigeria’s Tin Can Island port reception facilities alone” (Onwuegbuchunam et al., 2017) due to a lack of adequate waste reception facilities intended for handling a range of oil, chemical and garbage waste. The number is expected to rise even higher if a valuable solution or an upgrade to the facilities isn’t kept in place.

The Nigeria Ports Authority also known as the NPA is the federal governing agency responsible for the operation of all major ports within Nigeria, currently doesn’t own or operate any waste reception facilities within the ports or terminals but instead outsources the job and responsibility to privately owned pollution and control companies. With a belief that the private pollution control companies provide ports with better waste reception facilities. “The project is self-financing and contract tenure is 20 years beginning from the year 2006. In addition, this company is given the responsibility of monitoring waste discharge from vessels visiting the ports and reporting back to the authority” (Onwuegbuchunam et al., 2017). Creating a situation whereby there are no independent organizations or governmental task forces put in place to carry out an audit of the activities within privately operated waste control and pollution contractors brews a recipe for corruption as private companies can find ways to limit their expenses and raise their profit over cost.

A lack of adequate waste control facilities may also encourage ships to discharge their waste into the surrounding waters before entering the port of their destination. Harmful substances such as human waste may cause bacteria as well as other microorganisms to pollute

and infect marine creates within the water, toxic and noxious liquids discharge can also have a more devastating effect, reducing the marine species population and affecting communities who thrive off fishing and sea activities. It is evident that without proper utilization of waste control reception facilities to undertake the task of properly disposing waste elements from ships the continued effect of sea pollution will increase.

2.3 Summery

Oil Pollution in Nigeria is one of the most prominent forms of oil-related problem. This is due to big Oil companies and refiner's spillage oil which heavily affects the community. For instance, the Niger Delta is one a region in Nigeria known for having an abundance of crude oil found underneath the ground. in 2008 and 2009, a Royal Dutch Shell's 55-year-old pipeline ruptured and spilled millions of liters of crude oil into the Niger Delta river affecting the Bobo fishing community. 10 years passed as the environmental conditions worsened before shell official started their long-awaited clean-up of the spill On May 1st, 2010, An oil pipeline from the ExxonMobil Corp facilities in Akwa Ibom state, a region within the Niger Delta, raptured and spilled, affecting the local surrounding communities, farming, fishing and drinking water.

The Nigerian port authority doesn't own a waste control management facility in any port. Instead, they outsource the work to privately-owned companies who are not required to be audited by a governmental agency which allows a lack of security and efficacy. As a result, this encourages ships to discharge their waste into the surrounding waters before entering the port of their destination. Harmful substances such as human waste may cause bacteria as well as other microorganisms to pollute and infect marine life within the water. Toxic and noxious liquids

discharge can also have a more devastating effect, reducing the marine populating and affecting communities with thriving of fishing and sea activities. It is evident that without proper utilization of waste control reception facilities to undertake the task of properly disposing waste elements from ships, the continued effect of sea pollution will increase.

Chapter III

The Impacts of Environmental Pollution in Nigeria

The impacts of environmental pollution are heavily felt within areas of the Nigerian population, culture, agriculture, economy and so much more. People and areas affected often suffer greatly due to the changes that occur in the natural environment. Environmental pollution greatly impacts living creatures from all spectrum. Humans whom unfortunately experience environmental degradation may even pose to lose their life or suffer from health implications. This chapter expresses the impacts and the areas affected by pollution.

3.1 The Impact of Oil Pollution Within Nigerian Communities

Pollution in Nigerian waters has led to many of the challenges the country faces today. Nigeria's life, culture economy, and people are under heavy threat from Maritime related pollution. For instance, we discussed that environmental pollution by oil spillages were one of the most important tragedies plaguing the country water supply systems which are not just heavily relied on by the surrounding communities but also by the entire nation itself. Oil spillages from private companies and refineries leave a negative impact on whatever community they operate from.

An oil spillage into the Niger delta River can destroy the entire bio-ecosystem compromising of plants, animals, microorganisms, soil, rocks, and minerals and more

Importantly be linked to death. For instance, “A new study, the first to link environmental pollution with newborn and child mortality rates in the Niger Delta, shows that oil spills occurring within 10 km of a mother’s place of residence doubled neonatal mortality rates and impaired the health of her surviving children” (Hodal, 2017). In other words, Babies born within Nigeria to parents whom happen to live close to an oil spillage are more than likely to die in the first few months of their life’s. this shocking reality is the truth many in Nigerian living in rural areas must face.

The children whom have not fully developed basic defenses such as the blood-brain barrier, which helps protect against toxic chemicals, according to Hodal, are still at risk. Even small doses of pollution are likely to be large in comparison to an infant’s body weight. Mothers who ingest poisoned food or contaminated water are also at greater risk of maternal malnutrition and sickness, potentially increasing infant mortality risks.



Figure 2. Pregnant woman stands near oil spill

(Source; Osodi George, 2017)

Oil pollution doesn't only affect newborn babies and infant children, it also affects the water supply, contaminating the fishes and plants that dwell below. The Niger Delta is one of the richest wetlands in the world. Housing several species of plants and aquatic animals. Due to immersive exploitation of crude oil found within the region, several problems have risen such as contamination and destruction of wetlands, water bodies, aquatic life, and destruction of farmlands. Oil exploitation has also “increased the rate of environmental degradation and has perpetuated food insecurity as a result of the death of fish and crops as well as loss of farmlands and viable rivers for fishing activities leading to loss of livelihood”. (Osuagwu et Olaifa, 2018). Many Nigerians found within this region are often poor, suffering from starvation as a direct result of the oil spills. Some

communities or groups living within the Niger Delta region for years have depended on fishing as their prime source of food and economic survival. The destruction only creates more problems for them in the future.

It is no doubt that the catastrophic effects of oil spillages impede on the agricultural productivity of the community, which in the long-run has an adverse consequence on the economic life of the inhabitants of this region as stated earlier. Thus, ensuring that the people living within this region continue to toil in the circle of poverty due to the destruction of their way of life. Farming becomes also incredibly difficult as the soil becomes polluted unable to grow any plants or induce toxins into them, leaving it undigestible. This reason creates more problems than alternatives forcing community members to fall into criminal activities.

3.2 The Impact of Pollution Concerning the Nigerian Economy

Nigeria has been impacted by economic challenges due to pollution coming from all areas of life. Maritime related oil pollution affects the economy as well as the communities that have no other choice but to live in the polluted area. For instance, we talked about how oil spills have contributed to the hardship many Nigerians face today, but these spills also have several effects on the economy as well. On a rudimentary level, oil spills lead damaged waterways, marine life and plants, and animals on the land. "The impact of oil spills can also ruin the infrastructure and economy of a particular area with the long-term effects being felt for decades". (Chavis, 2018). Disturbing future generations and adding pain and suffering to them can be felt from starvation, poverty, lack of clothes and shelter. Cleaning an oil spill can ultimately be very

expensive, spreading the costs among government agencies, non-profits, and the oil transport company too. As a result, each time an oil spill occurs with the Niger delta or any surrounding community, the Nigerian people are to lose even faith in the government. And oil companies' ability to control this very much needed product.

Oil has a direct impact on water, the most important natural resource need for any community to survive and contribute to the economy. The chemical composition of oil mixes with the water and creates a new substance known as mousse which becomes even more sticky than oil alone, affecting it to stick to organisms and materials much more quickly causing it to become more expensive to treat and contain. Nitrates and algal blooming in drinking water sources can also drastically increase treatment costs for contaminated water for resulting in billions of US dollars to rectify.

When mousse forms it often resembles food for a number of animals, this attracts certain peculiar birds and marine life that when consumed that can end up being killed. And attempting to clean the oil-water mixture can be very difficult. It becomes challenging to dispose of and usually retains very little value when treated. In the event of an oil spill, animals can suffer detrimental effects on their fur and feathers. "For example, a seal pup's fur will break down, causing it to experience hypothermia. This same effect is responsible for the majority of bird deaths in oil slicks. Outright ingestion of oil creates toxins in the system" (Chavis, 2018). This causes the animals affected to experience trauma and lose of life. Reducing the animal pollution within the area. As a result of this, communities that rely heavily on animal agriculture for their livelihood are left out. Commerce is slowly reduced leading to financial loss.

Animals affected in the immediate vicinity of the oil spill also have the potential of affecting animals farther up the food chain. For instance, take a fish for example. If the fish

consumes a small amount of oil, it may be able to survive but may pass on that oil to another animal bigger than itself far away from the site of the incident. Causing death. One long-term effect on animals is the fact that most birds and reptiles exposed to an oil slick have the side effect of producing thinner eggshells. In addition, algae and seagrass becomes tainted. This can make the entire ecosystem uninhabitable for years causing a ripple effect of instability to the surrounding economies.

Another impact of environmental degradation on the economy is how much the regions tourism industry loses each year, we understand that tourism holds many significant benefits such as its economic benefits and significance that give the region a certain respect among the businesses in the community, public officials, and the public in general. Healthy tourism gives rise to decisions or public policies that are favorable to tourism, leading to an influx of foreigners coming and spending money with the Community. “Support is important for tourism, as it is an activity that affects the entire community. Tourism businesses depend extensively on each other as well as on other businesses, government and residents of the local community” (Stynes) in other words tourism affects every aspect of society promoting business for economic benefits and significance. Instead, Environmental pollution does the opposite, it destroys the tourism industry as fewer people desire to travel into those regions affected. Business will not receive any new annual customers willing to spend money on souvenirs, food, and tours because the land becomes undesirable to people looking to enjoy their stay.

Another important threat facing the economy in the event of an oil spill is the overall cost and unforeseen challenge of cleaning up an oil spill. Often at times although the cost is shared between the government and parties involved the total cost of cleaning up an oil spill and returning everything to normal can be extremely enormous. Since oil spills can occur anywhere

in the ocean or near land, the resources needed to repair the situation in a timely manner are generally not located near the site. This can even become more expensive when a location is located within a remote area like a small fishing community located along the Niger River. The general ways to clean up an oil spill are varied and cause their own environmental effects.

For example, controlled burning can also be used. However, this method causes a large amount of air pollution in the atmosphere and can easily get out of control causing more destruction to Nigeria rainforest and spreading the fire to other areas. Detergents are also beneficial in fighting an oil slick but also possess long-term effects on the ecosystems.

3.3 The Impact of Maritime Air Pollution Regarding Human Life

Environmental pollution on human health and life is extremely important. Earlier in this paper, I provided the information concerning how babies in the Niger Delta were more likely to die before and shortly after their birth. Environmental pollution whether by oil, air, garbage and so forth brings many hazardous implications to human beings as well. Some of these implications remain dormant for long periods of time, staying undetected until they harm the afflicted or curse him/her their life. In Nigeria as well as around the world many ports and Maritime vessels produce a certain amount of air pollution, some more than in others. And although ports have always been gateways for global trade and are critical to world economies, they are also major sources of ship pollution by air and so fought, vehicle emissions, dust, and even noise. A well-known characteristic ports are how close to heavily populated urban areas they are centered. This is due to civilization growing alongside port. Unfortunately, this also creates a high possibility of exposing millions of inhabitants to additional pollution.

Before we list the implications of shipping-related pollution on the human body let us start by explaining how shipping vessels contribute to air pollution. Vessels traveling along the waves of the sea use an engine that relies heavily on fuel oil. Heavy fuel oil is much cheaper than petrol used for land transport but also has a higher polluting impact. According to Dudley Curtis, The SO₂ content of Heavy Fuel Oil is 2700 times higher than road fuel! In developed countries, SO₂ emissions have been dropping so that now SO₂ pollution is rare in urban environments. The main SO₂ source remaining is from ships coming into port. Meaning the maritime industry is behind in insuring ships and vessels strive to be at the forefront of a green future.

In addition to ships, ports contain a vast array of diesel-powered machinery such as straddle carriers, terminal tractors and reach lifters. These diesel-powered engines result in an elevated emission of various pollutants from the ports creating lots of noise which is another form of pollution. When added to the shipping emissions this makes ports, a significant net contributor to pollution in large port cities.

Ports also contribute in pollution by “having large amounts of bulk materials e.g. aggregates, foodstuffs, fertilizer and wood products. These materials in dry and windy conditions inevitably result in dust drifting into neighboring areas. Dust, because it can be seen and felt by affected people, can be a major nuisance” (Thongplang, 2017). Thus, contributing to health-related pollutions. These materials can often be smelly, which further upsets people living within proximity to the Port. Pollution from ports and ships causes an array of environmental impacts, can seriously affect the health of workers and contributes significantly to regional air pollution.

Many people often focus on the younger generation, but maritime contributed air pollution can have a significant effects on the people with existing health concerns and those who live nearby the ports, air pollution is also associated with an increased health risk in many

adults especially for the elderly whom when compared to their neighbors or those who live on the same street or within a few blocks of each other, have an increased risks of heart attack and deaths from heart disease. According to the Environmental Defense Fund (EDF), people age 65 and over, living with higher concentrations of nitrogen dioxide (NO₂) and black carbon (BC) outside their homes were associated with an increased rate of having a heart attack, heart surgery, and/or dying due to coronary heart disease. The study also found that among the elderly, the other vulnerable populations where children and pregnant women, deeming them more likely to experience health impacts from exposure to air pollution.

3.4 The Impact of Pollution Regarding Nigerian Agriculture

As previously hinted at but often less talked about, is how pollution disrupts agriculture, especially in Nigeria, a country that is amongst Africa's wealthiest, most populous nation, with a fast-growing economy. More than half of the country lives below the poverty line, while northern Nigerians suffer the world's third-highest level of chronic undernutrition among children. It is estimated that more than one million children between the ages of six months and five years are acutely malnourished.

Agriculture could be referred to as the production, processing, promotion, and distribution of agricultural products. It plays a vital role in the entire life of the Nigerian economy. Agriculture is also the backbone of the economic system of any country. In addition to providing food and raw material, agriculture also provides employment opportunities to a very large percentage of the population contributing in many ways. Agriculture is the main source of livelihood of many people accounting for almost 70% of the nation's population who directly

rely on it as a mean of living. This high percentage in agriculture is the result of the non-development of non-agricultural activities to absorb the fast-growing population. Agriculture contributes to another main source of national income for Nigeria apart from oil and gas. There are multiple reasons why agriculture isn't just important for the Nigerian people but also important to the world.

Pollution destroys agricultural crops making them indigestible to the human body. It is a widespread problem that influences not only agricultural productivity but also human health issues causing grave and irreparable damage to the Nigerian natural environment and its people. Environmental pollution affecting Nigeria agriculture has become a major concern resulting from the activities of not just the community inhabitants but also from the shipping and transportation pollution. "Nigeria as a developing country has lost much of her habitable environment due to environmental degradation and pollution, which destroys crops and aquaculture through the contamination of waterways, groundwater, and soil and causes flaring of associated gas" (Godson-ibeji et Chikaire, 2016). Pollution degradation of the land is not only financially expensive but also cost the natives of the land deeply, for instance farms coming from extremely poor communities rely heavily on the crop to feed their family and sell for commodity at the market. A situation where the farmer cannot produce enough to sell or consume will lead to starvation, lack of return to the local government or administration and a rise in governmental aid and support.

Rampant mismanagement of the land resources leads to significant negative consequences on crop, land productivity and economic activity, which further impoverish the already poor farmers in these areas. With the increasing soil infertility as a result of the destruction of soil micro-organisms, dwindling agricultural productivity, and contamination by

crude oil and gas residue or spillage, farmers have been forced to abandon their home and lands in search of alternative means for their survival. This is a prime reason why agricultural destruction is never a good thing. The nutrients in the ground disappear making it uninhabitable for even future generations.

3.5 Summary

Oil pollution is one of the greatest forms of pollution the Nigerian society is challenged with. Oil spillages often occur within an area whom as the Niger delta River leading to the destruction of bio-ecosystem compromising of plants, animals, microorganisms, soil, rocks, and minerals and more Importantly be linked to death. For instance, A new study found environmental oil pollution was linked to newborn and child mortality rates in the Niger Delta. It showed that oil spills occurring within 10km of a mother's place of residence had doubled the neonatal mortality rates and impaired the health of her surviving children. In other words, Babies born within Nigeria to parent whom happen to live close to an oil spillage where more likely to lose their life's in the first few months of their birth. this shocking reality in which Nigerian living in rural areas affected by oil spillage must face.

Pollution has had its effects on the Nigerian economy by touching on major industries and natural resources needed to fuel people and organizations. This sections explains the various ways by which pollution from pollutants has affected communities by displacing them and disrupting their business, destroying their source of water which is a natural resource needed for survival to even be able to work. This section also explains how pollution by oil has affected the tourism industry which could potentially bring in a high amount of revenue for the federal

government. In this section, we also explained how the loss of animals and needed for local communities to hunt and farm have been killed due to hazardous materials contaminating their food source, in turn, reducing their population which makes it difficult to farm them and produce financial gain for the economy.

The maritime industry has contributed to air pollution globally. It is an undeniable fact especially within Nigerien ports and terminals. Air pollution is a major form of crisis many often do not pay attention to. Shipping vessels are a major source of ship pollution by air and so fought, vehicle emissions, dust, and even noise. A well-known characteristic of ports are how close to heavily populated urban areas they are centered, which is due to civilization growing alongside port. Unfortunately, this element has also created a high possibility of exposing millions of inhabitants to additional pollutants such as nitrogen dioxide (NO₂) and black carbon (BC) which can be very deadly to the older generations as well as newborns and minors exposing them to a higher chance of health issues.

This section introduces the impacts of pollution on agriculture, it links the relationship with communities, pollution, economy, human health and agriculture, taking a deeper look and account into how groups of people are affected when their main source of income and livelihood is under attack from. Pollution on the land destroys agricultural crops making them indigestible to the human body, resulting in several health hazards which may lead to the end of one's life. The problems are a widespread concern that influences not only agricultural productivity but also economic activity and it has the potential to cause grave and irreparable damage to the Nigerian natural environment. Nigeria is a developing country that has lost much of her habitable environment due to environmental degradation and pollution. The Nigerian people feel its impacts severely, especially the poor.

Chapter IV

Solutions Aimed to Minimize Maritime Environment Pollution in Nigeria

This Chapter emphasizes some of the various solutions available, in order to combat environmental pollution in correlation to maritime activities. This chapter discusses how proper waste reception facilities, the inclusion of environmental law and regulations, fines and penalties, emergency fund protocols, and cold ironing, can help protect the Nigerian environment from potential disasters targeting the ecosystem. Some of the solutions provided may come at a great financial cost to the government. It is accurate to imply that if implemented, there will be measurable progress in the sustainability of the natural ecosystem.

4.1 Proving Adequate Waste Reception Facilities Administered by the Government

In order to efficiently reduce maritime pollution in Nigerian ports as a result of poor waste management, the government will have to reevaluate themselves and realign with the International Maritime Organization (IMO) rules and laws for the prevention of Maritime Pollution (MARPOL). Annex V-Prevention of pollution by garbage from ships, highlights the necessary step and measure to ensure proper disposal of harmful garbage resulting from ships in order to reduce the risk of polluting marine life at sea. According to MARPOL Annex V, it requires governments to ensure ships are provided with adequate reception facilities at ports and terminals for the collection of garbage without causing undue delay to ships, and according to the

needs of the ships using them. The Nigerian Port Authority must ensure private waste control facilities under contract from the government are audited annually to ensure the expectations of the Port and IMO are

1. Kept and followed directly to the manual.
2. Ensure no illegal activity has occurred.
3. Waste from ships are properly disposed of and collected.
4. Promote quick turnaround.
5. Increase the efficiency of overall Maritime Operation.

If accommodated properly, pollution as a result of garbage from ships will surely plummet, encouraging more commercial traffic and reliability from the Ports, terminals and reception facilities.

4.2 Enforcing Nigeria's Laws and Regulations

The creation of laws aimed at protecting the nation's waterways is in truth the first step necessary for the security and safety of our seas. But enforcing those laws is where true importance occurs. Nigeria like many countries have established effective laws designed for the prevention of pollution. Such laws may include the National Environmental Standards Regulations and Enforcement Agency, aimed at protecting Nigeria's environment, The Harmful Waste Act which prohibits the carrying, depositing and dumping of harmful waste on land and in territorial waters and so on. When it comes to whom enforce this law, Nigeria utilizes its Navy unlike the U.S whom rely on their Coast Guard.

The utilization of the Navy does not suffice, leading to a lack of enforcement. This is not to say that the Nigerian Navy is incapable of enforcing and protecting Nigeria's maritime rules and laws on the sea but we must also understand that the Navy is designed and intended for combat against both foreign and domestic entities which pose a threat to the state. As such the Navy interest and primary focus is toward a different goal or agenda. Thus, why it would be to the betterment of Nigeria to follow in the footsteps of the United States and establish a Coast Guard, primarily focus on maritime activities and the enforcement of the country rules and regulations.



Figure 3. Nigerian Navy trains with U.S. Coast Guard.

(Source; Lally Johnathan, 2019)

This stands to offer the benefit of.

1. Improved Enforcement of Maritime Rules
2. Maritime Law Enforcement
3. Aid and Navigation to mariners
4. Quick response team
5. Search and Rescue units

This advantage stands to not only help the country's natural environment but also help other mariners coming into Nigeria's ports and terminals. It provides them with security and confidence encouraging them to follow the rules set out by the government and other governing agencies.

4.3 Stricter Punishment and Fines for Pollution of the Sea by Oil and Gas Agents

Nigeria is one of the world's biggest suppliers of crude oil and gasoline, although many of the refining activities occur inland, there are some which happen on water. Refining activities often leave a devastating effect on water, thus making it a maritime issue that simultaneously affects seaborne commercial trade and wildlife. As previously highlighted, foreign oil and gas companies exact an extremely strong presence of influence over the Nigerian economy as well as host communities in which they operate to gather petrochemical resources and crude. Idemudia & Ite (as cited in Effiong, 2010) noted that "The way the oil industry operates in many developing

countries indicate that the interest of host communities and multinational oil companies are often at odds. In short, the host communities bear the brunt of environmental degradation and other costs, whereas they derive few benefits from the revenues generated". Foreign oil and gas companies do not hold the interest of the oil-producing communities in which they operate but rather their primary goal is to maximize their revenues and investments.

Therefore, it is within reason that the Nigerian government should take the necessary precautions by enforcing stiffer punishments on foreign oil and gas companies whom deviate from the rules or spill oil due to negligence. These punishments will not be designed to limit their business flexibility but instead to protect health and prosperity for the host communities in which they conduct their refining operations. Ensuring that the environment remains sustainable not only benefit agricultural, commercial and navigational purposes of the the surrounding population, but also for future generations to thrive culturally without fear of environmental toxicity.

4.4 The Implementation of an Emergency Fund and Protocol Against Oil Pollution.

As a member of the IOPC, Nigeria is entitled to funds against oil pollution according to the International Maritime Organization (IMO). Although this is a positive phenomenon, it is also important for the Nigerian Transportation ministry to create and fund a countrywide oil spill initiative program which sets aside available resources to combat, secure and clean up an oil spill as soon as they occur, reducing significant impacts. This fund will:

1. Provide the necessary equipment and tools needed
2. pay for spill clean-up costs when the party responsible doesn't compensate spill victims for their financial losses when the spiller won't
3. seek reimbursement from spillers for oil spill cleanup costs.
4. research and development and other specific appropriations

A federally approved trust fund will help protect and ensure that the Nigeria environment and natural resources remain untampered with while providing a level of security, peace of mind and wellbeing for potential citizens whom may be at risk of an oil spill exposure.

4.5 Cold Ironing; An Alternative Solution to Combating Maritime Pollution

Nigerian ports across the country fall behind in many aspects of maritime environment pollution prevention initiatives when compared to western and European Ports. A modern progressive approach to reducing emissions from ships coming into port may be the installation of "Cold-irons" to reduce the amount of emissions ships burn into the atmosphere while docked at port.

Cold Ironing or Alternate Maritime Power (AMP) is an Alternate Maritime Power designed for anti-pollution measures designed to assisting the reduction of air pollution generated from diesel generators or fuel by using shoreside electric power as a substitute. Cold Ironing is used when the ship is docked at port so that the engines of the ship which works on diesel does not need to be used unnecessarily. This, in turn, helps in reducing

the emissions from the ships by a great amount. With this process, emergency equipment, refrigeration, cooling, heating, lighting, and other equipment are still able to receive continuous electrical power, while the shiploads or unloads its cargo. Cold ironing also provides several benefits such as

1. Reduction of noise pollution;
2. Provides better onboard comfort while in port
3. Provides green profile for ship owners and customers
4. Reduces lifecycle cost by fewer fuel consumption and maintenance cost

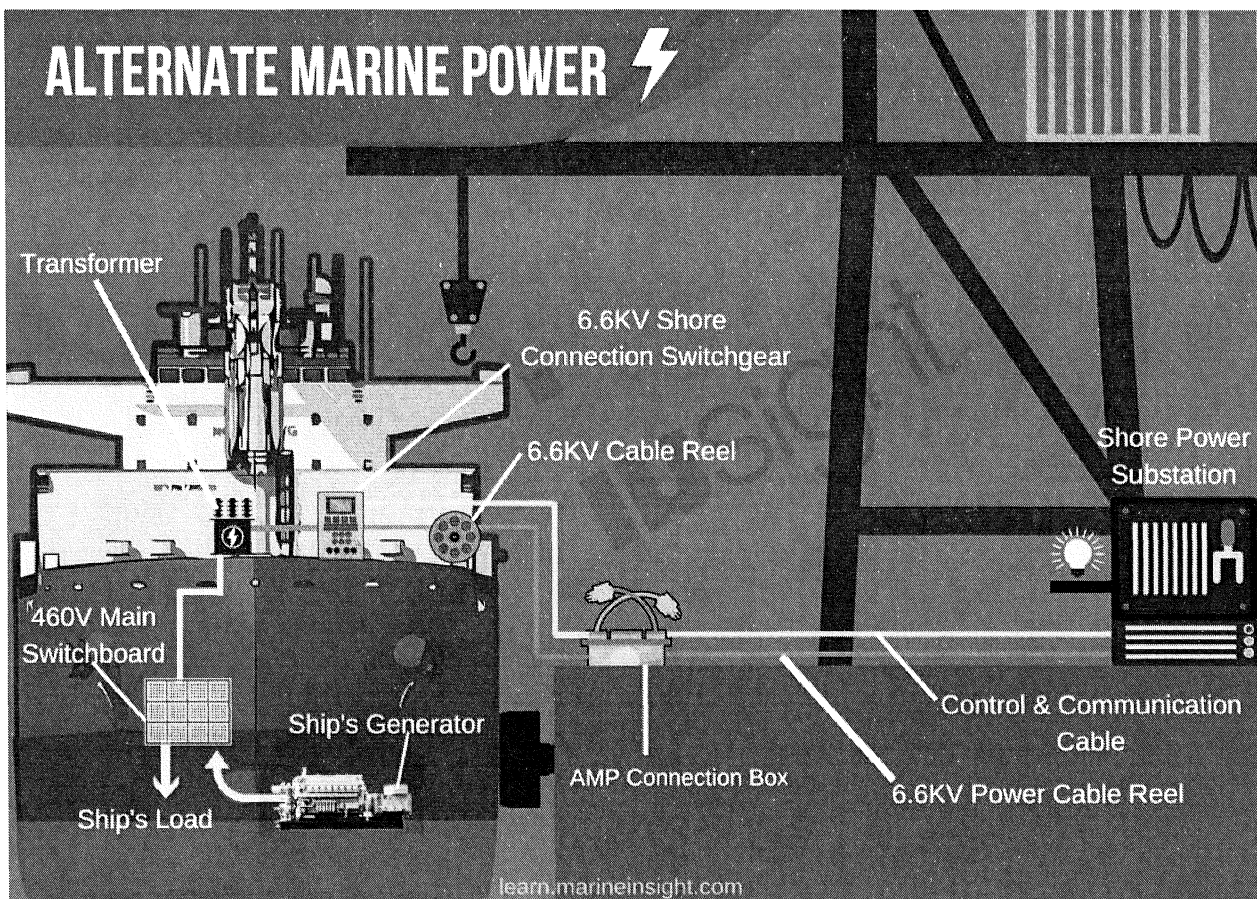


Figure 4. Alternate Marine Power

(Source; Agarwal & Begum, 2019)

A decision to incorporate an alternate maritime power will help outfit Nigerian ports with the tools needed to minimize environmental pollution by emissions significantly reducing the footprint left behind by ships. If the Nigerian Port Authority were to provide this alternative source of energy to ships, this may also attract possible options for potential investors into the country.

4.6 Summery

The federal government and Port authority lack proper waste management and facilities which handle toxic materials and hazardous waste from the ships. They do not own any facility instead they outsource it to different companies which operate without governmental audit. This increases the chance of corruption and a shortcut culture. For Nigerian ports and terminals to operate efficiently the port authority must control their own waste control facility and management which is under IMO law

It is important for the Nigerian government to impose stricter punishments and fines on oil companies who spill oil within the communities they undeniable serve. Oil companies spillages often affect communities greatly, both in cost and potential hazards. Therefore, it is within reason that the Nigerian government should take the necessary precautions by enforcing sticker punishments on foreign oil and gas companies who deviate from the rules or spill oil due to negligence. These punishments will not be designed to limit their business flexibility but instead to protect health and prosperity for the host communities where they conduct refining operations from. Ensuring that the environment remains sustainable not only agricultural, commercial and navigational purposes that will benefit the surrounding population but also for future generations to thrive culturally without fear of environmental toxicity.

This sections highlights the importance of Nigeria having its own oil spill trust fund which will provide the necessary equipment and tools needed, pay for spill clean-up costs when the party responsible doesn't compensate spill victims for their financial losses when the spiller won't, seek reimbursement from spillers for oil spill cleanup costs and research and development and other specific appropriations. A fund will provide the necessary equipment and tools needed, pay for spill clean-up costs when the party responsible doesn't compensate spill victims for their financial losses when the spiller won't, seek reimbursement from spillers for oil spill cleanup costs and research and development and other specific appropriations.

One of the most efficient solutions Nigerian Ports and terminals could effectively use to reduce air pollution within orts is “Cold Ironing” or also known as Alternate Maritime Power which is designed for anti-pollution measures dedicated in assisting the reduction of air pollution generated from diesel generators or fuel by using shoreside electric power as a substitute. Cold Ironing is used when the ship is docked at port so that the engines of the ship which works on diesel does not need to be used unnecessarily. This, in turn, helps in reducing the emissions from the ships by a great amount. With this process, emergency equipment, refrigeration, cooling, heating, lighting, and other equipment are still able to receive continuous electrical power, while the shiploads or unloads its cargo. Cold ironing also provides several benefits such as providing a green profile for ship owners and customers.

Chapter V

Conclusions

Environmental pollution is a critical subject of discussion that we must all come to understand. It affects what we do and impact the life's around us, especially in a country such as Nigeria where huge Oil and gas companies are allowed unparallel reign, a country where the Port authority and relevant governmental agencies do not operate their own waster control facilities affecting the maritime industry and allowing room for pollution-related incidents

Nigeria maritime industry has suffered violations against it resulting in environmental pollution that spills into the land affecting the communities it reaches. Some of these violations are atrocities against the natural environment such as oil spillages caused by the incompetence of oil and gas companies, which irrespectively give room to illegal refining activities as well as a host of other activities contributing to the degradation of the maritime environment. Poor waste control facilities that force maritime vessels and ships to find less environmentally friendly ways to dispose of their waste and garbage materials. These violations result not only in maritime Environmental pollution but also in the economic downturn and destruction of the land.

The necessary solutions needed to minimize maritime environmental pollution includes ensuring the Port authority provide ships with an adequate reception facility at ports and terminals for the collection of garbage without causing undue delay to ships, and according to the needs of the ships using them which reaches expectations of the Port and IMO. The government should also enforce stricter fines and outfit the ports and terminals around the country with alternative Maritime powers or Cold ironing.

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