

Joint Master in Global Economic Governance and Public Affairs

The Challenges in Achieving SDG 14 (Life Below Water) in Nigeria: The Environmental Impact of Policies Regulating the Oil and Gas Industry

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2023

Statutory declaration

I hereby declare that I have composed the present thesis autonomously and without use of any other than the cited sources or means. I have indicated the parts that have been taken out of published or unpublished work correctly and in a verifiable manner through a quotation. I further assure that I have not presented this thesis to any other institute or university for evaluation and that it has not been published before.

11/06/2023, Lorin Giulia

Acknowledgments

The writing of this thesis would never have been possible without the precious help of my supervisor, Tatjana Khun, who granted me her insights and provided valuable advice. I would like to thank her for the time she spent meeting with me on numerous occasions and for sharing her knowledge.

I am also grateful to LUISS and CIFE for building such a complete programme which challenged me every day of the academic year. Both institutions enabled me to gain the necessary knowledge throughout the year to be able to write a thesis on a complex topic.

Additionally, Arnaud Lecompte, the director of the Global Economic Governance and Public Affairs programme, is to be thanked. I will forever be appreciative of the opportunity to participate in this master's degree, which made me grow both on the academic and personal levels.

Finally, I would like to give a last thank you to my parents, my family, and my loved ones for always supporting me, no matter how far away I am from them. Their unconditional love and support are what keeps me going.

Abstract

The paper investigates the intrinsic relationship between the oil and gas industry in Nigeria, at the core of its economic growth strategy, and the implementation of Sustainable Development Goal 14 (Life below water). Nigeria has been heavily reliant on the industry, which contributed significantly to its economic development. However, this overdependence raises concern regarding the long-term economic sustainability of the country, as well as its environmental hazard. It has notably led to weak governance, low enforcement of regulations, and corruption practices that pose challenges to the achievement of environmental SDGs. The Petroleum Industry Act introduces a new framework for the oil and gas industry in Nigeria. Its impact on the marine environment is explored by the research, but no significant progress has been identified. The paper advocates for economic diversification as a means to improve all areas of sustainable development. Blue Economy is notably identified as a potential driver of economic stability and social well-being for Nigeria, all the while focusing on the protection and reasonable use of marine resources. The paper, therefore, provides recommendations to enact the 'blueing' of the overall economy and the oil and gas industry, with the purpose of achieving SDG 14 and consequently the other aspects of sustainable development.

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Chapter 1: Introduction

1. Introduction

The implementation of the Sustainable Development Goals (SDGs) introduced by the United Nations (UN) is a main objective to be reached by 2030 for 193 member states (United Nations, 2023). All countries coming together during the UN General Assembly in September 2015 and ratifying the 2030 global agenda represents a breakthrough, where both developed and developing economies agreed on the importance of achieving economic growth, social inclusion, and environmental safeguard at a global scale (Ogbodo et al., 2021). The 17 goals are meant to guide all nations into attaining a fairer level of living conditions throughout the world. The publication of yearly reports by the UN allows for monitoring the evolution of each country in achieving each one of the 17 goals and their sub-targets. They notably enlighten the fact that, because of national specifics, countries are not equal in reaching the SDGs. This implies that countries will not reach all SDGs at the same time, as they each prioritize some goals over others in relation to their specific needs.

In light of the climate emergency, the achievement of environmental SDGs should be a priority all around the world, though the reality is far from it. SDG 14 focuses on one of the most important resources provided by the Earth: water. More specifically, its focal point is to ensure the prosperity, conservation, and responsible use of oceans, seas, and all marine resources (The Global Goals, 2022). Oceans represent 70 percent of the surface of our planet and therefore play a key role in supporting life on Earth. This diverse and crucial ecosystem deeply contributes to regulating climate change by transporting heat from the equator to the poles (National Oceanic and Atmospheric Administration, 2021). Oceans are a source of a number of natural resources, including food, materials, and energy; and are at the heart of important activities such as transportation and recreation. The latter especially participate in economic growth. Oceans, seas, and marine resources are overall key elements for human well-being, as well as socioeconomic development. Improved protection of

marine areas notably participates to diminish poverty by rising fish catches, creating new jobs, increasing income improving health, and empowering women (United Nations Environment Program, 2017). In short, the preservation of life below water is an absolute necessity to safekeep a healthy life on Earth.

With a coastline of 853 km adjacent to the Atlantic Ocean, Nigeria is blessed with a maritime area of about 46,000 km², where a diversity of natural marine resources can be found (Ateme, 2021). Because a number of economic activities in the country are derived from the ocean, putting marine conservation at the forefront of priorities would be coherent. Nonetheless, Nigeria still faces significant challenges for SDG 14 to be achieved (Sustainable Development Solutions Network, 2022b). This can be explained by the fact that Nigeria's main activity is based on the exploration and exploitation of oil and gas, which are known to be detrimental to the environment in general, and to marine resources in specificity. Being a member of the Organisation of the Petroleum Exporting Countries (OPEC), and Africa's largest oil producer (Elum, Mopipi and Henri-Ukoha, 2016), Nigeria positions the oil and gas sector at the heart of its economic development strategy. This paper thus discusses the extent to which the Nigerian federal government prioritizes economic interests based on the oil and gas industry, over the preservation of marine biodiversity.

Furthermore, the concept of Blue Economy is introduced as a viable solution for Nigeria to combine both aspects. This novel model is indeed concerned with the conservation of oceans and their inherent resources, while responsibly using them to promote sustainable economic growth and individuals' well-being (Ibrahim, 2018; Okafor-Yarwood et al., 2020; Lee, Noh and Khim, 2020; Cisneros-Montemayor et al., 2021).

This paper aims to uncover the negative effects of Nigeria's principal industry on marine biodiversity and by extension on the achievement of SDG 14. It starts by presenting the study focus and the methodology adopted for the research. The second main section explores the existing literature to explain why and how the oil and gas industry has become a main factor of economic growth in Nigeria, and the extent to which it affects marine biodiversity. The third chapter focuses on the implementation of a new framework for the industry in Nigeria, known as the Petroleum Industry Act

(PIA) 2021, and explores the environmental regulations it establishes. The final chapter introduces the possibility for Nigeria to sustainably use marine resources for the benefit of economic and social development, through implementing Blue Economy. The part also provides recommendations to enforce this concept in the sector and in Nigeria. The paper concludes with findings from literature and discussion.

2. Methodology

This paper intends to explore the consequences of oil and gas exploration on the achievement of SDG 14. The ancillary objective of the research is to underline that the Nigerian federal government fails to prevent such operations to deter natural resources because of the economic gains they bring. The main research question the paper addresses is: To what extent do Nigeria's economic growth policies in the oil and gas industry hamper the achievement of SDG 14 (Life below water)? Accordingly, the research methodology used in the paper is documentary analysis. This analytical method is useful because the revision and evaluation of documents provide insights to gain informed understanding and foster empirical knowledge (Bowen, 2009). A literature review was conducted to gather existing scholarly work, reports, and other studies related to the research topic. Relevant articles and publications were collected from academic databases, journals, and institutional websites in order to provide up-to-date and reliable information. Furthermore, a case study approach was adopted to examine the introduction of a new legal framework in the Nigerian oil and gas sector and its impact on the marine environment. Consequently, related documents and official reports were explored to gain in-depth understanding of the environmental impact of the novel regulations. To complement the qualitative findings, quantitative data was gathered from secondary sources. Numerical figures related to Nigeria's progress towards SDG 14 and the evolution of gas flares and oil spills were collected from international organisations and reputable data sources. The quantitative data is represented in graphics and was analysed through descriptive statistics. This method describes and summarizes the data in a meaningful and efficient way (Vetter, 2017). Discussing and

interpreting the graphical elements in conjunction with the textual data allows for a comprehensive understanding of the research findings.

3. Limitations

The research process encountered some challenges linked to the availability of data, as well as the gathering of updated information. Searching for reliable and up-to-date figures relating to SDG 14 and the state of marine resources in Nigeria was especially challenging. In addition, some sources presented conflicting data for the same period, which required particular attention and the exploration of complementary resources to obtain reliable information. In order to overcome the lack of data, several organizations and specialists were contacted, but not all provided a response.

Chapter 2: Literature review: Economic growth, a major challenge to the introduction of environmental SDGs in Nigeria?

As Nigeria strives to achieve sustainable development and meet the goals set by the UN within the 2030 Agenda, the question arises as to whether economic growth, driven by the oil and gas sector, challenges the successful implementation of environmental SDGs. This chapter presents an extensive literature review that explores the complex relationship between economic growth and environmental sustainability, with a focus on SDG 14, in Nigeria. It starts by recognizing the important contribution of oil and gas to the government's budget and national revenue. This very contribution has nonetheless created an overdependence on the sector, with the emergence of unsustainable growth patterns. The Natural Resource Curse and Dutch Disease typically prove the adverse effects of excessive reliance on natural resources. The review further delves into the role of the Nigerian government in regulating the industry, thus uncovering the strong hold it possesses. A third part examines the impact of Nigeria's prominent sector on marine resources and SDG 14, highlighting the environmental pollution and habitat destruction thus caused. Looking at the evolution of SDG 14 in Nigeria finally allows to grasp the progress made, as well as the remaining gaps barriers to its achievement.

1. The oil industry in Nigeria: a factor of economic development?

a) Nigeria and the oil industry

For any country, regorging of large volumes of natural resources is a blessing, even more so when it regards fossil fuel. Only a few countries around the globe can make it an income engendering commodity. The significance of crude oil comes from the fact that it can be refined into new products including fuels and lubricants for

automotive, ships or aircraft engines (European Commission, 2020). Nigeria is one of those countries in Africa that has discovered to be rich in mineral resources in the 1950s and rapidly identified it as an important driver of economic development in the nation. The discovery of oil in commercial quantities rapidly made the oil and gas industry the biggest in the Nigerian economy (Ebimobowei, 2022).

Crude oil became the principal natural resource in Nigeria from the mid-1970s onwards. Mostly driven in the area of the Niger Delta, onshore oil exploration represents over 65% of total production, whilst the remaining production accounts for offshore work, in particular drilling for oil in the continental shelf (Ebimobowei, 2022). Considering the rising role of oil in the country, it joined the OPEC. Through being the first Sub-Saharan African state to join the coalition in July 1991 (OPEC, 2021), it further put the nation as a producing leader on the international scene for oil and gas. Nigeria later realized the extent of the potential of the industry in the aftermath of the Middle East war. Indeed, in 1973, while most nations suffered from an unexpected boom in oil prices and the related increase in general prices, Nigeria strongly benefitted from the situation and soon put this industry at the core of its economic growth strategy. To this extent, the oil sector now constitutes 90% of the country's foreign exchange earnings and 80% of its Federal Revenue, thus participating to employment generation, foreign exchange, government income and gross domestic production (Ebimobowei, 2022; Anyaehie and Areji, 2015).

The abundance of crude oil in Nigeria allows the country to rank 1st in Africa to produce this coveted resource. At the international level, the country is the 12th producer of oil and gas and accounts for 3 percent of total global production owed to the possession of the 10th largest hydrocarbon reserves (Akinyetun, 2016). This situation allows the country to have the biggest economy in Africa in terms of GDP. Yet, the country remains far behind in terms of socioeconomic development of local communities, with the alarming level of poverty that continues to rise (Oludimu and Alola, 2021). Especially, the locations where oil exploration are undertaken are also the most affected by the lack of development. This undoubtedly questions the ability of the Nigerian oil industry to drive development, not only in terms of GDP but also that of the overall society. I therefore interrogates whether the oil industry benefits the country as a whole. Indeed, several studies have evaluated if Nigeria is affected by the Natural

Resource Curse, or the Dutch disease. To this end, the long-term economic model of Nigeria is also examined.

b) The Natural Resource Curse and the Dutch disease: to what extent is Nigeria affected?

While it could be expected that a country uses its natural resources in order to develop, studies have shown that oil exploration is not necessarily a source of economic growth but can rather be associated with a number of distortions. Evidence has shown that the discovery of oil in Nigeria has driven the enactment of “rent seeking” (Enyoghasim et al., 2019). Tullock (1967) and Kreuger (1974) both introduced this phenomenon as corrupt political institutions that earn benefits from abundant natural resources, which actions are at the origin of societal deficiencies. To this extent, a country being rich in natural resources does not necessarily implies wealth. Two terms have been used to refer to this inconsistency, the so-called Natural Resource Curse and the Dutch disease. These two phenomena are of particular importance in the case of Nigeria, since Oludimu and Alola (2021) declared in their study that the country is affected by both.

The concept of resource curse was first identified by Richard Auty in 1993, referring to the contradiction that resource-rich countries grow more slowly than those that do not possess natural resources. Not only their economic growth is slower, they also tend to have higher rates of conflict and authoritarianism (Ebimobowei, 2022). Corrigan (2014) further defines the Natural Resource Curse as a situation arising when resources provide lower rewards than the input cost. In particular, the author estimates that natural resources adversely affect economic development and governance in the context of weak institutions. To this end, possessing abundant natural resources might not appear as a beneficial feature, but rather as a curse. According to Neo (2009), this paradox can be explained by the fact that resource-rich economies, most notably those located in the South, previously were colonies exploited for their resources without consideration for their development. The colonial past could therefore persist even long

after the country's declaration of independence, and further compromise these previous colonies from diversifying their economies. Neo (2009) further underlines that over-relying on a single resource brings internal conflicts to take control of the exploited resource.

The Dutch Disease phenomenon is related to the Natural Resource Curse but goes beyond by implying that an expensive natural resource sector can drive other industries to failure, typically the manufacturing and the agriculture sectors (Corden, 1984). This disease creates an over-dependence of the country's economy on a single sector, which is additionally price sensitive and anchored in a volatile global market. The term "Dutch disease" was first introduced in 1977 in an article published by *The Economist* regarding the situation happening in the Netherlands following the discovery of gas fields in the late 1950s (*The Economist*, 1977). Indeed, while this discovery allowed the country to increase its export earnings of natural gas, it resulted in a large capital influx into the sector. Consequently, the domestic currency appreciated, leading to a rise in the Dutch unemployment rate coupled with the weakening of the manufacturing sector (Neo, 2009).

In practice, an important number of developing economies have shown struggles in allocating the gains from their natural resources towards socioeconomic development (Adam et al., 2019). While Nigeria is indeed wealthy with oil and gas, its inhabitants remain poor, with limited access to vital resources such as clean water, electricity, hospitals, modern schools and safe roads. Food insecurity is an additional issue brought by Nigeria's dependence on the oil industry (Elum, Mopipi and Heni Ukoha, 2016). Most precisely, the oil-producing regions, such as the Niger Delta, are excruciatingly impacted by the delay in development, for the benefit of other regions that continue their advancement. This further underlines the important responsibility of the oil sector for the shortfall of socioeconomic progress.

Corruption is identified as the main cause for the inability of the oil sector to drive development, as the oil money is kept hidden in politicians' private accounts rather than being invested in development projects that benefit the population as a whole (Elum, Mopipi and Henri-Ukoba, 2016). According to Oludimu and Aloha (2021), the widening socioeconomic gap in the country is due to corruption in the oil

industry, allowing less than 2% of the Nigerian population to share 80% of the country's total energy revenue. Looking at Transparency International's Corruption Perception Index (CPI), the country is ranked 150th out of 180 countries and scores 25 out of 100 in 2022. Undoubtedly, these results prove Nigeria's deeply corrupt nature and the extent of the weakness of the institutions in place. Elum, Mopipi and Heni Ukoha (2016) argue that the former and current political class have not been successful in honouring their responsibility to improve the lives of their people and protect the environment. Notably, the authors highlight the inefficiency and weak enforcement of regulations towards multinational companies to exploit natural resources without adversely affecting the locals' wellbeing and homes. In fact, such a setting allows the global oil companies operating in Nigeria to benefit their own interests before all else, therefore adding up to the natural resource curse. According to the study of Adams et al. (2019), the behaviour of multinational oil companies (MNOCs) to maximise their profits through rent-seeking, long-term lobbying, tax avoidance and transfer pricing is a factor contributing to Nigeria's impotence to step back from the loop of the natural resource curse. The authors argue that not only MNCs do not contribute to the socioeconomic development of oil-rich countries, but they can also cause slower socioeconomic growth for the affected local communities. Through entertaining such a behaviour, MNOCs rattle the traditional economies and activities of the local populations and sustain the cycle of poverty in the affected regions (Elum, Mopipi and Heni Ukoha, 2016). In particular, the MNOCS' operations pollute the environment, thus contributing to the loss of biodiversity, which notably affects fishers and farmers, in addition to threatening Nigeria's food security.

The Natural Resource Curse and the Dutch Disease both uncover the underlying challenge faced by Nigeria, being the excessive exploitation of natural resources resulting in an over-dependent economy.

c) Nigeria's overdependence on the oil industry

When Nigeria obtained its independence from the British Empire in 1960, like most African countries, the nation's main source of revenue came from agriculture and extraction of solid minerals (Anyaehe and Areji, 2015). The discovery of many natural resources scattered in various regions of the nation in the 1960s, coupled with the expansion of petroleum in global markets rapidly drove the country to shift its economy-base from agriculture to petroleum. Akinyetun (2016) notably underlines the short period of time it took Nigeria to completely change its economy, as well as the nation's neglect of the agrarian industry and other economic sectors. Today, we can define Nigeria as a mono-economic country, considering the level of dependence on the oil industry and the revenues it brings. Indeed, petroleum and other petroleum related products account for 75.1 percent of the country's total exports; and another 12.7 percent represent exports in natural and manufactured gas (Allianz, 2023). These figures further show that Nigeria is solely reliant on the oil industry, while it has potential to develop other sectors through exploiting solid minerals, agriculture, manufacturing and service industries. To this end, Nigeria can be described as a commodity dependent country, that is a country that derives "at least 60 percent of their merchandise export earnings from the commodity sector" (UNCTAD, 2021). This state of dependence leads to important economic challenges including negative terms of trade, unpredictable export revenues owed to high export price volatility of these products, macroeconomic and microeconomic challenges. The report of the United Nations Conference on Trade and Development (UNCTAD, 2021) refers to Nigeria as being trapped by this commodity dependency, despite the fact its exports were relatively diverse in the 1960s.

Nigeria indeed fails to enable each sector of its economy to blend together and mutually grow. According to Anyaehe and Areji (2015), a major issue lies with the nation's secondary sector, including manufacturing and building and construction, that is unable to integrate into the economy and therefore slows down economic development. Not only does the sector fails to support the primary sector, but the goods produced by the latter do not go to the secondary sector and are directly distributed to their end user. Undeniably, the fact that economic sectors fail to cooperate is mainly owed to poor infrastructures and badly integrated human capital. The authors thus underline the need for boosting the secondary industry in order to use Nigerian resources as efficiently as possible. The inefficiency of its economic model is furthered

by completely putting aside valuable resources. As previously mentioned, the agrarian sector used to be the main source of revenue for the country before the discovery of oil, but is now being forgotten. Moreover, Nigeria could strongly benefit from the 37 types of solid minerals available on its soil, as a source of foreign revenue earner and GDP contributor (Anyaehe and Areji, 2015). This industry nonetheless remains neglected and left to local peasants that lack the monetary resources and expertise to make it a viable source of exploitation. The study of Anyaehe and Areji (2015) further highlights that despite being among the top global petroleum producers, Nigeria is yet to stop exporting important amounts of refined oil to sustain its domestic needs, because of its lack of other petrochemical industries needed to support the oil industry. Allianz's country report notably shows that petroleum, petroleum related products and materials account for 24.6 percent of total imports, making them the most imported products (Allianz, 2023).

Being a mono-economy based on petroleum has important implications for the country. Notably, Nigeria's inability to diversify its economy has created mass unemployment, that cannot totally be absorbed by this one industry. In fact, one industry cannot employ the entirety of a nation's population. The unemployment rate is high in Nigeria, amounting to 40 percent according to Coface (2023). This is an alarming figure for the well-being of the country's economy. This occurrence is a source of social tensions stemming from the growing gap between the wealthy people operating in the oil industry, and the poor ones working in the mainstream economic industries (Anyaehe and Areji, 2015). It is further important to pinpoint that as the main source of government revenues, the oil industry drives socio-political instability. Interest groups at the command of the Federal Government control the oil industry and have failed to run important macroeconomic policies to diversify the economy, which only benefits their own interests (Ebimobowei, 2022). It undeniably shows the government's prioritisation of sharing the oil revenue, rather than allocating it to creating sustainable economic development, focusing on economic diversification and engagement of cooperative behaviours to create wealth (Anyaehe and Areji, 2015). Consequently, Nigeria's current model of development is bound to fail as it deeply fragilises the country. On top of that, it is necessary to keep in mind that petroleum is a non-renewable resource, and to this extent it is destined to be exhausted eventually. While Nigeria seems to have forgotten

about this certainty, the international community has not and is already searching for alternative renewable energy sources, which promises for a gradual demise of the oil market (Anyaehe and Areji, 2015). Consequently, Nigeria's economic model is unsustainable in the long-term and deeply weakens the country.

Relying on one sector has indeed increased the vulnerability of the nation, making its economy unstable due to fluctuations in international oil markets, which is highly volatile. Both the Dutch disease and the Natural Resource Curse imply economic fluctuations in export prices and render difficult long-term planning through its inability to diversify the economy (Neo, 2009). The instability of oil prices on international markets can easily explain the lower rates of economic growth and stability in Nigeria (Ebimobowei, 2022). The study indeed found a statistically significant negative relationship between crude oil and gas exports and economic growth between 1990 and 2019, implying that more exports in oil and gas drive slower economic growth in the country. The empirical research further shows that domestic crude oil sales and economic growth have a statistically insignificant negative relationship. The author concluded that oil revenues overall adversely affect economic growth during the reviewed period.

Overall, evidence has shown that the over-reliance of Nigeria on the oil industry has adversely influenced the country, in terms of economic and social development, and has brought increased instability within the nation. The government has notably been highlighted as a main actor resistant to changing the current framework because of the benefits it derives from it.

2. The role of the Nigerian government in regulating the oil industry

The Nigerian political landscape has been shaped by the opportunity to control the oil industry, and the wealth yielding from it. The federal government has asserted a strong hold on its natural resources as soon as they have been discovered in the territory through implementing a number of laws (Akinyetun, 2016). The enforcement of such regulations provides the government with exclusive rights to the deposits. They are

backed by the Nigerian Constitution which gives the government control rights on oil and gas minerals located both on and under any land in the country, including its exclusive economic zone (Udoma et al., 2019). A body for the Ministry of Petroleum Resources has been created within the government, with the scope of regulating this industry and formulating relevant policies. It is also entitled to authorize petroleum activities as it is the body providing leases and permits to operate in the national territory (Udoma et al., 2019). Other agencies exist, such as the Nigerian Content Development and Monitoring Board, to oversee, track and coordinate the evolution of Nigeria's involvement in the petroleum industry.

The main regulation implemented is known as the Petroleum Industry Act (PIA), which replaced the former Petroleum Act in 2021. This new framework aims to reshape the oil and gas market of the country, through providing a legal, governance, regulatory and fiscal structure (Price Waterhouse Coopers, 2021). Some key areas of the new Act include discussions about energy transition and sustainability, underlining the country's awareness for a necessary change in the sector. Nevertheless, it is important to note that, in line with the former Petroleum Act, the government maintains ownership and control over petroleum activities and resources within the Nigerian territory, including its territorial waters¹, continental shelf² and exclusive economic zone³ (EEZ) (International Energy Agency, 2022). Furthermore, the Minister of Petroleum Resources' role of formulating, monitoring and supervising government policies in the industry is renewed; as well as for its capacity of granting permission for operations (Udoma et al., 2019).

Regulations exist in addition to the main framework in the industry. Notably, the Oil Pipeline Act provides a legal structure for the operation and maintenance of pipelines incidental and supplementary to oilfields and oil mining in Nigeria (Akinyetun, 2016). First enforced in 1956, the legislation regulates the granting of licences and permits, which allow the use of pipelines to transport oil, gas, as well as

¹ They represent the area of the sea that is bordering the shores of a country (Encyclopedia Britannica, 2020).

² The area of the continental margin that is between the shoreline and the shelf break, or between the shoreline and the point where the depth of the water is between 100 and 200 meters (UN Oceans and Law of the Sea, n.d.).

³ The area beyond the territorial sea that is subject to the legal framework of the coastal state (United Nations, 2019).

their derivatives and components for the purposes of producing, refining or conveying the aforementioned products (UNEP, 2013).

A number of laws were additionally passed for the protection of the environment, such as the Oil in Navigable Waters Act that was promulgated to enact the terms of the International Convention for the Prevention of Pollution of the Sea by Oil of 1954 to 1962. The law was intended to reduce the pollution Nigerian waters, notably through delimitating prohibited areas at sea (Chioke, 2021). Under this Act, the discharge of crude oil, fuel, lubricating oil, heavy diesel oil or any product containing at least 100 parts of oil from a Nigerian ship into a prohibited sea area is outlawed and repressible.

Despite the existence of such regulatory measures, their effectiveness in overcoming environmental issues and promoting sustainable practices is doubtful. According to numerous studies (Ele, 2022; Okoro and Arinze Umobi, 2022; Elum, Mopipi and Heni Ukoha, 2016), the laws and regulations in place are not the problem, but rather the weakness of the implementation process that fails to drive compliance from oil and gas actors. The Nigerian government has been unsuccessful in monitoring and enforcing such environmental standards, leading to companies not complying to said environmental measures⁴. As highlighted by Ele (2022), poor enforcement is due to regulatory agencies that lack technical and human resources. The author also argues that the fines are low for non-compliant companies, thus implying that they are not discouraged to act against the law. Undoubtedly, Nigeria's government has a big responsibility, and the continued disrespect of laws underlines a lack of political will to better enforce environmental protection regulations. This can be proved by looking at the alarming state of natural deterioration in the country.

3. How has the oil industry been affecting SDG 14?

⁴ In the case of *Gbemre v Shell Petroleum Development Company Nigeria* in 2005, the latter stakeholder refused to oblige to the court's decision to stop further gas flaring activities in the applicant's community.

a) Sustainable development and SDG 14 in Nigeria

The concept of “sustainable development” is not new, it has first been discussed in the Brundtland report in 1987. The idea was defined as a “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development, 1987). For the first time, a world summit made an official statement on the impact of human activity on the environment by shedding light on the problem. The report publicly recognized that individuals have present and future needs which should be prioritized, but that the environment’s capacity to fulfill them can be limited due to the state of technology and social organization. The idea that social and economic development and environmental protection act as three pillars of sustainable development was later added by the World Summit on Sustainable Development in 2005 (United Nations, 2005). These three concepts work interdependently and mutually reinforce one another (see Figure 1).

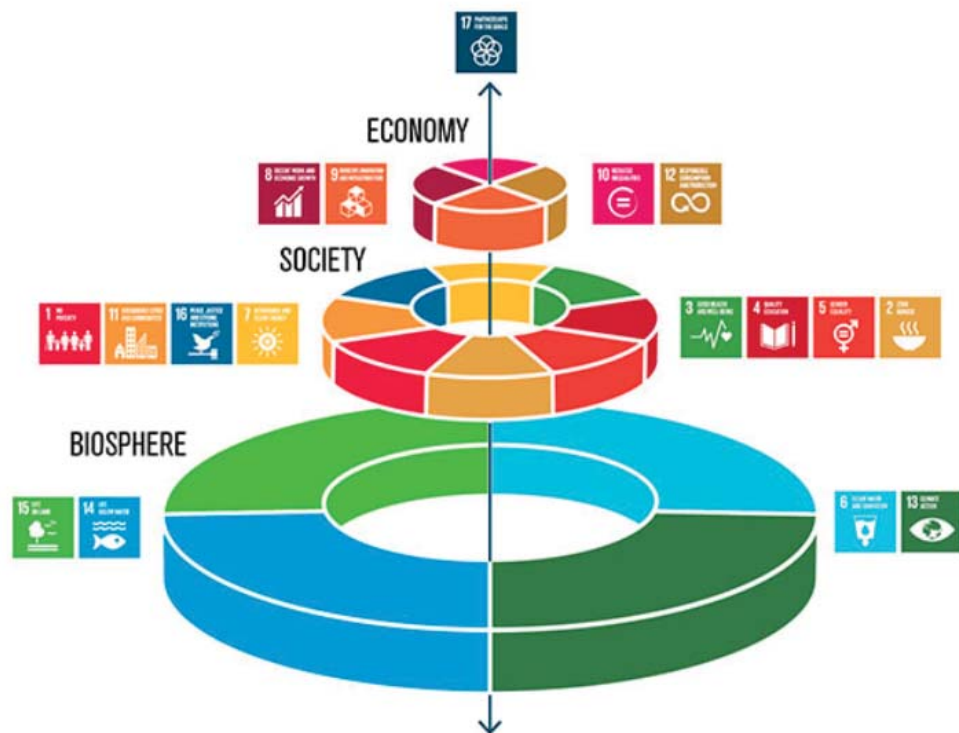


Figure I: The 17 Sustainable Development Goals and their interlinkages⁵
(Stockholm Resilience Centre, 2017)

In 2015, the UN took a step further and implemented the 17 Sustainable Development Goals and their corresponding 169 targets (United Nations, 2015). They represent an ambitious plan of action in all three areas of sustainable development. World leaders pledged to attain them by 2030. These goals were designed to guide countries in implementing sustainable development policies in their countries, by giving them different small targets to reach (United Nations, 2015). The diversity of targets in all the areas of sustainable development are particularly useful as countries can choose to focus on a number of goals according to their specific needs. This model was intended to be easily implementable and adaptable to the situations of all countries, both developed and developing.

SDG 14 is particularly interesting for its focus on life below water. It aspires to drive a better use and conservation of the oceans, seas and marine resources (United Nations, 2022b). According to the UN, while ocean acidification is restricting the oceans' ability to limit temperatures rise, continued ocean warming coupled with its pollution threaten marine species and adversely impact the under-water ecosystem. The situation of over-fishing adds further stress to the existing fish stock (United Nations, 2022a). The targets identified by the UN to achieve SDG 14 are as follow: reduce marine pollution; protect and restore ecosystems; decrease ocean acidification; sustainable fishing; preserve coastal and marine areas; stop subsidies that support overfishing; augment the economic benefits from sustainably using marine resources; increase scientific knowledge, research and technology to contribute to ocean health; support small scale fishers, and implement international sea law (The Global Goals, 2022; United Nations, 2022c).

This SDG is specifically important in the context of Nigeria, as the country benefits from a rich aquatic ecosystem, such as freshwaters, brackish, coastal waters and marine ecosystems (Adeyemo and Shogbanmu, 2020). Their safeguard is fundamental to ensure good living conditions in the country. These ecosystems

⁵ The illustration shows the economy and society as integral parts of the biosphere.

support various animal species that serve as food for the population, they are also at the basis of crucial services for humans, namely transport, water for domestic and industrial use, and power generation (Adeyemo and Shogbanmu, 2020). The reservoirs for hydrocarbon deposits, which are at the heart of the Nigerian economy, are further deeply reliant on aquatic ecosystems.

b) The impact of the oil industry on marine resources

Every phase of the routine oil and gas activities adversely impacts the marine environment. The research conducted by Cordes et al. (2016) highlights the extent of disruption the marine environment is subject to during such operations. During the exploration phase, the use of underwater sound and light emissions for the seismic surveys⁶ specifically affects the well-being of mammals. Their behaviours might be modified, in terms of migration and feeding, but these marine specials can also experience physical injuries such as hearing damage (Cordes et al., 2016). Artificial lighting can further cause disruptions in ecological processes, including the migration of plankton. The negative impact on the environment is only expanded as the infrastructures are installed. Typically, anchors cause physical disturbances to the seabed and local sedimentation escalation, and corrosion and leakage of pipelines pollutes the deep-sea fauna. Moreover, drilling aquatic resources are affected by drilling activities, which include the disposal of waste (e.g. drill cuttings and excess cement), produced water⁷ and other chemicals (Cordes et al., 2016). The study underlines that the combination of physical disruptions and toxic chemicals lead to “reduction in oxygen concentration, organic enrichment, increased hydrocarbon concentrations, and increased metal abundance” which modify biogeochemical processes. The fact that ocean and climate change raise the toxicity of petroleum hydrocarbons, through increased temperatures and ocean acidification, is additionally emphasized.

The use of gas flaring practices by oil producing companies that operate in Nigeria further deteriorates the environment. The process of burning crude oil to

⁶ They are used to uncover the subsurface geology and locate potential reservoirs.

⁷ Produced water is contaminated water due to oil and gas extraction activities.

discharge natural gas strongly participates to rising greenhouse gas emissions, like carbon dioxide, methane and nitrogen oxide (ELRI, 2021). The diffusion of such gases in the atmosphere notably causes global temperatures to rise and contributes to climate change. According to the United Nations (2021), global warming has a direct effect on oceans as they experience sea-level rises and marine heatwaves. They result in increased danger of marine and coastal biodiversity loss, such as deterioration of coral reefs and mangroves that are at the core of ocean life (United Nations, 2021). Despite the adverse environmental hazards associated with it, this practice is regularly used by oil actors in Nigeria since they believe it is cheaper to flare gas rather than retain it, resulting in the country flaring 24 billion cubic meters of natural gas annually (Enyoghasim et al., 2019).

Aside from regular activities, accidental discharges particularly endanger the marine environment. An uncontrolled release of hydrocarbons from the reservoir, namely a blowout, poses the greatest risk to wildlife (Cordes et al., 2016). Nigeria faced such a disaster in 1980, when the Texaco (Funwa-5) oil was released into the water. The 400,000 barrels of crude oil then discharged drove the vegetation to dry up, and plant and animal life to decrease in the Niger Delta (Aghalino and Eyinla, 2009). Leftovers of crude oil could still be found on the Nigerian beaches months after the occurrence. Moreover, the consequences of oil spills in the marine environment are numerous and long-term. These leaks are owed to failing, corroded or vandalised equipment. Their ecological effects are diverse and encompass soil erosion, extinct marine wildlife, diminished marine resources and ecosystems. Not only the oil released is toxic, but it also consumes the dissolved oxygen, therefore creating a shortage which could be fatal to living species (Ekpu, 2020). To this end, in Nigeria, oil spills kill many mammals (e.g. whales, dolphins, seals), fishes, turtles, cetaceans, and birds (Akpan, 2022).

Overall, the presence of oil in the marine habitat causes physiological and behavioural disruptions that decrease the reproductive abilities of species (Ekpu, 2020). The food chain is additionally disrupted, and the induced “direct coating” effect prevents animals from breathing and eating, impedes sunlight penetration to plants and raises temperatures. Nigeria is specifically sensitive to hydrocarbon contamination owed to its geological formation. In particular, the low viscosity, high permeability, and shallow depth of aquifers cause minor spills to pollute a large volume of water in the long-term

(Ekpu, 2020). The areas most at stake in the country are located in the Niger Delta, Lagos lagoon, Ogun River, River Onne, Calabar River (Adeyemo and Shogbanmu, 2020).

c) How has the SDG14 evolved in Nigeria?

In order to assess the evolution of SDG 14 in Nigeria over the years, it is necessary to look at a number of indicators: mean area that is protected in marine sites important to biodiversity; the Ocean Health Index; the proportion of fish caught from overexploited or collapsed resources; the proportion of fish caught by trawling or dredging; the proportion of fish caught and discarded; and the biodiversity threats embodied in imports (UN Sustainable Development Solutions Network, 2022).

Firstly, the state of protected areas in marine sites is critical in Nigeria, as evidenced by the data in Table 1. Indeed, there has been no evolution over the past 20 years in the country, without the implementation of any area to protect the local biodiversity. It highlights a large space for improvement since Nigeria is far from the objective set by the UN of safeguarding all sites crucial to biodiversity. In addition, in accordance with the Ocean Health Index, not only the waters in Nigeria are not considered as clean enough, but its state has been worsening over the years. Table 2 reveals that the country's index score has been progressively decreasing since 2014, when it peaked at 41.22, to an all-time low of 37.1 in 2020. On the other hand, Table 3 and Table 4 show that the proportion of fish respectively caught by overexploited or collapsed stocks and by trawling or dredging have decreased in the past years, which positively affect the reaching of SDG 14. Despite the encouraging figures, Nigeria is yet to reach the global long-term objective for both indicators. The overall trend regarding the proportion of fish then discarded has been going down over the studied period (2000-2018), though Table 5 highlights an increase from 29 percent in 2017 to 45 percent the following year, thus distancing itself from the 0 percent goal. The last indicator in Table 6, cannot be compared overtime owed to missing data. Nevertheless, the marine biodiversity threats embodied in imports of 0.01 per million population is considered as relatively low.

Nigeria's evolution mean area that is protected in marine sites important to biodiversity (%)

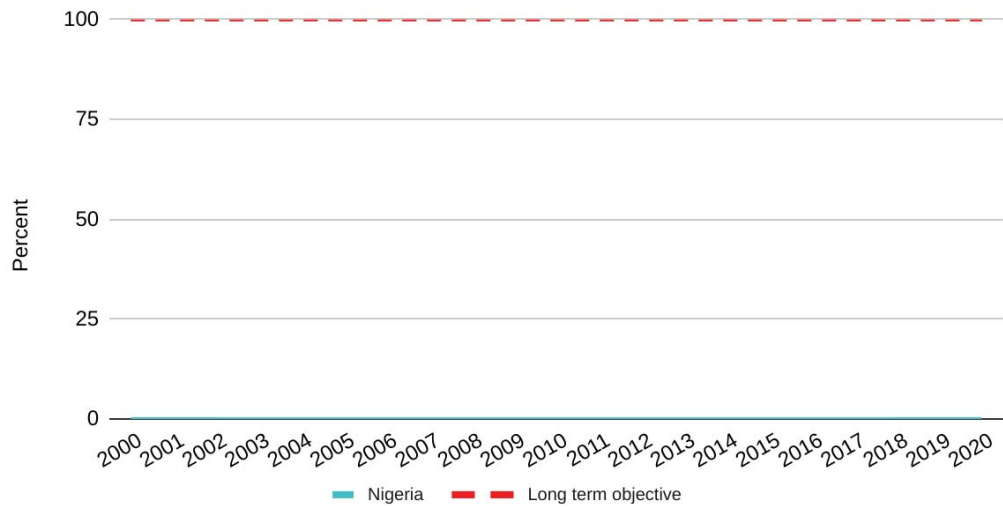


Table 1: Mean area that is protected in marine sites important to biodiversity (UN Sustainable Development Solutions Network,2022b).

Nigeria's Ocean Health Index: Clean Waters score (worst 0-100 best)

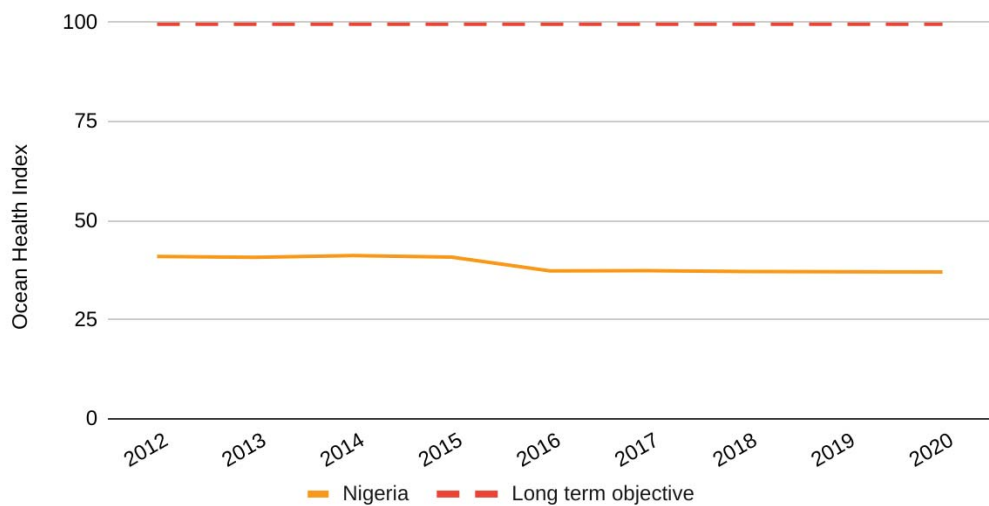


Table 2: The evolution of the Ocean Health Index in Nigeria (UN Sustainable Development Solutions Network,2022b).

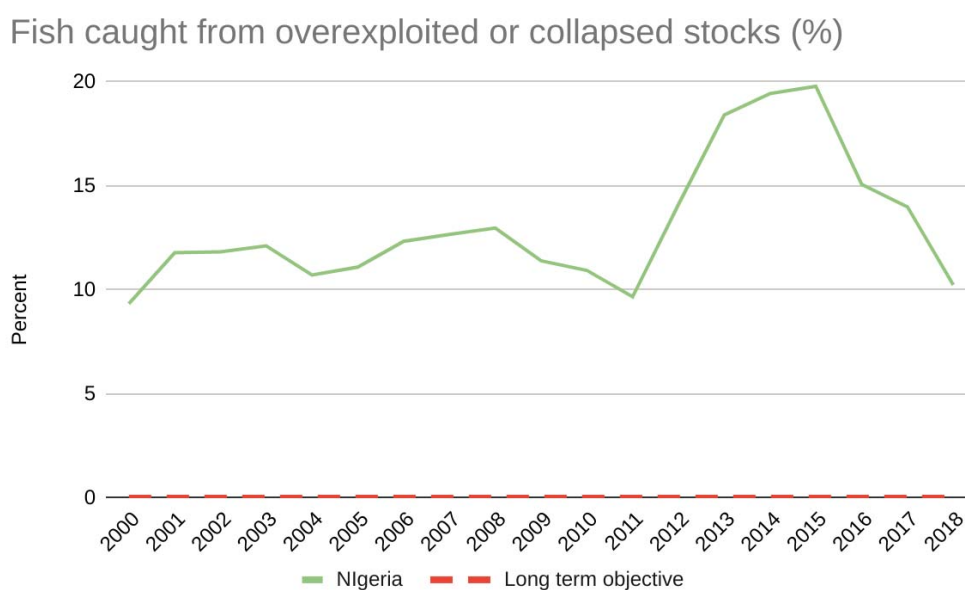


Table 3: The evolution of Fish caught from overexploited or collapsed stocks in Nigeria (UN Sustainable Development Solutions Network,2022b).

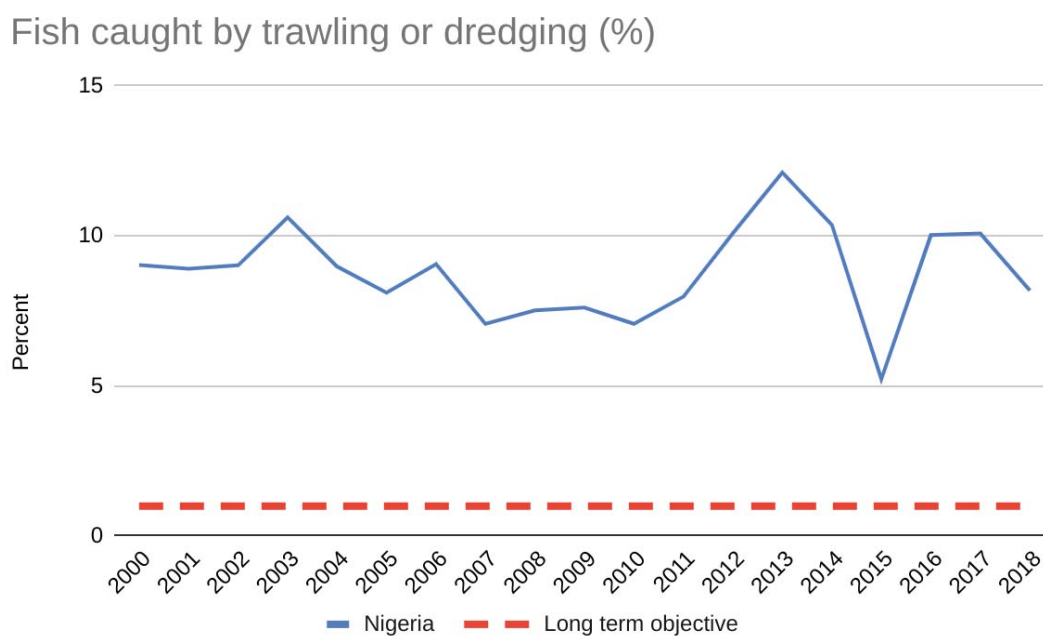


Table 4: The evolution of Fish caught by trawling or dredging in Nigeria (UN Sustainable Development Solutions Network,2022b).

Fish caught that are then discarded (%)

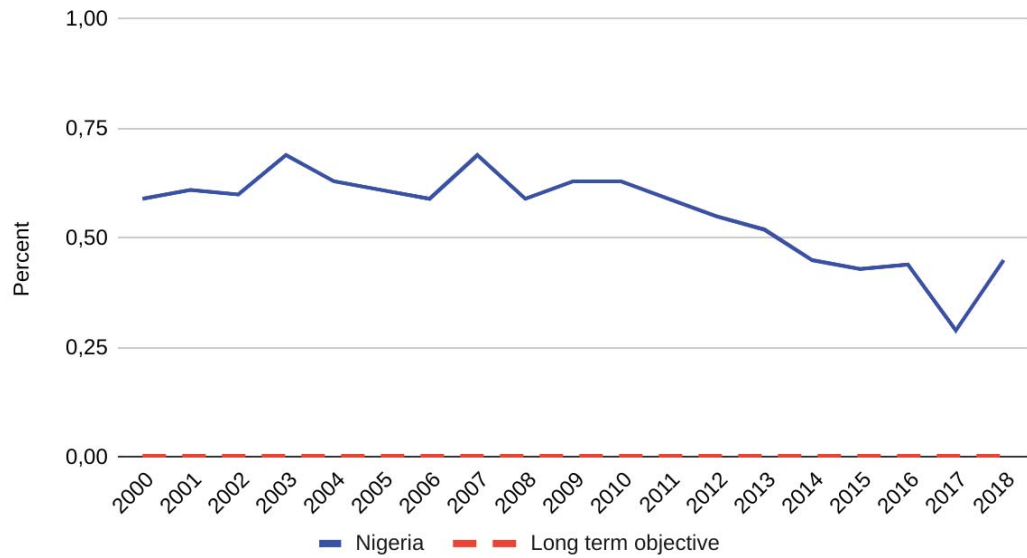


Table 5: The evolution of Fish caught that are then discarded in Nigeria (UN Sustainable Development Solutions Network,2022b).

Marine biodiversity threats embodied in imports (per million population)

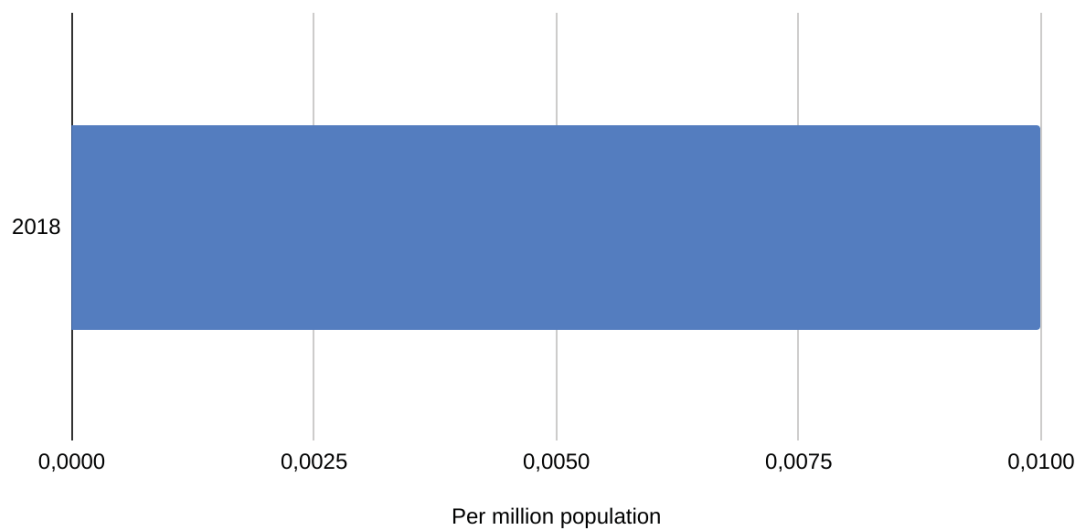


Table 6: Marine biodiversity threats embodied in imports in Nigeria (UN Sustainable Development Solutions Network,2022b).

The 2022 Sustainable Development Report considers that Nigeria's performance in terms of SDG 14 is achieved at about 60 percent (UN Sustainable Development Solutions Network, 2022). The report underlines that significant challenges are yet to be overcome for Nigeria to be successful in attaining this crucial goal (UN Sustainable Development Solutions Network, 2022a). Considering that the situation has been stagnating in the nation relatively to the previous year, the necessity for Nigeria to implement further measure is key to enact change.

Chapter 3: Case study: The introduction of new regulations in the oil sector by the Nigerian government - an assessment of life below water

In the pursuit of economic growth and development, many countries have turned to their natural resources, including oil and gas, as a path towards economic growth. However, this approach often comes at a cost to the environment, particularly in fragile ecosystems such as marine environments. Nigeria, as a major oil-producing nation, has faced the complex challenge of balancing economic growth with environmental sustainability, particularly in the context of SDG 14 – Life Below Water. Chapter 3 focuses on a case study that examines the introduction of new regulations in the oil sector by the Nigerian government and assesses their impact on life below water. Specifically, this chapter delves into the Petroleum Industry Act (PIA) 2021, which represents a significant step in the regulatory framework governing the oil industry in Nigeria. By analysing the environmental implications of this act, we can gain insights into its effectiveness in addressing environmental concerns and protecting marine resources.

1. The Petroleum Industry Act 2021

a) What changes does it bring to the oil industry?

As discussed in Chapter 2, the PIA was introduced in Nigeria in 2021 as a new framework to better coordinate the industry on which the government mostly relies. Under this new framework, two regulators have been created, namely the National Upstream Petroleum Regulatory Commission (NUPRC) (PIA, s4(1)) and the Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA) (PIA, s29(1)). They are in charge of supervising the technical and commercial operations in their respective areas (International Energy Agency, 2022). Moreover, by turning

Nigerian National Petroleum Company (NNPC) into a Limited company that is quasi-commercial (PIA, s53), the goal is to focus on productivity and increase its independence (Gavin, 2022). Still, the leading petroleum firm in Nigeria remains owned by the government, which enable it to keep a strong hold on the industry. In accordance with the law stated under the PIA, the President of Nigeria is tasked with naming the president of the NNPC. About 30 percent of the profits realized by the firm will further be allocated to financing the Frontier Exploration Fund, an entity dedicated to financing exploration in other basins in Nigeria (Nwuke, 2021). Another 10 percent of rents on petroleum prospecting licences and 10 percent of rents on mining leases will also be allocated to this fund.

Additionally, a new fiscal structure has been created under the PIA as a means to better encourage investment in the petroleum sector, bolster revenues going to the government (PIA, s258(1)(a)), and enhance transparency in the fiscal system (PIA, s258(1)(e)). The major changes lie in having replaced the petroleum profit tax with a hydrocarbon tax and having enacted a tax on the income earned by oil companies. This regulation imposes a tax on a wide range of hydrocarbons, such as crude oil, condensates, and natural gas liquids produced from associated gas (Nwuke, 2021). Penalties have also been implemented for gas flaring due to midstream operations. The resulting revenues will be allocated to the Midstream and Downstream Infrastructure Fund to finance infrastructure investment (Nwuke, 2021). Such penalties will notably support the already existing Oil Pipeline Act, and the Oil and Gas Pipelines Regulations. They both shape the regulatory framework for the operation and maintenance of pipelines (Udoma et al., 2019), which good maintenance is required to reduce gas flaring and its underlying negative consequences on the environment.

The project of rethinking Nigeria's main industry comes from the desire to strengthen its economic growth by better attracting opportunities and investors from all over the world, as well as becoming increasingly efficient in exploiting petroleum resources (Deloitte, 2021). To this end the main objective of the Act is to implement effective institutions with clearly defined roles to better regulate the petroleum industry (Chinwa Ole and Best Herbert, 2022). For the first time, the PIA enables Nigeria to have a sole global legislation framing the oil and gas sector, that overcomes previous institutional incoherence and conflicting interests (Okoro and Arinze-Umobi, 2022). In

that sense, the PIA revokes several laws in an attempt to provide a more unified and comprehensible structure of the oil and gas sector. To this extent, the provisions brought by the Act can be identified as a commitment from the government to overcome the issues of overlapping roles and conflict of interests that hindered the previous petroleum governance. The framework strongly focuses on establishing a commercially driven and profit-oriented national petroleum company, in addition to creating a welcoming business environment to petroleum operations (Chinwa Ole and Best Herbert, 2022).

Overall, the recent enforcement of the PIA as the main framework that regulates the industry confirms the government's strong influence on the sector and keeps upholding the position of oil at the centre of its development policy.

b) Is the Act efficient to reduce the oil and gas industry's marine environmental hazard?

As environmental issues become increasingly relevant both at the local and global levels, the PIA naturally includes advancements in this area. Indeed, the laws previously enforced in the country to address environmental threats posed by the industry were unsuccessful. This was mainly because of the government's laxity and weak capacity to enforce them against MNOCs. Therefore, the implementation of more specific and enforced policies is crucial to reach environmental sustainability.

Among the advancements brought by the PIA, the foundation of the NUPRC and the NMDPRA are crucial. The mandates of both these regulators notably include the setting of standards to protect the environment, and ensure that companies comply with them (Okoro and Arinze-Umobi, 2022). As stated in the PIA, both agencies have a duty to work towards eliminating natural gas flaring and venting, as well as monitoring oil and gas operations to ensure they are in accordance with national goals.

Furthermore, the innovative structure prevents companies to engage in any practice that could harm the environment. If such activities are nonetheless enacted, the

Minister of Petroleum Resources is entitled to revoke a prospecting licence or a petroleum mining lease. The decision can be taken if the stakeholder at fault “fails to conduct petroleum operations in accordance with good international petroleum industry practices” (PIA, s96(1)(a)) or if they have “failed to comply with environmental obligations required by applicable law” (PIA, s96(1)(i)). Such a provision is not new for Nigeria as it was already enacted under the former Petroleum Act (Okoro and Arinze-Umobi, 2022), but its enforcement was limited as the government was reluctant on revoking licences of oil and gas operators.

A new feature that characterises the PIA, is the requirement that any licensee or lessee provides an Environmental Management Plan to the NUPRC or the NMDPRA. These institutions must assess that the plan complies with the environmental measures of the PIA, as well as ensuring its capability to manage and overturn the negative impacts their oil and gas operations might bring to the environment (PIA, s102(3)). This is a positive measure as it drives companies to prepare to remedy the harm caused, even before causing it. We note that no penalty is specified under the PIA, thus the revocation of a lease or licence is what applies in case of non-compliance (Okoro and Arinze-Umobi, 2022). This questions the desire of the relevant institutions to ensure the appliance of this measure in face of such a strong punishment.

In line with the PIA, gas flaring becomes prohibited in Nigeria and disrespect of the provision entitles the faulty to a fine (PIA, s104(1)). The same exemption already existed under a previous law, which non-compliance was followed by a stricter penalty, namely the annulment of the operator’s licence or lease (Odude, 2023). The decrease in punishment intensity is hoped to result in more penalty-implementation from the regulatory bodies, relative to previous laws. Especially since the money coming from these fines shall be invested in environmental remediation (PIA, s104(4)). This innovation is important in the case of Nigeria as it adds the element of environmental justice at the core of oil and gas regulations. As underlined by Okoro and Arinze-Umobi (2022), implementing such a justice system “does not stop at just punishing the offender but also extends to remedying the harm done by them”. Hopefully this provision acts as an educational measure and prevents offenders to reiterate their adverse behaviours towards the environment.

Finally, the establishment of an Environmental Remediation Fund by the Commission or the Authority is a key advancement for the country. It aims for the rehabilitation or management of harmed induce to the environment by the operations of licensees and leases. The Fund comes into action when these actors fail to contribute to the rehabilitation of the negative impacts on the environment (PIA, s103(4)). It is further financed through a charge embedded in the conditions to the grant of a licence or a lease, the financial contribution to pay depending on the size of the operation and the level of environmental risk of the project (PIA, s103(1)). To this end, a licensee and lessee must evaluate their environmental impact every year and accordingly adjust their contribution to the Fund as stated by the PIA (s103(5)). This measure is an important advancement for the purpose of environmental remediation as resources are ready to be used at all times for this purpose. Odude (2023) stresses how such an intervention could bring positive change if accompanied with political will. Before the creation of this fund, enacting remediation practices was hardened by MNOCs' unwillingness to allocate financial resources to these measures (Okoro and Arinze-Umobi, 2022).

Therefore, the PIA implements a new set of important policies aimed at better protecting the environment and remediating its deterioration induced by oil and gas operations. They are crucial in the sense that they highlight a rising recognition from the government that safeguarding the environment is vital. Nevertheless, comparison of the former and new frameworks reveal that most measures were already enforced before. Okoro and Arinze-Umoni (2022) rightfully questions the efficiency of the regime since it sets up already existing provisions that were proven useless under previous laws. As already mentioned, the biggest issue in environmental protection in Nigeria boils down to the poor enforcement of the regulations in place (Ele, 2022). Poor implementation was mostly explained by conflict of interest between regulators, and scarce capacity. Though the PIA was built to overcome the former, regulatory bodies still lack finances, technical, material and human resources (Ele, 2022). To this end, it is not the framework, but the implementation system and the political will that should change for improved results. It can be added that the sanctions in place in case of non-compliance from the MNOCs are either too lenient, or too strict (Ele, 2022). In one case the fines are too low, in the other, the annulment of the licence of lease appears as unrealistic. Indeed, in the past, no such punishment was ever enacted as this industry is the main

wealth generator of the Nigerian economy and stopping related operations would be too great a loss of earnings. In short, these penalties don't have the power to dissuade operators to comply with environmental rules, hence MNOCs unlikeliness to prevent or mitigate the pollution induced by their activities. Moreover, despite the establishment of the Environmental Remediation Fund representing a first step to repair environmental damages, it does not provide enough finances from additional sources for the available funds to meet the total remediation cost (Ele, 2022). Indeed, the cost of cleaning up the oil polluted Bayelsa state only would cost USD12 billion (RFI, 2023). This leaves space to imagine the amount needed in the fund to allow complete remediation of oil damage on the environment in Nigeria.

Despite the suppression of most gas flaring activities as stated by the PIA, these kinds of operation have not stopped since the enforcement of the provision. This is possible by the granting of exemptions to a licensee to flare gas in the case of emergency or exemption, and failing to define what is considered as an emergency or the circumstances that levy the prohibition (Aleru, 2023). The volume of gas flared per year has consistently decreased since 2019 (*see* Table 7). From 465 million Mscf⁸ flared in 2019, the volume decreased to 224 million Mscf in 2022. Nonetheless, the volumes registered remain significant after the enforcement of the Act in August 2021. Looking at the monthly volumes of gas flaring shows that the volumes registered since the PIA has been implemented are too high to be exceptional. As shown by Table 8, in December 2021, December 2022 and February 2023, about 29, 28 and 27 million Mscf have respectively been flared. Over these months, the volumes of gas flared are typically higher than during some periods before the Act was enacted, like in September 2020 and May 2021. Consequently, these figures highlight the inefficiency of the Act in stopping, or even substantially decreasing, gas flaring activities.

Furthermore, oil spills, which are a main source of marine pollution from oil activities (Aghalino and Eyinla, 2009; Michael and Okolo, 2018; Elekwachi, Hycienth and Onyishi, 2019; Akpan, 2022), continue to pose an issue in the country. It implies Act has failed to tackle this issue since its implementation. Similar to gas flaring, the barrels of oil spilled per year have diminished between 2019 and 2022 (*see* Table 9).

⁸ Abbreviation for a thousand cubic feet per day, a measure for a volume of gas (Pantheon Ressources, n.d.).

Nevertheless, the country registered the highest peak of oil spilled in September 2021, soon after the implementation of the PIA (see Table 10). Additionally, the trend of oil spillage since the enforcement of the PIA is sensibly close to that prevailing to its implementation (see Table 10). This calls for Nigeria to enact stricter policies in this regard, notably by implementing more preventive measures rather than waiting for the damage to be done. Typically, better tracking of spills, routinely inspections of infrastructures and definite limitations on the filling of oil tanks are needed to better protect the marine ecosystems. The PIA urgently needs to incorporate strict measure to effectively prevent oil induced marine pollution, in order to attain SDG 14.

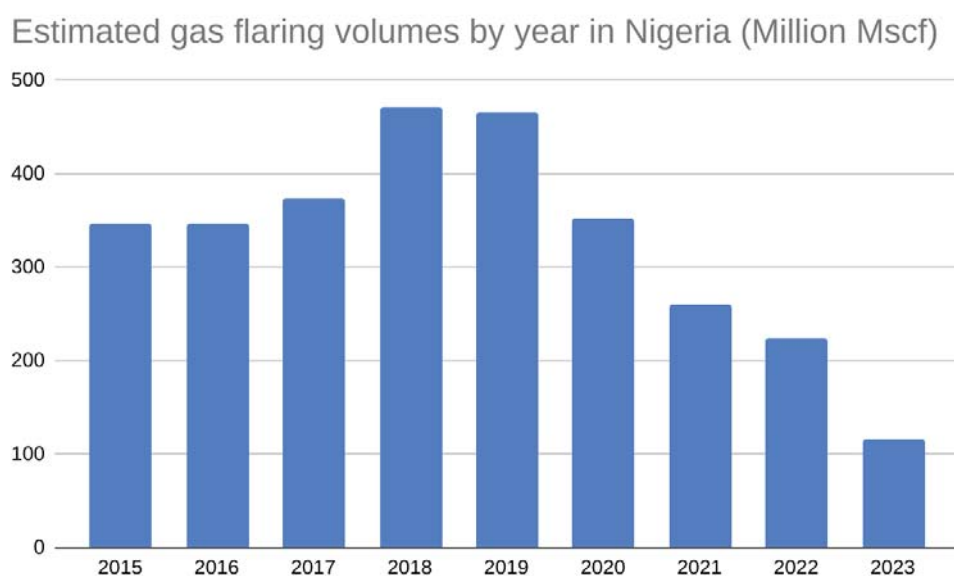


Table 7: Estimated gas flaring volumes by year in Nigeria (in Million Mscf) between 2015 and 2023 (until May) (Nigerian Gas Flaring Tracker, 2023)

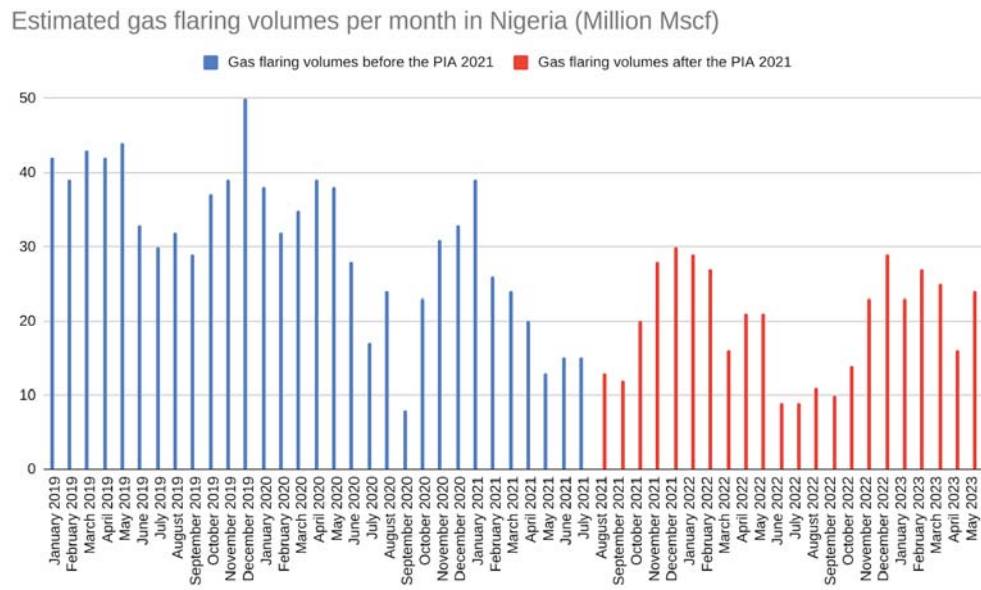


Table 8: Estimated gas flaring volumes per month in Nigeria between January 2019 and June 2023 (Nigerian Gas Flaring Tracker, 2023)



Table 9: Barrels of oil reportedly spilled by year in Nigeria between 2015 and 2023 (until May) (Nigerian Oil Spill Monitor, 2023)

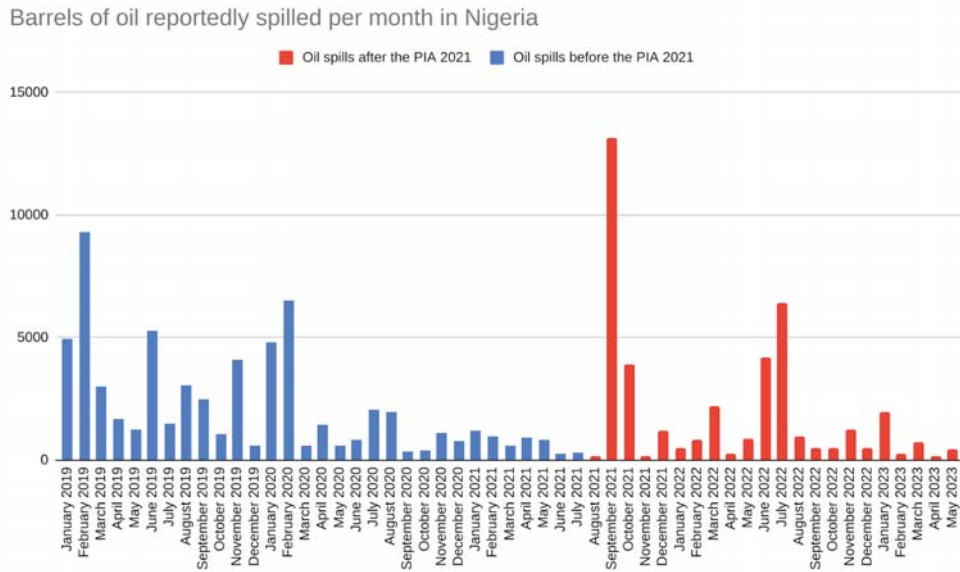


Table 10: Barrels reportedly spilled in Nigeria between January 2019 and May 2023 (Nigerian Oil Spill Monitor, 2023).

In light of these elements, this paper considers that PIA 2021 will not be capable to positively affect the marine ecosystem. Consequently, the achievement of SDG 14 will not be improved.

c) To what degree does this Act underline the government’s prioritisation of economic growth over environmental protection?

The PIA 2021 has been built by the Nigerian government with the purpose of bettering the efficiency of the oil and gas industry. Though some environmental considerations have been taken into account in the new framework, it is still largely inefficient in tackling the extent of environmental pollution, both on land and under water. The primary objective was for the industry to be more attractive for international

investors, as well as to ensure availability of petroleum reserves to meet the boost in energy demands worldwide (Deloitte, 2021). The Act further reforms the tax system, so as to increase the government's earnings from the MNOCs operating in the country. Clearly, the country's reliance on the oil and gas sector is far from being over and continues to place it at the centre of its economic growth initiative.

We can further note that a major innovation brought by the Act is the reformation of the former state-owned national petroleum company into a limited company, where the federal government still has a strong hold. This is the ultimate proof of Nigeria's desire to maximize its revenue, and further implies that environmental protection, among other things, might take a backseat (Chinwa Ole and Best Herbert, 2022). Accordingly, a regulator might compromise effective risk governance regulation if it is believed that it could hinder profit maximization.

On the other hand, the Act's considerations regarding environmental protection remain too weak in respect to the urgency of the situation (Okoro and Arinze-Umobi, 2022). It lacks strong safeguarding measures to mitigate environmental impacts, including pollution, oil spills and habitat destruction. Also, considering Nigeria's history regarding weak enforcement of regulations (Elum, Mopipi and Heni Ukoha, 2016), it is impossible to ensure that the new provisions of the PIA will be enacted on the ground. We can additionally note that the major issue of corruption cannot be fixed with this new framework, which will further hurt the country. The federal government of Nigeria keeps too much of a grip on the oil and gas industry, though some adjustments have been made. Since most of the government's income comes from the industry (Ebimobowei, 2022; Anyaehie and Areji, 2015), it is unlikely that it will enable a change in operations to be more considerate of environmental concerns. To this effect, the PIA 2021 challenges Nigeria's government commitment to ensure sustainable and responsible growth of the industry.

2. The lack of strong regulations of the industry regarding biodiversity safeguard impairs the reaching of SDG 14

a) Achieving SDG 14: a long way to go for Nigeria

Looking at the Sustainable Development Report for the year 2022, Nigeria has not improved its performance in reaching SDG 14 relatively to 2021. The average performance of the country is about 60 percent for this goal (UN Sustainable Development Solutions Network, 2022). It was already at the same level in 2021 (UN Sustainable Development Solutions Network, 2021) and in 2020 (UN Sustainable Development Solutions Network, 2020), showing no advancement from the country in this sector over the years. Nonetheless, we can underline a strong progress compared to 2019, when the average performance for SDG 14 was at 35 percent (UN Sustainable Development Solutions Network, 2019). Yet, it is important to note that the steep improvement between 2019 and 2020 might be due to a modification in the indicators taken into consideration. Notably, the proportion of inadequately managed plastic waste negatively impacted the overall assessment of SDG 14 for Nigeria, as the indicator reached 81 percent (UN Sustainable Development Solutions Network, 2019). This indicator was no longer considered to assess the performance of SDG 14 from 2020, therefore rendering a comparison between 2019 and 2020 more difficult.

By focusing on the latest available data relative to the 14th goal, it is still possible to identify the areas where Nigeria has to improve the most in order to increase in average performance level from a 60 to a higher percentage. The first indicator with a lot of room for improvement is the proportion of mean area that is protected in marine sites important to biodiversity. The data reveals that no such protected area exists in Nigeria (UN Sustainable Development Solutions Network, 2022), therefore impeding the protection of a number of species and further endangering them. This indicator has been stagnating overtime, since no such policy has ever been implemented in Nigeria for the recorded period (*see* Table 1). Furthermore, the Ocean Health Index is low in Nigeria with a score of 37.1 (UN Sustainable Development Solutions Network, 2022). This number is an additional proof regarding the small level of cleanness in Nigerian waters. The index is measured based on several indicators, including coastal protection, carbon storage, biodiversity, natural products and artisanal fishing opportunities (Ocean Health Index, 2023). Conversely, Nigeria needs to identify the coastal areas which are

most at stake so as to declare them as protected zones with specific regulations to safeguard their biodiversity. The government additionally must dedicate more efforts towards cleaning its waters for the country's OHI score to improve.

The lack of advancement regarding the achievement of this SDG in the past years can be justified by the poor allocation of financial means towards this objective. The 2020 Voluntary National Report shows that development and funding capacities of the government do not integrate SDGs 14 and 15 which aim is to achieve environmental sustainability (Ogbodo, Bichi and Ogbodo, 2021). According to Olaleye (2022), between 2018 and 2020, only 0.3 percent of Nigeria's total spending was dedicated to reaching the environmental SDGs, namely goals 13, 14 and 15. In addition, out of the monetary support Nigeria gets from the UN, only USD 500,600 are allocated to SDG 14 which represent a little above 0 percent of the available USD 1 billion. These figures clearly show the lack of commitment from the Nigerian government to unblock the necessary funds towards better protecting the underwater ecosystem, but also the environment more generally. In fact, Nigeria has identified strategic goals to prioritize based on the country's development primary concerns and objectives. According to the Voluntary National Review (VNR) conducted by the country in 2020 (United Nations, 2020), the SDGs on which Nigeria desires to focus on are: poverty (SDG 1), health and well-being (SDG 3), education (SDG 4), gender equality (SDG 5), inclusive economy (SDG 8), environment of peace and security (SDG 16) and partnership (SDG 17). Since no environment goal is considered as a priority for the country, it can explain why Nigeria still has room for improvement in this area.

b) [The environmental impact of lenient governance of Nigeria's petroleum sector](#)

The issue of the legal framework related to protecting the environment has already been discussed in this paper as a major challenge that hampers the achievement of SDG 14, in addition to other environmental objectives. In agreement with Eneh (2011), on paper, some policies in Nigeria could be efficient if they were rightfully

enforced on the ground. That is to say that perfectly working policies fail at the implementation stage. This notably drives operators in the industry to not comply with enforced legislations. Eneh (2011) further hypothesizes that “in the long run, government agencies are controlled by the industry they relate to”. These agencies can in fact apply laws and policies and report data so as to benefit the interests of powerful operators. In short, the latter actors are enabled to behave at their convenience without any regard to their environmental impact because of the lenience of the bodies regulating the oil and gas industry. In particular, the MNOCs’ failure to promptly remediate to oil spills has had devastating effects on the environment. There have been instances of clean-up efforts taking several months, and even years, to be started after oil spills. A severe case includes the Ogoni oil spill, where decades were needed before being addressed, and the remediation process became entangled in political issues (Michael and Okolo, 2018). For an ecosystem to recover from a small oil spill can take up to 15 years, and for larger quantities of oil to completely disappear the time can be expanded to 40 years (Markleen, 2013). The lack of commitment to environmental reparation is evident in Nigeria. Odisu (2015) underlines that the pursuit of higher profits drives oil companies to disregard all potential obstacles to this objective, including the environment. Additionally, despite implementing limitations on gas flaring activities, as it is the case with the recent PIA 2021, Nigeria remains among the top countries for the flaring of gas quantities. According to the World Bank data (2022), the country ranks at the 9th position in terms of the volumes of flared gas. Compared to oil spills, the environmental impact is not something that can be remediated. Its danger rather lies in the carbon emission it releases in the atmosphere, hence the importance of banning this activity.

Though the petroleum industry pollutes by nature, it is possible to reduce its adverse effect on the environment if thorough regulations are followed. In Nigeria, successive instances have shown that lenient regulations are due to a lack of political will to protect the environment. Because of this negligence, oil producing companies can easily continue to destroy the environment through their activities.

c) A necessary change in governance to better manage Nigeria's oil and gas industry

The reason why the Nigerian government is so reluctant to strengthen environmental policies in the industry can be interrogated. It all boils down to the fact that the oil industry finances most of the government's budget (Ebimobowei, 2022; Anyaehie and Areji, 2015). Indeed, imposing more limitations to oil activities for the sake of the environment would make it harder for MNOCs to operate in the country. The government therefore fears that reduced levels of production could deter additional investments or decrease their earnings generated by the sector. The amount of governmental revenues that stems from the petroleum industry has led to a culture of corruption, with elites engaging in rent-seeking behaviours to get access to the oil wealth (Elum, Mopipi and Henri-Ukoha, 2016; Oludimu and Alola, 2021). Weak institutions, lack of transparency and bribery are notably what allow those in powerful positions to take advantage of the industry through exploiting it for personal gains. Personal and political interests are therefore the core reasons explaining why environmental regulations remain weakly enforced in this industry.

This situation undeniably calls for a change in the governance of this sector because ensuring the well-being of marine biodiversity is crucial for the livelihood of several local actors (Okafor-Yarwood et al., 2020). It is time that regulators in Nigeria realize the positive impacts that can stem from a healthy environment and ecosystem.

Chapter 4: Discussion: How to combine economic interests and environmental sustainability?

This chapter explores the challenge of balancing economic interests with environmental sustainability in the oil and gas industry. A socioeconomic approach is used to build bridges between both aspects. The chapter delves into the potential benefits of a sustainable industry, while taking into consideration the broader impacts on marine biodiversity and the needed economic diversification of Nigeria. The concept of Blue Economy is introduced as a possibility to protect the environment without hurting the nation's development, as well as underlining its relevance to achieve SDG 14. The section additionally discusses how the oil industry can contribute to this novel economic concept; and provides recommendations to incentivize sustainable practices in the sector.

1. In what ways would Nigeria benefit from a more sustainable oil industry? A socioeconomic perspective

a) Beyond sole environmental considerations: the effects of the harmed marine biodiversity on the Nigerian society

Destroying the environment is not only disastrous for the nature and the living species inhabiting this area, but it also brings important issues to the coastal communities and the development of the region. According to Elum, Mopipi and Henri-Ukoha (2016), there are strong implications for the food security in the country. In some Nigerian regions, such as the Niger Delta, the traditional economy deeply relies on the natural resources. Thus, the consequences of oil activities, have profound impacts on the lives of people, especially fishermen through the destruction of marine resources. The effects of oil and gas activities on fisheries can be observed through several indicators, such as the deterioration in the quality of landed fish species (with reduced body condition or size and increased levels of contaminants); elevated mortality rates

among targeted species, resulting in declines in population size and density; restricted access to target species due to their displacement from previously suitable habitats; changes in the likelihood of successfully capturing target species using specific fishing methods; and direct impacts on the health of fishers, potentially leading to reduced participation in fishing activities (Andrews et al., 2021). Additionally, oil spills are especially detrimental to plants, animals and aquatic life, as well as on the livelihoods of local residents. Indeed, the pollution of the customary fishing areas results in reduced livelihoods, ultimately leading to more hunger levels within fishing communities (Elum, Mopipi and Henri-Ukoha, 2016).

On top of this, through impeding local individuals to engage in fishing activities, the unemployed youth is increasingly driven to migrate from rural areas to urban centres in search of better job opportunities, despite no guarantee of finding jobs. This vicious circle plagues the country, and more particularly the oil-producing regions, with endemic levels of poverty (Aworawo, 2000). The study shows that consistently disrupting the primary source of income for the people, caused by the activities of multinational oil companies operating in the communities, is a driver of poverty in the region. This disruption has resulted in environmental degradation and the loss of livelihoods. Consequently, the inhabitants of the region live in unfavourable health conditions and an environmentally polluted atmosphere, which hinders their ability to maintain a good standard of living (Enyoghasim et al., 2019). When comparing the level of development in Nigerian oil producing regions to the amount of revenue generated, it becomes evident that the people can be considered poor. A significant portion of the population continues to live in isolated rural regions, marked by a inadequate fundamental amenities, namely electricity, well-maintained roads, access to clean water, modern educational institutions, hospitals, and adequate housing (Elum, Mopipi and Henri-Ukoha, 2016).

The research paper of Enyoghasim et al.' (2019) assesses the extent to which the carbon dioxide emitted through oil exploration and exploitation activities impacts the health of individuals in the Niger Delta. It resulted that people who are exposed to this substance and inhale it regularly are more likely to face health issues and to die younger. To live in oil producing regions thus has strong implications for the healthiness of their inhabitants. This is backed by the research of Andrews et al. (2021), which emphasizes

that throughout all stages of oil extraction, transportation, refining, and consumption, there are adverse environmental and health consequences caused by pollution, waste, and toxic substances. These impacts affect the quality of air, water, soil, agricultural crops, and natural food sources that people rely on. The health risks associated with these impacts include conditions such as asthma, various cancers, and gastrointestinal issues. The study further shows that the use of crude oil dispersants during spill cleanup operations can lead to respiratory and hematological diseases, as well as the death of marine organisms with commercial significance.

Therefore, the petroleum industry has bolstered the country's economic growth at the expense of the development of oil producing areas, with the host communities being deprived of their natural resources for exploitation. They remain poor, undeveloped and missing crucial physical infrastructures to live in decent conditions (Elum, Mopipi and Henri-Ukoha, 2016), as well as being prone to degrading health conditions. The social and cultural impact of oil production is also deeply entrenched, with affected communities perceiving this industry as a threat to their cultural identities and values (Andrews et al., 2021). The accumulation of negative impacts from the industry is prone to creating a climate of tension, with the outbreak of violence. The Niger Delta region is specifically known for the ongoing conflicts in oil development sites due to most of the benefits going to the elites of the country, with poor distribution towards local communities (Andrews et al., 2021).⁹

b) The necessity to diversify Nigeria's economy for sustainable development

This paper argues that all the negative consequences stemming from the petroleum industry result in Nigeria's overdependence on oil. The wealth that the

⁹ An instance of such conflict is the Boko Haram insurgency, which is partly attributed to the perceived exclusion of the country's northern region from benefiting and participating in decision-making regarding oil wealth. Another strife is driven by the Movement for the Emancipation of the Niger Delta, which seeks to reclaim the region from government elites and oil corporations. They highlight the underlying issues of marginalization, limited statehood, and the struggle for equitable distribution of oil resources.

industry brings indeed blinds the government into prioritizing their own interests instead of the global good, and therefore take decisions to bolster this industry ultimately benefiting them, at the expense of the environment and the well-being of local communities. Diversifying Nigeria's economy is therefore a crucial step to take in order to satisfy all three pillars of sustainable development.

Broadening a country's economic base allows to bolster its stability in the long run (Anyaehe and Areji, 2015), therefore meeting the economic pillar of sustainable development. The economic dimension is especially important in the case of Nigeria. Basing most of its economy on a natural resource that is not renewable make it an impossible economic model to keep in the long run. A necessary adjustment to fulfil economic sustainability is to focus on other forms of capital, such as machinery, building or human, which is expected to ultimately rise gross national income per capita (Beutel, 2021). It additionally includes addressing the basic needs of people, which encompass access to employment, food, healthcare clothing and housing. This aspect is specifically important for impoverished individuals. Economic diversification can further drive advancements in technology, social organization, and expansion of economic sector, which has the capacity to meet all individuals' needs. Regarding the environmental situation, it is important rely on more than one single natural resource to avoid natural depletion and degradation (Anyaehe and Areji, 2015). In this sense, the diversification of the economy enables more ecological balance. Overall, going through this process is important to create a well-rounded economy with a capacity to promote fairness and equity within a society.

Nigeria has strong incentives to diversify its economy as it has the power to overcome many issues it faces, including economic instability due to extensive reliance on oil, environmental degradation and social crisis. In accordance with numerous research (Anyaehe and Areji, 2015; Chinecherem Uzonwanne, 2015; Beutel, 2021), the country urgently needs to open its economy to other industries.

c) Maritime resources as a source of income and well-being

With the significant fisheries resources Nigeria benefits from, a good diversification strategy would be to focus on this industry since it could result in increased earnings and well-being. The country could easily profit from its 853km coastline and 200 nautical miles EEZ (Olaoye and Ojebiyi, 2018). In this zone, Nigeria has exclusive rights to explore and exploit any natural resources, where there are about 104 different fish species¹⁰. Marine resources are vital to humans' survival and prosperity as emphasized by the OECD (2021). If they are well managed, tourism and fisheries are marine-centred industries that have the potential to bring more income and employment. Currently, Nigeria's oil related operations impair such industries to thrive due to their degrading impact on the aquatic resources. Nonetheless, this paper asserts that if Nigeria gives lower importance to petroleum and increasingly focuses on marine resources, the country will be incentivized to enforce more efficient protection measures.

Better managing and protecting natural resources further has the potential to bolster the well-being of coastal communities, through enabling them to live in better conditions. Not only will increased fisheries production allow the supply to meet the demand levels for these products (Olaoye and Ojebiyi, 2018), but this will also decrease the risk of food insecurity that Nigeria is currently facing. Fisheries and aquaculture are an important source of food production, and sustainable management of their resources has the power to promote development that strengthens food security (FAO, 2022). Indeed, according to Gjertsen (2005), safeguarding aquatic natural resources, like coral cover and abundance of fish, can enhance their abundance and result in higher catches for fishermen. The greater amounts of fish catches can subsequently lead to higher fish consumption within fishing households. The process of bolstering an industry based on natural resources other than oil can also create new jobs opportunities for locals, therefore paving the way for exiting the cycle of poverty that is specific of oil producing areas (Elum, Mopipi and Henri-Ukoha, 2016). Fudge, Ogier and Alexander (2023) introduce the Blue Economy as a concept that ultimately increases well-being for local populations, all the while preserving the health of the marine environment, as well as sustaining economic growth and better livelihood.

¹⁰ Shad, catfish, sardines, soles, sharks, and saw fishes are instances of species that can be found in Nigerian waters.

Marine resources should not be put in conflict with economic development, but rather appear as an opportunity to bolster it, as well as increasing earnings and bettering living conditions. These are the core values of the Blue Economy, which potential implementation will be evaluated for Nigeria in the following section. As noted by (Hammed Damilare, 2018), the pursuit of diversification towards the Blue Economy offers opportunities to address development challenges, optimize resources, and explore new paths for economic growth.

2. Incorporating Blue Economy in the oil industry

a) The concept of Blue Economy in Nigeria

Professor Gunter Pauli was the one who introduced the Blue Economy approach, also known as the Ocean Economy, as an economic philosophy in 1994, following the United Nation's demand to examine new business models ideas in anticipation of COP3 in Japan (Pauli, 2010). The major importance of the ocean and the emerging platforms for ocean development and governance was later highlighted during the Rio+20 Summit. The Blue Economy underlines the balance that is needed between socioeconomic progress and environmental degradation. To this end, this concept was thought with the core objective of sustaining economic growth, social inclusivity and the preservation or enhancement of livelihoods, while ensuring the long-term sustainability of the oceans and coastal areas (Elisha, 2019). It emphasizes the need to decouple socioeconomic activities and development from environmental harm and maximize the benefits derived from marine resources (Elisha, 2019).

In the context of a Summit focusing on Blue Economy in the United Arab Emirates in 2014, the United Nations stated that it “conceptualises oceans as ‘Development Spaces’ where spatial planning integrates conservation, sustainable use, oil and mineral wealth extraction, bioprospecting, sustainable energy production and marine transport” (United Nations, 2014). The international organisation indeed believes that marine ecosystems are more productive when they are sustainably

managed (United Nations, 2022b). Blue Economy is an approach that the World Bank defines as the “sustainable use of ocean resources for economic growth, improved livelihoods and jobs, and ocean ecosystem health” (World Bank, 2017). It necessitates the involvement of several activities, including renewable energies, fisheries, maritime transport, tourism, climate change, and waste management. In short, Cisneros-Montemayor et al. (2021) summarize the concept as marine resources being the source of economic viability, environmental sustainability and social equity and well-being (see Figure 2).

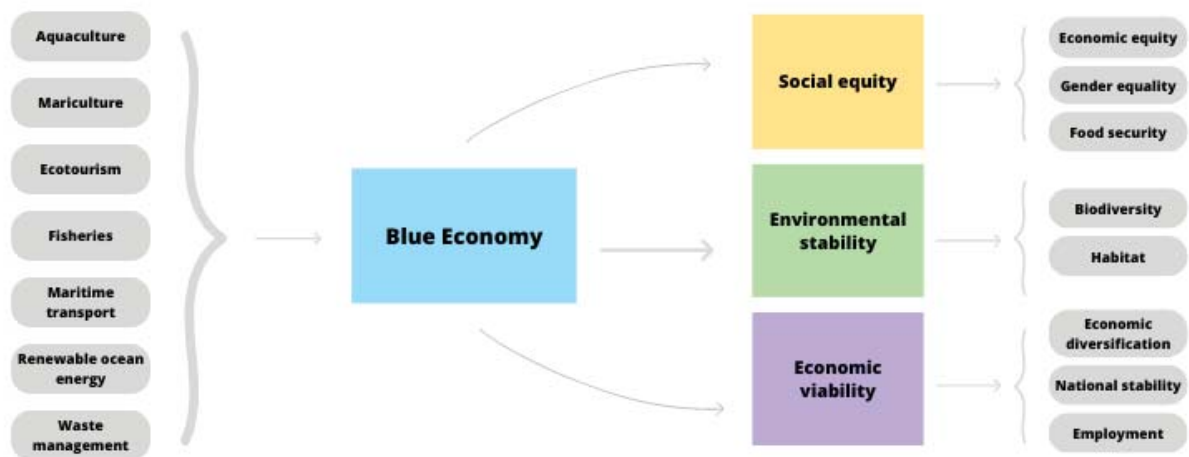


Figure II: Marine resources that enable the establishment of Blue Economy and the resulting positive consequences on social, economic and environmental aspects (OECD, 2016; World Bank, 2017; NIMASA, 2018; Cisneros-Montemayor et al., 2021)

It is important to note that prospects of growth based on this economic model are strong, as global population growth, economic and technological advancements, climate change and global trade are driving economic activities in the ocean to gain momentum (Hamisu, 2019). The OECD (2016) projects that under “business-as-usual” scenario, the ocean economy could more than double its contribution to global

value-added by 2030, relative to the 2010 levels. Aquaculture, offshore wind energy, fish processing, and shipbuilding and repair are activities are the sectors identified with the best growth prospects. The OECD report additionally states that ocean will increasingly contribute to employment creation in the coming years, with up to 40 million new full-time equivalent jobs. Undoubtedly, seizing the opportunity to better manage the ocean prospects strong economic growth for the future.

The significance of Blue Economy for Nigeria is real, with a maritime sector that already strongly benefits the economy through exploitation, distribution and export of marine resources (Hamisu, 2019). According to the Nigerian Maritime Administration and Safety Agency (NIMASA), maritime transport for trade already is quite developed in the country with 95 percent of trade by volume being shipped and handled by seaports (NIMASA, 2018). Nonetheless, there are possibilities to expand the shipping industry since it has the potential of yearning USD147 billion yearly (Igbozurike, 2020). Furthermore, offshore oil and gas, which are considered as maritime resources, represent an important component of the oil and gas industry in Nigeria. The agency also states that maritime shipping accounts for about USD 6 billion annually, and to a lesser extent fishing operations bring USD 1 billion annually to the Nigerian economy. The offshore portion of oil and gas activities remains the most significant by generating USD 8 billion every year. These activities are considered as already established in the context of the Blue Economy. Yet, the agency identifies a potential for Nigeria to develop additional industries like aquaculture, mariculture, biotechnology, and marine renewable energy (NIMASA, 2018). Therefore, considering the extent of Nigeria's maritime resources, the country has opportunities yet to be improved.

Nevertheless, a number of obstacles that can hinder the implementation of this concept in Nigeria must be considered. First, piracy and armed attacks are increasingly hampering all sectors of the Blue Economy, through slowing economic growth and interrupting business operations from the maritime industry (Hamisu, 2019). According to the study, climate change caused by growing carbon emissions strongly impact Blue Economy related activities. Notably, the resulting ocean warming changes the physical properties of the sea and has a direct negative effect on the natural resources. Similarly, Nigeria is increasingly subject to flooding, which cause environmental wastes and fertilizers to be directed into seas and rivers by floodwater, thus affecting the quality of

Nigerian natural waters (Ogbodo, Bichi and Ogbodo, 2021). The impact of oil spillage on the marine environment of the oil producing regions cannot be overemphasized again, and therefore limits the well-functioning of the Blue Economy in the region. The research of Ateme (2021) also underlines the important fact that Blue Economy remains a new development framework which good implementation depends on a number of resources capital and commitment. This clearly represents an additional challenge for a developing economy like Nigeria.

b) To what extent does the Blue Economy participate to the reaching of SDG 14?

The concept of Blue Economy is closely linked to environmental SDGs, with a particular attention to SDG 14. Given the direct focus of the Blue Economy on global ocean and water resources, it is unsurprising that SDG 14, "Life Below Water," holds the highest importance among the SDGs (Lee, Noh and Khim, 2020). As opposed to the 'business-as-usual' model, Blue Economy calls for action to manage, safeguard and preserve in a sustainable manner the ocean now, for the benefit of both present and future generations (Igbozurike, 2020). The former model based their ocean economic development on the exploitation of marine resources, without considering the negative consequences on these resources stemming from their activities. The author highlights two main elements of Blue Economy. The first lies in the absolute need to safeguard and rehabilitate already existing ocean resources in order to achieve its second objective of developing new sustainable activities based on the ocean (Igbozurike, 2020). Blue Economy thus allows to stop bridging socioeconomic development with the destruction of ocean ecosystems (Elisha, 2019). It is by putting ocean conservation at the core of the model that Blue Economy is a major enabler of SDG 14. Because this goal especially focuses on the relationship between the maritime environment and sustainable development, it is automatically close to Blue Economy. Nonetheless, Ibrahim (2018) underlines that Blue Economy goes beyond the "simple relationship between SDG Goal 14 and Blue Economy". It indeed relates to all SDGs and provides a structure to

implement the concept on the ground that will create successful synergies in the sustainable use of ocean and marine ecosystems (Ibrahim, 2018).

Moreover, Gunter Pauli's novel approach focuses on the marine resources as a source of energy and food, therefore enhancing national agricultural production and contributing to reach sustainable development, prosperity and well-being (Nikitenko, Voronkova and Kaganov, 2022). Blue Economy is closely linked to all aspects of sustainable development and permits its implementation. Despite the evident focus on protecting maritime resources, the idea of Blue Economy is to better manage them as a way to sustain economic and social well-being. Elisha (2019) states that ocean-related matters largely contribute to achieving the economic SDGs, as well as a green economy. The research highlights Blue Economy as a means to take advantage of the economic potential of the ocean and all water resources. This concept further drives the implementation of basic standards of living that allow an appropriate level of life for all (Nikitenko, Voronkova and Kaganov, 2022). In line with Bertarelli (2020), engaging in Blue Economy has the capacity to support a wide range of social sustainable goals, including poverty, hunger, jobs, gender equality, and resilient communities. Therefore, blue economy considers all aspects of sustainable development because the better management and use of marine resources has positive implications for the socioeconomic development of a nation.

Its objective is to stimulate economic progress, foster social inclusivity, and ensure the preservation or enhancement of livelihoods, all the while prioritizing environmental sustainability (Elisha, 2019). As all sustainable development goals are interlinked, from achieving SDG 14, a variety of other goals can be completed.

c) Can the oil industry contribute to the Blue Economy?

Since the discovery of oil and gas in Nigeria, all operations associated with these resources have been at the core of the country's economic development. The Nigerian government earned a revenue of USD391.6 billion directly stemming from the oil and gas industry over the period 1970-2005, 30 percent of which were generated between

1999 and 2005 (Hamisu, 2019). Between 1970 and 2005, the country also strongly benefited from oil exports, which represent 96.3 percent of total foreign earnings. Similarly, out of the USD118.4 billion earned during this period from exports, one fourth was generated between 1999 and 2005 (Hamisu, 2019). In view of these figures, the sector has undeniably been a driver of growth in the country. When thinking of implementing a new economic model in the country, we naturally question the role of oil and gas in it.

To some extent, it appears contradicting to evaluate this industry in the context of Blue Economy considering the adverse impact of oil and gas activities on the environment previously highlighted. Seeing how the marine and coastal resources are destructed from this industry make it hard to grasp how it could contribute to the Blue Economy, where the preservation of marine resources is central. Nonetheless, it must be reminded that oil and gas remain a main contributor to economic growth in Nigeria (Enyoghasim et al., 2019, Ebimobowei, 2022) and moving radically away from it seems unrealistic in the foreseeable future. Therefore, a solution for Nigeria to progressively reduce its dependence on oil and gas activities, is to understand how they can be included into this novel economic model.

The Nigerian economy is experiencing steady growth, with the country's oil and gas sector being heavily reliant on maritime resources. Both the offshore and onshore components of the sector depend on the sea for crude oil exports and product imports. Since they are mainly transported through maritime means, and maritime transportation being a crucial element of Blue Economy, the expansion of this model can benefit the oil and gas industry (Hamisu, 2019). Moreover, as the sector will continue to expand in the future, it is expected to play a compelling role in contributing to the country's Blue Economy. Conversely, according to Bala-Gbogbo (2018) there is a growing trend with the oil production being increasing conducted offshore, hence the expectancy that the sector will be an integrant part of the Blue Economy in Nigeria.

3. Recommendations: Government's regulations to incentivize the "blueing" of the oil sector

As highlighted in the previous chapters of this paper, while the creation of Protected Marine Areas (PMAs) to safeguard marine biodiversity is key to achieving SDG 14, Nigeria still fails to implement them. The country needs to invest in a thorough evaluation of the state of its waters to evaluate the areas most at risk of losing their biodiversity. All activities, including oil and gas operations, with the potential of harming the defined PMAs should be suspended to allow natural rehabilitation of these zones.

The polluter-pays principle is weakly enforced and allows oil and gas operators to damage the marine environment to go unpunished. Immediate action is needed, and stricter measures must be adopted. Notably, the immediate polluter and all stakeholders associated with it must be held liable for their actions and be required to provide the funds that meet the cost of environmental remediation. Not only direct and indirect polluters of the region should share the economic burden of cleaning-up, but it also unblocks more funds to do so thoroughly.

Despite the PIA's statement that gas flaring is outlawed, the fact that exemptions can be given and allow this activity makes it unclear whether it is actually prohibited. The Nigerian government needs to be more definitive about this decision, and make gas flaring illegal under all circumstances, without which a reduction in gas flaring seems unrealistic.

Nigeria further needs to enforce stricter measures when it comes to oil spilling. They can be better managed by implementing limitations for the filling of oil tanks. Regular monitoring of oil and gas infrastructures should become mandatory to ensure their quality. Geographical surveillance systems can typically be used to improve the monitoring of oil spillage. Moreover, as most oil spilling cases in Nigeria are reported to be caused by sabotage, improved security systems are necessary. The granting of licences and leases should depend on operators agreeing to provide all the necessary resources to properly clean and remediate to the spills they generate. Quickening the cleaning of spills process is crucial to avoid their spread in the environment.

This paper highlights the urgent need for the country to diversify its economy and move away from the oil and gas sector. The Blue Economy has the potential to thrive in Nigeria but requires the support of the government. It is necessary to invest in

ocean-based industries, like shipping, mariculture and renewable ocean energy. The development of renewable marine resources can also be an opportunity to participate in the Blue Economy, while decreasing the country's reliance on hydrocarbons.

The above-mentioned measures are solely viable if the government supports the project and enforces the regulations. This paper considers that the lack of political will in Nigeria is the main obstacle to an oil sector that reduces its impact on the marine environment. The high level of corruption in Nigeria is what enables public officials to benefit from oil earnings and explains their reticence to a new system. Therefore, reducing corruption is key and requires more transparency. As it has been the case in other countries, the publication of officials' earnings and revenues can help tackling corruption.

For the implementation of a more sustainable country in the long run, the paper recommends that topics, like environmental protection, Blue Economy and sustainable development should be included in educational programmes. It is important to instill such values to young Nigerians to increase their environmental consciousness, as they will be the future leaders of the country.

Conclusion

The study examined the complex relationship between economic growth in Nigeria, driven by the oil and gas industry, and the achievement of SDG 14: Life below water. Despite the abundance of natural resources in the country, its development has been hindered and its current model of economic growth appears as unviable in the long run. The existence Resource Curse and Dutch Disease phenomena have been validated in the country and can explain the inability of the overall Nigerian society to benefit from this industry. The combination of corruption and the dependence of government revenues on oil and gas are identified as major challenges to achieving SDG 14. Because they wish to keep benefiting from the economic gains it yields, public institutions indeed lack political will to enforce efficient policies to better shield the environment from oil and gas activities. The establishment of the PIA 2021 is in line with this, as the environmental provisions it introduces are not sufficient and, so far, are not fully respected. The lack of robust regulations relating to biodiversity safeguarding in the Act will therefore not allow Nigeria to better perform in SDG 14.

It is clear that Africa's main oil importer needs to improve the enforcement of environmental policies for these to be efficient. The paper further underlines the necessity to diversify its economy. Implementing Blue Economy is an opportunity for Nigeria to use the diversity of its marine resource at its advantage. The concept is crucial as it sheds light on a system that allows natural resources to be a driver of economic and social development. The establishment of Blue Economy additionally offers the possibility to attain SDG 14, as well as other sustainable development goals.

By implementing stronger regulations, diversifying the economy, and embracing the principles of the Blue Economy, Nigeria can work towards a more sustainable and balanced approach that promotes both economic interests and the achievement of environmental SDGs, including SDG 14. It is crucial for the government, industry stakeholders, and the broader society to collaborate in driving this necessary change in ideology and governance to ensure a better future for Nigeria's environment and its people.

To complement the findings of this paper, additional research can be conducted on the evolution of the implementation of Blue Economy in Nigeria. This could be helpful to evaluate the progress and the challenges to address in the country to successfully apply Blue Economy.

List of acronyms

EEZ: Exclusive Economic Zone

ELRI: Environmental Law Research Institute

FAO: Food and Agriculture Organisation of the United Nations

MNC: Multinational Company

MNOC: Multinational Oil Company

NIMASA: Nigerian Maritime Administration and Safety Agency

NMDPRA: Nigerian Midstream and Downstream Petroleum Regulatory Authority

NNPC: Nigerian National Petroleum Company

NUPRC: National Upstream Petroleum Regulatory Commission

OPEC: Organisation of the Petroleum Exporting Countries

OECD: Organisation for Economic Cooperation and Development

PIA: Petroleum Industry Act

PMA: Protected Marine Area

SDG: Sustainable Development Goal

UN: United Nations

UNCTAD: United Nations Conference on Trade and Development

UNEP: United Nations Environment Programme

VNR: Voluntary National Review

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Bibliography

Adams, D., Adams, K., Ullah, S. and Ullah, F. (2019). Globalisation, governance, accountability and the natural resource ‘curse’: Implications for socio-economic growth of oil-rich developing countries. *Resources Policy*, 61, pp.128–140. doi:<https://doi.org/10.1016/j.resourpol.2019.02.009>.

Adeyemo, O. and Shogbanmu, T. (2020). SDG 14 - life below water: trend and trajectory in Nigeria. *Proceedings of the Nigerian Academy of Science*, 13(2s). doi:<https://doi.org/10.57046/oncm7100>.

Aghalino, S.O. and Eyinla, B. (2009). Oil Exploitation and Marine Pollution: Evidence from the Niger Delta, Nigeria. *Journal of Human Ecology*, 28(3), pp.177–182. doi:<https://doi.org/10.1080/09709274.2009.11906236>.

Akinyetun, T. (2016). Nigeria and Oil Production: Lessons for Future . *International Journal of Multidisciplinary Research and Development*, 3(5).

Akpan, E.E. (2022). Environmental Consequences of Oil Spills on Marine Habitats and the Mitigating Measures—The Niger Delta Perspective. *Journal of Geoscience and Environment Protection*, 10(06), pp.191–203. doi:<https://doi.org/10.4236/gep.2022.106012>.

Aleru, C.J. (2023). Climate Change under the Nigerian Petroleum Industry Act (PIA) 2021. *African Journal*, [online] 7. Available at: <https://ajjeel.com/index.php/a/article/view/51/52>.

Allianz (2023). *Allianz | Country Risk Report Nigeria*. [online] Allianz.com. Available at: https://www.allianz.com/en/economic_research/publications/country-risk/nigeria.html.

Andrews, N., Bennett, N.J., Le Billon, P., Green, S.J., Cisneros-Montemayor, A.M., Amongin, S., Gray, N.J. and Sumaila, U.R. (2021). Oil, fisheries and coastal

communities: A review of impacts on the environment, livelihoods, space and governance. *Energy Research & Social Science*, 75, p.102009. doi:<https://doi.org/10.1016/j.erss.2021.102009>.

Anyaehe, M.C. and Areji, A.C. (2015). Economic Diversification for Sustainable Development in Nigeria. *Open Journal of Political Science*, [online] 05(02), pp.87–94. doi:<https://doi.org/10.4236/ojps.2015.52010>.

Anyanwu, C. (2012). *The oil industry and the Nigerian environment*. p.27.

Ateme, M.E. (2021). Developing marine and coastal resources in Nigeria: Prospects and challenges. *Maritime Technology and Research*, 3(4), pp.335–347. doi:<https://doi.org/10.33175/mtr.2021.244473>.

Bala-Gbogbo, E. (2018). *Nigeria heads out to sea in search of safer future for oil development*. [online] www.worldoil.com. Available at: <https://www.worldoil.com/news/2018/10/29/nigeria-heads-out-to-sea-in-search-of-safer-future-for-oil-development>.

Bertarelli, D. (2020). *Developing a vibrant blue economy is feasible, but we need to collaborate* | UNCTAD. [online] unctad.org. Available at: <https://unctad.org/news/developing-vibrant-blue-economy-feasible-we-need-collaborate> [Accessed 2 Jun. 2023].

Beutel, J. (2021). *Economic diversification and sustainable development of GCC countries. When Can Oil Economies Be Deemed Sustainable?* pp.99–151.

Bowen, G.A. (2009). Document Analysis as a Qualitative Research Method. *Qualitative Research Journal*, 9(2), pp.27–40. doi:<https://doi.org/10.3316/QRJ0902027>.

Chinecherem Uzonwanne, M. (2015). Economic Diversification in Nigeria in the Face of Dwindling Oil Revenue. *Online*, [online] 6(4). Available at: <https://core.ac.uk/download/pdf/234646874.pdf>.

Chinwa Ole, N. and Best Herbert, E. (2022). The Nigerian Offshore Oil Risk Governance Regime: Does the Petroleum Industry Act 2021 Address the Existing

Gaps? *Studia Iuridica Lublinensia*, 31(3), pp.143–163.
doi:<https://doi.org/10.17951/sil.2022.31.3.143-163>.

Chioke, A. (2021). Developing an Effective Legal Framework for Oil Pollution Management in Nigeria. *NAU.JCPL*, 8(1), p.2021.

Cisneros-Montemayor, A.M., Moreno-Báez, M., Reygondeau, G., Cheung, W.W.L., Crosman, K.M., González-Espinosa, P.C., Lam, V.W.Y., Oyinlola, M.A., Singh, G.G., Swartz, W., Zheng, C. and Ota, Y. (2021). Enabling conditions for an equitable and sustainable blue economy. *Nature*, [online] 591(7850), pp.396–401.
doi:<https://doi.org/10.1038/s41586-021-03327-3>.

Coface (2023). *Economic Studies: Nigeria*. [online] Coface.com. Available at: <https://www.coface.com/Economic-Studies-and-Country-Risks/Nigeria>.

Cordes, E.E., Jones, D.O.B., Schlacher, T.A., Amon, D.J., Bernardino, A.F., Brooke, S., Carney, R., DeLeo, D.M., Dunlop, K.M., Escobar-Briones, E.G., Gates, A.R., Génio, L., Gobin, J., Henry, L.-A., Herrera, S., Hoyt, S., Joye, M., Kark, S., Mestre, N.C. and Metaxas, A. (2016). Environmental Impacts of the Deep-Water Oil and Gas Industry: A Review to Guide Management Strategies. *Frontiers in Environmental Science*, 4.
doi:<https://doi.org/10.3389/fenvs.2016.00058>.

Deloitte (2021). *Petroleum Industry Act, 2021: Administrative framework Petroleum Industry Act, 2021: Administrative framework*. [online] Available at: https://www2.deloitte.com/content/dam/Deloitte/ng/Documents/energy-resources/PIA_Tax_Administrative%20Framework.pdf.

Ebimobowei, A. (2022). Oil Revenue and Economic Growth of Nigeria: 1990 – 2019. *African Journal of Economics and Sustainable Development*, 5(1), pp.17–46.
doi:<https://doi.org/10.52589/ajesd-jwzxifnw>.

Ekpu, A. (2020). Environmental Impact of Oil on Water: A Comparative Overview of the Law and Policy in the United States and Nigeria. *Denver Journal of International Law & Policy*, 24(1).

Ele, M. (2022). Oil Spills in the Niger Delta-Does the Petroleum Industry Act 2022 Offer Guidance for Solving this Problem? *Journal of Sustainable Development Law and Policy (The)*, 13(1), pp.130–161. doi:<https://doi.org/10.4314/jsdlp.v13i1.6>.

Elekwachi, W., Hycienth, N. and Onyishi, C. (2019). Oil Spill Incidents And Wetlands Loss In Niger Delta: Implication For Sustainable Development Goals. *International Journal of Environment and Pollution Research*, 7(1), pp.1–20.

Elisha, O.D. (2019). The Nigeria blue economy: Prospects for economic growth and challenges. *International Journal of Scientific Research in Education*, 12(5), pp.680–699.

ELRI (2021). *Impact of Gas Flaring on Global Warming & Agriculture – ELRI*. [online] elri-ng. Available at: <https://elri-ng.org/2021/11/04/impact-of-gas-flaring-on-global-warming-agriculture/>.

Elum, Z.A., Mopipi, K. and Henri-Ukoha, A. (2016). Oil exploitation and its socioeconomic effects on the Niger Delta region of Nigeria. *Environmental Science and Pollution Research*, 23(13), pp.12880–12889. doi:<https://doi.org/10.1007/s11356-016-6864-1>.

Encyclopedia Britannica (2020). Territorial waters | international law | Britannica. In: *Encyclopædia Britannica*. [online] Available at: <https://www.britannica.com/topic/territorial-waters>.

Eneh, O.C. (2011). Managing Nigeria’s Environment: The Unresolved Issues. *Journal of Environmental Science and Technology*, 4(3), pp.250–263. doi:<https://doi.org/10.3923/jest.2011.250.263>.

Enyoghasim, M.O., Anochiwa, L., Agbanike, F.T., Uwazie, I.U., Kalu, E.U., Onwuka, O.K., Okwor, S.A. and Ogbonnaya, I.O. (2019). Oil Exploration And Exploitation in Nigeria and The Challenge of Sustainable Development: an Assessment of The Niger Delta. *International Journal of Energy Economics and Policy*, [online] 9(4), pp.369–380. doi:<https://doi.org/10.32479/ijeep.7812>.

European Commission (2020). *Language selection | Energy*. [online] energy.ec.europa.eu. Available at: https://ec.europa.eu/energy/topics/oil-gasand-coal/oil-refining_en [Accessed 16 May 2023].

FAO (2022). *The State of World Fisheries and Aquaculture 2022*. Rome: FAO. doi:<https://doi.org/10.4060/cc0461en>.

Fudge, M., Ogier, E. and Alexander, K.A. (2023). Marine and coastal places: Wellbeing in a blue economy. *Environmental Science & Policy*, 144, pp.64–73. doi:<https://doi.org/10.1016/j.envsci.2023.03.002>.

Gavin, J. (2022). *Has Nigeria's Petroleum Industry Act reshaped the industry?* [online] African Business. Available at: <https://african.business/2022/09/energy-resources/has-nigerias-petroleum-industry-act-reshaped-the-industry#:~:text=The%20PIA%20has%20played%20a,and%20Downstream%20Petroleum%20Regulatory%20Authority>. [Accessed 22 May 2023].

Gjertsen, H. (2005). Can Habitat Protection Lead to Improvements in Human Well-Being? Evidence from Marine Protected Areas in the Philippines. *World Development*, 33(2), pp.199–217. doi:<https://doi.org/10.1016/j.worlddev.2004.07.009>.

Hamisu, A.H. (2019). A study of Nigeria's blue economy potential with particular reference to the oil and gas sector. *World Maritime University Dissertations*.

Hammed Damilare, I. (2018). Harnessing the potentials of blue economy for sustainable development of Nigeria. *World Maritime University Dissertations*.

Ibrahim, H.D. (2018). Harnessing the potentials of blue economy for sustainable development of Nigeria. *World Maritime University Dissertations*. [online] Available at: https://commons.wmu.se/all_dissertations/673 [Accessed 5 Jun. 2023].

Igbozurike, J.K. (2020). Achieving the Blue Economy Dream in the Nigerian Maritime Sector. *SSRN Electronic Journal*. doi:<https://doi.org/10.2139/ssrn.3603037>.

International Energy Agency (2022). *Petroleum Industry Act – Policies*. [online] IEA. Available at: <https://www.iea.org/policies/16100-petroleum-industry-act>.

Lee, K.-H., Noh, J. and Khim, J.S. (2020). The Blue Economy and the United Nations' sustainable development goals: Challenges and opportunities. *Environment International*, 137, p.105528. doi:<https://doi.org/10.1016/j.envint.2020.105528>.

Markleen (2013). *Oil Spill Recovery And Clean-up Techniques | MARKLEEN*. [online] Markleen.com. Available at: <https://markleen.com/oil-spill-response/oil-spill-clean-up-techniques/#:~:text=The%20time%20an%20ecosystem%20takes>.

Michael, B. and Okolo, P. (2018). *Oil Politics And Environmental Remediation In Nigeria*.

National Oceanic and Atmospheric Administration (2021). *Why Should We Care about the ocean?* [online] oceanservice.noaa.gov. Available at: <https://oceanservice.noaa.gov/facts/why-care-about-ocean.html>.

Neo, H. (2009). Resource and Environmental Economics. In: N. Thrift and R. Kitchin, eds., *International Encyclopedia of Human Geography*. Amsterdam ; Oxford: Elsevier Science, pp.376–380.

Nigerian Gas Flaring Tracker (2023). *Nigerian Gas Flare Tracker*. [online] nosdra.gasflaretracker.ng. Available at: <https://nosdra.gasflaretracker.ng/>.

Nigerian oil spill monitor (2023). *Nigerian Oil Spill Monitor*. [online] oilspillmonitor.ng. Available at: <https://oilspillmonitor.ng/>.

Nikitenko, V., Voronkova, V. and Kaganov, Y. (2022). The Concept of Developing a 'Blue Economy' as a Basis for Sustainable Development. *Baltic Journal of Economic Studies*, [online] 8(5), pp.139–145. doi:<https://doi.org/10.30525/2256-0742/2022-8-5-139-145>.

NIMASA (2018). Nigeria's Matitime Industry Forecast 2018-2019. *Emerging opportunities and challenges*.

Nwuke, K. (2021). *Nigeria's Petroleum Industry Act: Addressing old problems, creating new ones*. [online] Brookings. Available at: <https://www.brookings.edu/blog/africa-in-focus/2021/11/24/nigerias-petroleum-industry-act-addressing-old-problems-creating-new-ones/>.

Ocean Health Index (2023). *Goals | OHI*. [online] [oceanhealthindex.org](https://oceanhealthindex.org/global-scores/goal-scores/). Available at: <https://oceanhealthindex.org/global-scores/goal-scores/>.

Odisu, T.A. (2015). The Nigerian State, oil multinationals and the environment: A case study of Shell Petroleum Development Company (SPDC). *Journal of Public Administration and Policy Research*, 7(2), pp.24–28. doi:<https://doi.org/10.5897/jpapr2014.0303>.

OECD (2016). *The Ocean Economy in 2030*. Paris: OECD Publishing. doi:<https://doi.org/10.1787/9789264251724-en>.

OECD (2021). *Developing countries and the ocean economy - ocean*. [online] www.oecd.org. Available at: <https://www.oecd.org/ocean/topics/developing-countries-and-the-ocean-economy/>.

Ogbodo, J.A., Bichi, A.H. and Ogbodo, J.I. (2021). ANALYZING THE PROGRESS, PITFALLS AND PROSPECTS FOR ATTAINING ENVIRONMENTAL-RELATED SUSTAINABLE DEVELOPMENT GOALS IN NIGERIA. *Animal Research International*, 18(1), pp.3990–4004.

Okafor-Yarwood, I., Kadagi, N.I., Miranda, N.A.F., Uku, J., Elegbede, I.O. and Adewumi, I.J. (2020). The Blue Economy–Cultural Livelihood–Ecosystem Conservation Triangle: The African Experience. *Frontiers in Marine Science*, 7. doi:<https://doi.org/10.3389/fmars.2020.00586>.

Okoro, U.S. and Arinze-Umobi, C. (2022). The Petroleum Industry Act 2021 And Quest For Stricter Environmental Regulation In Nigeria's Energy Sector. *Law and Social Justice Review*, 3(2).

Olaleye, O. (2022). *Nigeria: Budget Credibility and the Sustainable Development Goals* By: Olaniyi Olaleye, Budget Credibility Program Officer, *International Budget*

Partnership Nigeria: Budget Credibility and the Sustainable Development Goals. [online] Available at: <https://internationalbudget.org/wp-content/uploads/Nigeria-Budget-Credibility-and-the-Sustainable-Development-Goals.pdf> [Accessed 29 May 2023].

Olaoye, O.J. and Ojebiyi, W.G. (2018). Marine Fisheries in Nigeria: A Review. *Marine Ecology - Biotic and Abiotic Interactions.* [online] doi:<https://doi.org/10.5772/intechopen.75032>.

Oludimu, S. and Alola, A.A. (2021). Does crude oil output aid economy boom or curse in Nigeria? An inference from 'Dutch disease'. *Management of Environmental Quality: An International Journal,* ahead-of-print(ahead-of-print). doi:<https://doi.org/10.1108/meq-03-2021-0049>.

OPEC (2021). *OPEC : Nigeria and OPEC: 50 years together.* [online] www.opec.org. Available at: https://www.opec.org/opec_web/en/press_room/6489.htm.

Pantheon Ressources (n.d.). *USA Oil and Gas Exploration Glossary .* [online] www.pantheonresources.com. Available at: <http://www.pantheonresources.com/about-pantheon/projects/glossary/55-mscf> [Accessed 11 Jun. 2023].

Pauli, G. (2010). *The Blue Economy : 10 Years - 100 Innovations - 100 Million Jobs - English Edition.* Erscheinungsort Nicht Ermittlbar: Konvergenta.

Price Waterhouse Coopers (2021). *The Petroleum Industry Act.* [online] PwC. Available at: <https://www.pwc.com/ng/en/publications/nigeria-petroleum-industry-act.html>.

RFI (2023). *Cleanup of oil-polluted Nigerian state would cost \$12 bn: report.* [online] RFI. Available at: <https://www.rfi.fr/en/international-news/20230516-cleanup-of-oil-polluted-nigerian-state-would-cost-12-bn-report> [Accessed 26 May 2023].

Stockholm Resilience Centre (2017). *Contributions to Agenda 2030 - Stockholm Resilience Centre.* [online] stockholmresilience.org. Available at:

<https://www.stockholmresilience.org/research/research-news/2017-02-28-contributions-to-agenda-2030.html>.

The Economist (1977). The Dutch Disease. *The Economist*, pp.82–83.

The Global Goals (2022). *Goal 14: Life below water*. [online] The Global Goals. Available at: <https://www.globalgoals.org/goals/14-life-below-water/>.

Transparency International (2022). *2022 Corruption Perceptions Index - Explore Nigeria's results*. [online] Transparency.org. Available at: <https://www.transparency.org/en/cpi/2022/index/nga>.

Udoma, U., Elias-Adebowale, B.-O. - F., Agbelese, O., Onwuzu, F., Basiekanem, E., Adeyemi, A. and Osoka, O. (2019). *Oil and gas regulation in Nigeria*. [online] Lexology. Available at: <https://www.lexology.com/library/detail.aspx?g=4cdbb513-f54d-4eea-a53a-a3b41c6585c1> [Accessed 27 Apr. 2023].

UN Oceans and Law of the Sea (n.d.). *CONTINENTAL SHELF - GENERAL DESCRIPTION*. [online] www.un.org. Available at: https://www.un.org/depts/los/clcs_new/continental_shelf_description.htm.

UN Sustainable Development Solutions Network (2019). *2019 Africa Index and Dashboards Report*. [online] sdgindex.org. Available at: https://s3.amazonaws.com/sustainabledevelopment.report/2019/2019_africa_index_and_dashboards.pdf.

UN Sustainable Development Solutions Network (2020). *Africa SDG Index and Dashboards Report 2020*. [online] Available at: https://s3.amazonaws.com/sustainabledevelopment.report/2020/2020_africa_index_and_dashboards.pdf.

UN Sustainable Development Solutions Network (2021). *Africa SDG Index and Dashboards Report 2021*.

UN Sustainable Development Solutions Network (2022a). *Sustainable Development Report 2022: Nigeria*.

UN Sustainable Development Solutions Network (2022b). *Sustainable Development Report 2022. Sustainable Development Report*. [online] doi:<https://doi.org/10.1017/9781009210058>.

UNCTAD (2021). *The Commodity Dependence Trap Background document to the Commodities and Development Report 2021 Background document to the Commodities and Development Report 2021*. [online] Available at: https://unctad.org/system/files/non-official-document/DITC_COM_2021_D_BN01_en.pdf [Accessed 16 May 2023].

UNEP (2013). *Oil Pipelines Act*. | *UNEP Law and Environment Assistance Platform*. [online] leap.unep.org. Available at: <https://leap.unep.org/countries/ng/national-legislation/oil-pipelines-act> [Accessed 25 May 2023].

UNEP (2017). *GOAL 14: Life below water*. [online] UNEP - UN Environment Programme. Available at: <https://www.unep.org/explore-topics/sustainable-development-goals/why-do-sustainable-development-goals-matter/goal-14>.

United Nations (2005). *Resolution adopted by the General Assembly: World Summit Outcome*. [online] Available at: https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_60_1.pdf.

United Nations (2014). *Blue Economy concept paper*.

United Nations (2015). *The 17 sustainable development goals*. [online] United Nations. Available at: <https://sdgs.un.org/goals>.

United Nations (2019). *PREAMBLE TO THE UNITED NATIONS CONVENTION ON THE LAW OF THE SEA*. [online] Un.org. Available at: https://www.un.org/depts/los/convention_agreements/texts/unclos/part5.htm.

United Nations (2020). *NIGERIA'S 2020 VOLUNTARY NATIONAL REVIEW (VNR) ON SUSTAINABLE DEVELOPMENT GOALS (SDGs) MAIN MESSAGES*. [online] Available at: https://sustainabledevelopment.un.org/content/documents/26210Main_Messages_Nigeria.pdf.

United Nations (2021). How is climate change impacting the world's ocean. *United Nations*. [online] Available at: <https://www.un.org/en/climatechange/science/climate-issues/ocean-impacts>.

United Nations (2022a). — *SDG Indicators*. [online] unstats.un.org. Available at: <https://unstats.un.org/sdgs/report/2022/Goal-14/>.

United Nations (2022b). *Blue Economy: oceans as the next great economic frontier*. [online] United Nations Western Europe. Available at: <https://unric.org/en/blue-economy-oceans-as-the-next-great-economic-frontier/>.

United Nations (2022c). *Goal 14 | Department of Economic and Social Affairs*. [online] sdgs.un.org. Available at: <https://sdgs.un.org/goals/goal14>.

United Nations (2022d). *Sustainable Development Goals | United Nations in Nigeria*. [online] nigeria.un.org. Available at: <https://nigeria.un.org/en/sdgs>.

United Nations (2023). *The 17 goals | Sustainable Development*. [online] sdgs.un.org. Available at: <https://sdgs.un.org/fr/goals>.

Vetter, T.R. (2017). Descriptive Statistics. *Anesthesia & Analgesia*, 125(5), pp.1797–1802. doi:<https://doi.org/10.1213/ane.0000000000002471>.

World Bank (2017). *What is the Blue Economy?* [online] World Bank. Available at: <https://www.worldbank.org/en/news/infographic/2017/06/06/blue-economy>.

World Bank (2022). *Global Flaring Data*. [online] World Bank. Available at: <https://www.worldbank.org/en/programs/gasflaringreduction/global-flaring-data> [Accessed 30 May 2023].

World Commission on Environment and Development (1987). *Report of the World Commission on Environment and Development: Our Common Future Towards Sustainable Development 2. Part II. Common Challenges Population and Human Resources* 4. [online] United Nations, p.16. Available at: <https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf>.