

FROM EXPLORATION TO EXPLOITATION: CHALLENGES AND OPPORTUNITIES IN NIGERIA'S FRONTIER ACREAGES DEVELOPMENT

By

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Abstract

The paper examined frontier acreages and development in Nigeria. The paper adopted the doctrinal method of research with primary sources of information derived from legislations, while the secondary sources of information were distilled from journal articles, legal digests, and internet sources. The paper affirmed that Nigeria's oil and gas industry has long been a cornerstone of its economy. Therefore, as traditional oil fields mature, attention has shifted toward frontier acreages undeveloped regions with potential for hydrocarbon exploration, particularly in deep-water offshore areas, inland basins, and the northern regions. Frontier acreages represent untapped regions that hold promise for boosting Nigeria's oil reserves and energy security. With dwindling production from established fields, the government has taken steps to attract investment and exploration into these frontier areas, offering new incentives and regulations under the Petroleum Industry Act, 2021. The paper revealed that frontier acreages, particularly in the Chad Basin, Anambra Basin, and offshore Niger Delta, have significant hydrocarbon potentials. Recent exploration efforts, including seismic studies, indicate promising geological structures. However, these regions remain largely underexplored due to various challenges. Major obstacles included technical difficulties, due to harsh terrain, inadequate infrastructure, and security concerns in northern regions affected by insurgency. Additionally, fluctuating global oil prices and regulatory uncertainties prior to the PIA have hindered long-term investment. Environmental concerns, particularly in fragile opportunity to revitalize Nigeria's oil and gas sector. However, overcoming the technical, environmental, and security challenges is critical to realizing the full potential of these regions. To unlock the potential of frontier acreages, Nigeria must continue to enhance its regulatory framework, improve security in affected areas, and invest in infrastructure development. Partnerships with international oil companies and the adoption of advanced exploration technologies are essential. Furthermore, a sustainable approach that prioritizes environmental protection and community engagement will be key to long-term success.

Keywords: *Exploration, Exploitation and Frontier Acreages*

1.0 Introduction

In the context of oil and gas exploration, frontier acreage refers to unexplored or under-explored geographical areas, both onshore and offshore, that have potential for oil and gas reserves but have not yet been fully developed or assessed for their commercial viability. These regions are often characterized by difficult terrain, limited infrastructure, and high exploration risks, but they offer opportunities for new discoveries that can significantly contribute to a nation's energy production.³ A

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³ PIA, 2021, s 318, Interpretation.

meaningful dive into the provisions of the PIA on the Fund necessitates a preliminary inquiry on what a frontier acreage is according to the statute. A perusal of the specific provisions of the PIA establishing the Fund is also pertinent. A frontier basin, per the PIA, is a depressed portion of land or ocean floor “where hydrocarbon exploration activities have not been made or an area that is undeveloped” including acreage in Anambra, Dahomey, Bida, Sokoto, Chad and Benue “Frontier Areas”. The statute gives the Commission the leeway to expand the list of frontier acreages in the Frontier Areas. As of the time of going to press, the Commission is yet to designate any such new acreages. The PIA tasks the Commission with promoting the exploration of the frontier basins of Nigeria; developing exploration strategies and portfolio management for the exploration of unassigned frontier acreages in Nigeria; identifying and increasing information about the petroleum resources base within frontier basins in Nigeria; and undertaking studies, conducting analyses, and evaluating unassigned frontier basins in Nigeria. Also, frontier basin means basins where hydrocarbon exploration activities has not been carried out or previous commercial discovery oil and gas have not been made or an area that is undeveloped and includes Anambra, Dahomey, Bida, Chad and Benue trough or as may be declared by the Commission through a regulation.⁴

Importantly, the PIA creates the Fund. According to the PIA, the Fund shall be 30% of the NNPC’s “profit oil and profit gas as in the production sharing, profit sharing and risk service contracts,” which shall be remitted in an escrow account dedicated for the development of frontier acreages.⁵ NNPC is statutorily mandated to utilize the monies standing to the credit of this escrow account to carry out exploration and development activities in frontier acreages in Frontier Areas.⁶ How monies in the Fund will be appropriated is, however, for the National Assembly to decide.⁷ In a situation where data has been gleaned from an acreage constituting a frontier basin, and such data reveals that further testing and drilling works are critical for the realization of such acreage’s economic potential, but no exploration and production company is willing to lead the drilling efforts, the Commission may beckon on NNPC to drill or test the concerned acreage on a service fee basis. Any service fee so levied by NNPC shall be charged to the Fund.⁸ In addition to the service fee earned for taking the lead on a frontier acreage as contemplated by section 9(2) of the PIA, NNPC shall also have a right of first refusal in the award of the frontier acreage, where NNPC’s testing and drilling results in a “commercial discovery.” Frontier Acreages means any or all acreages in an area on land in Nigeria defined as a frontier in a regulation issued by the Commission.⁹ Frontier Exploration Fund means the fund established in section 9 (3) the Petroleum Industry Act, 2021.

The discovery of oil in the Niger Delta in the 1950s led to a heightened interest in frontier acreages land and offshore areas that had untapped potential for resource extraction.¹⁰ The government introduced the Petroleum Act of 1969, which granted the federal government exclusive rights over petroleum

⁴ *Ibid.*

⁵ *Ibid.*

⁶ *Ibid.*

⁷ *Ibid.*

⁸ PIA, 2021, 9 (3).

⁹ PIA, 2021, s 318.

¹⁰ Y Omoregbe, ‘The Legal Framework for Oil Exploration in Frontier Areas in Nigeria’ [2017] (35) *Nigerian Law Journal* 123-145.

resources.¹¹ The Land Use Act of 1978 further centralized land ownership, giving state governments control over all land within their territories, while individuals could only acquire leaseholds.¹² In recent decades, frontier acreages have increasingly referred to the undeveloped regions, particularly in the inland sedimentary basins (Chad, Bida, and Benue Troughs) and deep offshore blocks, where the Nigerian government and international oil companies have been exploring new opportunities for oil and gas development.¹³

The petroleum Industry, Act 2021 which received executive assent on August 16, 2021, and thus became law, has been lauded, deservedly for revolutionizing the legal and regulatory landscape of the Nigerian oil and gas industry.¹⁴ One of the changes introduced to the governance of the Nigerian oil and gas industry is the establishment of the Frontier Exploration Fund, which the PIA envisages will nourish and sustain exploration and development efforts in the frontier acreages.¹⁵ The provisions of the PIA on the Fund are, however, not without shortcomings, which may potentially precipitate a standoff between two key actors empowered by the statute to act in respect of or relating to the frontier acreages, namely NNPC and its upstream regulator, the Nigerian Upstream Petroleum Regulatory Commission “Commission”. The expansion into frontier acreages for development, particularly oil exploration, has sparked debates on environmental sustainability and the rights of local communities.¹⁶ The Niger Delta, once considered a frontier area, has suffered extensive environmental degradation, leading to tensions between oil companies, the government, and local communities. Development in frontier regions has raised issues around displacement, environmental damage, and the exclusion of local communities from the benefits of resource extraction. These concerns continue to influence contemporary debates on how best to manage frontier acreages for sustainable development.

Also, several laws govern the environmental impact of resource extraction in frontier acreages. These include the Environmental Impact Assessment (EIA) Act of 1992, which mandates an assessment of potential environmental impacts before any major development project, including oil exploration, is approved.¹⁷ The National Oil Spill Detection and Response Agency (NOSDRA) Act of 2006 is also important, as it aims to prevent and manage oil spills, which have been a major issue in frontier oil development.¹⁸ The Petroleum Industry Act (PIA) modernized Nigeria’s legal framework for oil and gas exploration and production. It introduced regulatory reforms aimed at encouraging investment, particularly in frontier acreages, and created mechanisms to ensure a greater share of oil revenues for host communities. The PIA also established the Frontier Exploration Fund, which dedicates 30% of oil revenue from production-sharing contracts to the exploration of frontier acreages.¹⁹ Nigeria’s oil and gas policies have been developed to encourage exploration and development in frontier areas. The government has focused on increasing exploration in inland sedimentary basins, such as the Chad Basin

¹¹ *Ibid.*

¹² *Ibid.*

¹³ A Adeola, ‘Regulatory Challenges in the Exploration of Frontier Acreages in Nigeria’ [2020] (18) *Oil, Gas & Energy Law Journal* 225-244.

¹⁴ PIA, 2021.

¹⁵ *Ibid.*

¹⁶ *Ibid.*

¹⁷ O Olusegun, ‘Environmental Law Impacts of Oil Exploration in Nigeria’s Frontier Acreages’ [2019] (42) *Nigerian Journal of Environmental Law* 85-108.

¹⁸ *Ibid.*

¹⁹ *Ibid.*

and Bida Basin, to diversify Nigeria's oil production away from the Niger Delta. These policies aim to attract foreign investment and partnerships with international oil companies to develop these frontier acreages.²⁰ In sum, frontier acreages in Nigeria have historically been shaped by colonial land policies, evolving through post-independence laws aimed at resource control and exploration. Legal frameworks like the Land Use Act, Petroleum Act, and PIA have guided development in these areas, but environmental and community concerns remain key challenges.

2.0 Petroleum Industry Act, 2021 and its Implications for Frontier Acreages Development in Nigeria

The PIA emphasizes exploration in frontier acreages, which refers to regions with significant exploration potential but that have not yet been fully developed. These include the inland sedimentary basins (C had Basin, Benue Trough, Bida Basin, Sokoto Basin, Anambra Basin, and many others) and the deepwater offshore blocks. The Act aims to expand Nigeria's resource base beyond the traditionally explored Niger Delta, encouraging oil and gas exploration in these under-explored areas.²¹ One of the most significant provisions in the PIA regarding frontier acreages is the creation of the Frontier Exploration Fund (FEF). This fund is designed to finance oil and gas exploration in these less-explored regions, with a focus on unlocking new reserves to ensure the sustainability of Nigeria's petroleum sector. The FEF is controlled by the NNPC Limited, and its allocation is aimed at exploring and developing areas that have not yet contributed significantly to Nigeria's petroleum production.²²

The Commission under the PIA, which is the regulatory body overseeing the oil and gas sector, plays a key role in ensuring that exploration in frontier acreages aligns with Nigeria's broader energy policy. The Commission, working with NNPC Limited, is responsible for managing the fund and overseeing the allocation of licenses and leases for frontier acreage exploration. The PIA also sets out the process for granting licenses and leases for petroleum activities, with the aim of attracting both local and international investment into these frontier regions. The establishment of the FEF represents a clear government commitment to encouraging exploration in frontier acreages. By dedicating a portion of profits to fund exploration activities, the government is creating a more predictable financial resource base for high-risk exploration projects.²³

The objective of these regulations is to provide the general rules for the administration of the Frontier Exploration Fund pursuant to section 9 of the Petroleum Industry Act, 2021. The Commission shall, within ninety (90) days of the effective date of these Regulations, establish an escrow account called 'Frontier Exploration Fund Escrow Account' pursuant to section 9 (4) of the Act for the purpose of managing the Frontier Exploration Fund.²⁴ The Commission shall be responsible for the administration of the Escrow Account and ensure that funds from the account are applied for the promotion of exploration and development of oil and gas resources in all the frontier basins in Nigeria.²⁵ Furthermore, the Commission shall, following the establishment of the Escrow ensure that NNPC make

²⁰ A Chukwuemeka, 'Frontier Acreage Development under the Petroleum Industry Act, 2021: Legal Implications' [2022] (15) *International Energy Law Review* 55-70.

²¹ P Igwe, 'Frontier Exploration and the Petroleum Industry Act: A Legal Review [2022] *Nigerian Petroleum Journal* 130-150.

²² *Ibid.*

²³ PIA, 2021, 9 (5).

²⁴ Frontier Exploration Fund Administration Regulations, 2021, section 2 (1).

²⁵ *Ibid.*, s 2.

contributions of the amounts specified in section 9 (5) of the Act in a specific manner, such as follows; with respect to production sharing contracts the amounts pursuant to subparagraph (1) shall be 30% of the proceeds from the disposal of profit oil at the fiscal price determined by the Commission, 30% of the proceeds from the disposal of profit gas and the natural gas liquid derived therefrom at the fiscal price determined by the Commission and the contributions by NNPCPL pursuant to this paragraph shall be made quarterly.²⁶ The Commission shall, within six months of the coming into effect of these regulations commence a Frontier basins exploration and development studies programme aimed at achieving the information data base of all acreages comprised in the frontier basins indicating the acreages that are licensed and the ones that are open by collecting all existing geological and geophysical data whether such data is with the National Data Repository, Nigerian Geological Survey Agency, any other governmental or private entity. Additionally, the Commission may at any time where sufficient information is available pursuant to the Act, request NNPCPL to submit a programme for the drilling and exploration of the most prospective leads identified from the study.²⁷ Thus, the frontier basin exploration and development studies shall be carried out by the Commission or through the endowment of a research programme for the specific purpose of enhancing hydrocarbon exploitation in a Nigerian University with relevant track record of expertise in the area.²⁸

Furthermore, the regulations makes provision for direct utilization of funds from the Frontier Exploration Fund by NNPCPL, pursuant to section 9(5) of the Act, at any time upon the establishment of the Escrow Account by the Commission present a request to the Commission in a form prescribed for approval to carry out exploration and development activities in an acreage in any of the frontier basins in Nigeria and to fund such activities from the Frontier Exploration Fund.²⁹ Additionally, where NNPCPL makes a discovery meriting appraisal pursuant to a petroleum exploration licence granted under the paragraph (b) of section 3, the Commission shall require NNPCPL to exercise its option of a right of first refusal under the Petroleum Exploration Licence and where the NNPCPL exercises that option, it shall comply with the requirements of the Act and the Acreage Management, Drilling and Production Regulations in respect of the acquisition of Petroleum Prospecting Licences or Petroleum Mining Leases as the case maybe.³⁰ Where the NNPCPL refuses to exercise its option of right of first refusal, the Commission shall have the right to offer the area to a third party in a licensing round.³¹

Frontier acreages are critical to the expansion of Nigeria's oil and gas reserves beyond the traditionally exploited Niger Delta region. These frontier areas, such as the inland sedimentary basins (Chad Basin, Benue Trough, Bida Basin, and many others) and deep-water offshore blocks, represent opportunities for the country to discover new oil and gas fields.³² Nigeria's petroleum development strategy increasingly focuses on tapping these untapped regions to increase reserves and maintain production levels.³³ Nigeria's heavy reliance on oil production from the Niger Delta has made the country

²⁶ *Ibid*, 2.

²⁷ Frontier Exploration Fund Administration Regulations, 2021, section 2 (1).

²⁸ *Ibid*, s 6.

²⁹ *Ibid*, s 6 (1) (2).

³⁰ *Ibid*, s 4.

³¹ *Ibid*.

³² C Nwafor, 'Environmental and Legal Challenges in the Development of Frontier Acreages' [2021] *Environmental Law and Policy Review* 99-118.

³³ A Bakare, 'Addressing Security Challenges in Oil Exploration in Frontier Acreages' [2021] (16) *Nigerian Journal of Oil and Gas Law* 75-60.

vulnerable to regional instability, environmental degradation, and over-dependence on mature oil fields. Developing frontier acreages provides an opportunity to diversify production sources across the country and reduce this reliance on a single region. The government is keen on promoting exploration in new frontier regions to sustain national oil production levels. Nigeria's government has created incentives to encourage both local and international oil companies to invest in frontier acreage exploration.³⁴

The Petroleum Industry Act (PIA) of 2021 established the Frontier Exploration Fund (FEF), allocating 30% of the Nigerian National Petroleum Corporation Limited's (NNPCL) profit from production-sharing contracts for the exploration of frontier acreages.³⁵ This fund is intended to support geological surveys, seismic studies, and exploration activities in these under-explored regions. Successful exploration and development of frontier acreages could lead to significant economic benefits for Nigeria.³⁶ New oil and gas discoveries in frontier areas would enhance the country's energy security, increase government revenues from oil exports, and create jobs and economic opportunities in regions beyond the Niger Delta. Additionally, the discovery of oil in frontier acreages, particularly in northern Nigeria, could spur economic development and investment in infrastructure in historically less-developed regions.

3.0 Appraisal of the Opportunities/Challenges in Frontier Acreages Development in Nigeria

Investing in frontier acreages and development in Nigeria presents both significant opportunities and challenges. Nigeria is rich in natural resources, including oil, gas, minerals, and agricultural potential.³⁷ Nigeria has a large and youthful population, leading to increasing demand for goods and services, which can stimulate economic growth and create investment opportunities. The Nigerian government has introduced various policies to encourage foreign investment, such as tax incentives, reduced tariffs, and investment protection agreements. Ongoing infrastructure projects, such as roads, ports, and energy facilities, improve access and can enhance the profitability of investments in frontier regions. For investors, entering frontier markets like Nigeria can provide diversification benefits and exposure to new growth markets. Nigeria's geographic location in West Africa makes it a gateway to the African market, providing potential access to neighbouring countries.³⁸

It is a fact that Nigeria is one of the largest oil producers in Africa, with significant reserves in the Niger Delta. Companies like Shell and ExxonMobil have made substantial investments in oil extraction and production, benefiting from lucrative returns due to high global oil prices. With a population exceeding 220 million, Nigeria has a burgeoning middle class driving demand for consumer goods.³⁹ Companies such as Unilever and Nestlé have invested heavily in Nigeria to tap into this expanding market, with Nestlé reporting significant growth in sales driven by local demand for food products. The Nigerian government established the Nigerian Investment Promotion Commission (NIPC) to facilitate and attract foreign investments. For example, the Economic Recovery and Growth Plan (ERGP) aims to improve the business environment and attract investments in various sectors, including agriculture and

³⁴ *Ibid.*

³⁵ (n 27).

³⁶ T Falana, 'Oil Exploration in Frontier Basins: Legal Implications and Policy Options' [2022] (14) *Energy Law Journal* 70-90.

³⁷ M Hassan, 'The Petroleum Industry Act: Frontier Basins Exploration' [2022] (45) *Journal of Energy Resources Development* 341-355.

³⁸ *Ibid.*

³⁹ *Ibid.*

manufacturing.⁴⁰ The Lagos-Ibadan Expressway upgrade is a key infrastructure project aimed at improving transport efficiency between two major economic hubs. Investments in this infrastructure can lead to lower logistics costs for businesses operating in the region. Frontier markets like Nigeria provide investors with the opportunity to diversify their portfolios. Investment funds like the African Development Bank (AfDB) have increased their exposure to Nigerian markets, recognizing the potential for higher returns compared to more developed markets. Nigeria's location makes it a regional hub for trade and commerce in West Africa. Companies like Maersk have established significant operations in Nigerian ports, leveraging this strategic position to facilitate trade across the region.⁴¹

However, from a negative perspective, Nigeria has experienced political instability, including conflicts, corruption, and changes in government policies that can pose risks to investors. While there are developments, many areas still face significant infrastructure deficits, such as unreliable electricity, poor transportation networks, and limited access to basic services. The regulatory framework can be complex and inconsistent, making it challenging for investors to navigate legal requirements and compliance issues.⁴² Certain regions face security challenges, including insurgency, banditry, and communal conflicts, which can jeopardize investments and operations.⁴³ Investments in frontier markets are often subject to high volatility, influenced by global economic trends, commodity prices, and local market dynamics.⁴⁴ There may be challenges in accessing financing for projects, particularly in less developed regions where local banks may be reluctant to lend. For instance, Nigeria has experienced periods of political unrest, particularly in the northern regions, where Boko Haram insurgency has disrupted economic activities. Investors like Total E&P have had to navigate these risks, impacting their operational strategies.⁴⁵ Despite improvements, many regions suffer from inadequate infrastructure. For example, energy shortages have hampered operations for manufacturers like Dangote Cement, which has invested in its own power plants to ensure consistent production. The fluctuating policies around foreign exchange and taxation can create uncertainty.⁴⁶ For example, the Central Bank of Nigeria's restrictions on foreign currency access have impacted foreign companies, leading to challenges in repatriating profits. In the Niger Delta region, oil companies have faced vandalism and kidnappings, impacted production and increased operational costs. Companies like Shell have spent millions on security measures to protect their installations. Fluctuating oil prices directly affect Nigeria's economy. In 2020, the drop in global oil prices due to the COVID-19 pandemic led to significant economic challenges, affecting the profitability of oil-dependent investments.⁴⁷

Nigeria has significant untapped potential in various sectors, including oil, gas, minerals, and agriculture. These frontier acreages, particularly in the Niger Delta and the northern regions, hold opportunities for exploration and development. Nigeria's economy is heavily reliant on oil and gas,

⁴⁰ *Ibid.*

⁴¹ T Abdullahi, 'Legal Frameworks for Oil Exploration in Nigerian Frontier Basins' [2023] (32) *International Journal of Petroleum Policy* 89-102.

⁴² *Ibid.*

⁴³ O Olusegun, 'Environmental Law Impacts of Oil Exploration in Nigeria's Frontier Acreages' [2019] (42) *Nigerian Journal of Environmental Law* 85-108.

⁴⁴ *Ibid.*

⁴⁵ *Ibid.*

⁴⁶ *Ibid.*

⁴⁷ O Olusegun, 'Environmental Law Impacts of Oil Exploration in Nigeria's Frontier Acreages' [2019] (42) *Nigerian Journal of Environmental Law* 85-108.

which contribute over 90% of export earnings.⁴⁸ This reliance poses challenges as global energy dynamics shift towards renewable sources. Nigeria is highly vulnerable to climate change impacts, including rising temperatures, erratic rainfall, and flooding. The agricultural sector, which employs a significant portion of the population, is particularly affected, threatening food security and livelihoods. Oil spills and gas flaring in the Niger Delta have led to severe environmental degradation, affecting local ecosystems and communities. This situation is exacerbated by climate change, as altered weather patterns can increase the frequency and severity of environmental disasters.⁴⁹ Although, the global shift towards renewable energy sources is gaining momentum, driven by concerns about climate change and the need for sustainable energy solutions.⁵⁰ Countries worldwide are committing to reducing carbon emissions and increasing the share of renewables in their energy mix. In response to global energy trends, Nigeria is exploring renewable energy options, including solar, wind, and hydropower.⁵¹ The government has set targets to increase renewable energy capacity, with initiatives like the National Renewable Energy and Energy Efficiency Policy (NREEEP). Nigeria's energy infrastructure is outdated and inadequate for supporting a rapid transition to renewable energy.⁵² This limits the country's ability to capitalize on its renewable potential, especially in rural areas. While there is growing interest in renewable energy, challenges such as regulatory uncertainties, financing gaps, and corruption hinder investment in these sectors. The need to balance the economic benefits of fossil fuel extraction with environmental sustainability poses a challenge. Many communities depend on oil revenues, and a sudden shift could lead to economic instability.⁵³

Frontier acreages can be explored for renewable energy potential, such as solar farms in northern Nigeria, which has abundant sunlight, or wind farms along coastal areas. Developing frontier regions can help diversify Nigeria's energy sources, reducing reliance on fossil fuels and contributing to energy security. Nigeria is a signatory to international agreements such as the Paris Agreement and has made commitments to reduce greenhouse gas emissions. The country aims to achieve 30% of its power generation from renewables by 2030. The government is working on improving regulatory frameworks to facilitate investment in renewable energy.⁵⁴ Initiatives like the Renewable Energy Micro-Utility (REMU) program aim to provide energy access to underserved areas. Thus, the interplay between frontier acreages, climate change, and energy transition in Nigeria presents both challenges and opportunities. As Nigeria navigates the complexities of a global energy transition, there is a pressing need to leverage its frontier regions for sustainable development. This involves balancing economic interests in fossil fuels with the imperative to combat climate change and invest in renewable energy solutions that can secure a more sustainable and resilient future for the country. Effective policy frameworks, investment in infrastructure, and community engagement will be key to achieving these goals.⁵⁵ Has the PIA inadvertently placed the Commission and NNPC at loggerheads regarding the

⁴⁸ T Abdullahi, 'Legal Frameworks for Oil Exploration in Nigerian Frontier Basins' [2023] (32) *International Journal of Petroleum Policy* 89-102.

⁴⁹ *Ibid.*

⁵⁰ *Ibid.*

⁵¹ *Ibid.*

⁵² *Ibid.*

⁵³ P Igwe, 'Frontier Exploration and the Petroleum Industry Act: A Legal Review' [2022] (19) *Nigerian Law Journal of Petroleum Law* 130-150.

⁵⁴ *Ibid.*

⁵⁵ *Ibid.*

utilization of the Fund? This question has become worth asking, as the PIA has created obligations for the Commission in respect of the frontier acreages whilst leaving the question on how the Commission shall finance the performance of these obligations open-ended.⁵⁶ As a result, signs are that it is the Commission's legitimate expectation that it shall finance its obligations regarding the frontier basins from the Fund.

4.0 Lessons on Frontier Acreages Development from Selected Petroleum Exporting Countries

The history of frontier acreages development in oil and gas in Saudi Arabia, Angola, Venezuela, and Brazil reveals different trajectories shaped by geology, politics, and economic strategies. Oil was discovered in Saudi Arabia in 1938 at the Dammam oil field.⁵⁷ The development of frontier acreages rapidly advanced after the establishment of the Arabian American Oil Company (Aramco) in 1933.⁵⁸ Saudi Arabia became a leading global oil producer, with significant investments in technology and infrastructure. The discovery of vast reserves allowed the country to play a central role in OPEC and the global oil market.⁵⁹ Angola's oil industry began to take shape in the 1950s, with significant discoveries made offshore in the 1970s. The country has substantial oil reserves, primarily in deep-water fields.⁶⁰ The civil war 1975-2002 initially hampered development but post-war, Angola attracted major foreign investment, particularly from companies like Chevron and Total. The government implemented policies to revitalize the oil sector and increase production, focusing on offshore exploration.

Venezuela's oil development began in the early 20th century, with the discovery of oil in the Lake Maracaibo region in the 1920s. By the 1970s, Venezuela had nationalized its oil industry, forming *Petróleos de Venezuela, S.A. (PDVSA)*.⁶¹ The country has vast reserves in the Orinoco Belt, but mismanagement, political instability, and economic sanctions have hindered the development and investment needed to exploit these frontier acreages effectively. Brazil's oil exploration started in the late 19th century, but significant development began in the 1970s with the discovery of offshore reserves. The pre-salt oil fields, discovered in the late 2000s, marked a turning point, leading to a boom in production. Brazil established a regulatory framework that encouraged foreign investment, particularly through its national oil company, *Petrobras*. The country emphasized local content and technology partnerships to enhance domestic capabilities.⁶²

Saudi Arabia and Brazil have implemented robust regulatory frameworks that attract foreign investment while ensuring national interests are met. Nigeria can benefit from creating a more transparent and predictable regulatory environment that provides clarity for investors, thus fostering growth in its oil and gas sector. Angola and Brazil have prioritized technological advancements and infrastructure development to optimize resource extraction. Nigeria should focus on enhancing its technological

⁵⁶ P Igwe, 'Frontier Exploration and the Petroleum Industry Act: A Legal Review' [2022] (19) *Nigerian Law Journal of Petroleum Law* 130-150.

⁵⁷ E Garcia, 'Venezuela's Petroleum Development in Frontier Regions' [2021] (29) *South American Energy Journal* 112-126.

⁵⁸ ⁵⁸ E Garcia, 'Venezuela's Petroleum Development in Frontier Regions' [2021] (29) *South American Energy Journal* 112-126.

⁵⁹ K Al Mutari, 'Saudi Arabia's Frontier Exploration Strategy' [2020] (18) *Middle East Petroleum Review* 213-230.

⁶⁰ L Ferreira, 'Brazilian Offshore Frontier Development' [2019] (37) *Latin American Oil and Gas Journal* 65-78.

⁶¹ *Ibid.*

⁶² *Ibid.*

capabilities and infrastructure to support efficient oil and gas exploration and production, especially in frontier areas. Brazil's focus on local content policies has strengthened domestic capabilities and created jobs. Nigeria can learn from this by promoting local participation in oil and gas development, ensuring that local community's benefit from resource extraction, thereby fostering economic growth and social stability. By examining the history of frontier acreages development in Saudi Arabia, Angola, Venezuela, and Brazil, Nigeria can draw valuable lessons that could enhance its oil and gas sector's growth and sustainability.⁶³ Focusing on regulatory clarity, technological investment, and local content can lead to more successful and inclusive resource management in Nigeria.

The primary legal instrument is the Royal Decree No. M/49 and the Petroleum and Mineral Resources Act, 1965. Article 11, outlines that the state retains all mineral resources as property of the state, which necessitates oversight for any exploration or development activity in frontier basins.⁶⁴ The Brazilian oil and gas sector is primarily regulated by the Oil Law (Law No. 9,478/1997) and the Pre-Salt Law (Law No. 12,351/2010).⁶⁵ Article 5 outlines the requirement for environmental assessments prior to exploration, especially in sensitive frontier areas, to ensure sustainable development. The Venezuelan oil and gas sector is governed by the Hydrocarbons Law (Decree No. 8,192/1997) and the Organic Law of Hydrocarbons (Decree No. 3,203/2001) article 5, details the types of contracts (such as joint ventures or service contracts) that can be entered into with foreign companies, which are essential for frontier acreage development, given the need for technology and capital and article 22 specifies the requirement for environmental impact assessments before any exploration in frontier regions to mitigate potential ecological damage. In Angola, the key legal frameworks are the Petroleum Law (Law No. 10/04) and the Petroleum Activities Law (Law No. 5/2004).⁶⁶

5.0 Conclusion

The development of frontier acreages in Nigeria presents both opportunities and significant challenges. These largely unexplored regions, such as the Chad Basin, Bida Basin, and Benue trough, have the potential to boost Nigeria's oil and gas reserves, contributing to the diversification of its energy sector. However, the process is hampered by security concerns, infrastructure deficits, legal disputes, environmental risks, and investment challenges. The Petroleum Industry Act (PIA) 2021 provides a regulatory framework to address some of these issues by setting up the Frontier Exploration Fund (FEF) to support exploration activities and introducing the Host Community Development Trusts (HCDTs) to ensure local communities benefit from oil activities. However, achieving sustainable and profitable development in these areas will require government and industry collaboration, investment in infrastructure, and community engagement to mitigate the social and environmental impacts.

6.0 Recommendations / Way Forward

Nigeria can learn from other oil-rich nations, such as Saudi Arabia, in implementing sound regulatory practices, fostering investor confidence, and maintaining transparency in resource governance. Ultimately, the successful development of frontier acreages will be key to securing Nigeria's energy future and economic stability in the long term.

⁶³ L Ferreira, 'Brazilian Offshore Frontier Development' [2019] (37) *Latin American Oil and Gas Journal* 65-78.

⁶⁴ K Al Mutari, 'Saudi Arabia's Frontier Exploration Strategy' [2020] (18) *Middle East Petroleum Review* 213-230.

⁶⁵ *Ibid.*

⁶⁶ *Ibid.*

The Way Forward The provisions of the PIA on the Fund are, no doubt, well-intentioned. They certainly borne well for the hydrocarbon's potential of the Frontier Areas if the NNPC keep its statutory duty to make timely contributions to the Fund. There is, however, need for the Fund's main actors, the National Assembly, NNPC and the Commission to be mindful of and respect each other's boundaries, rather than taking usurpatory actions. Should the Commission, for example, act under the mistaken belief that the PIA has conferred carte blanche on it in respect of the utilization of the Fund for its objectives, then the Commission risks legal trouble and embarrassing legislative inquisitions. The same analysis applies to the NNPC, as, by strict law, only the National Assembly has true powers to stipulate and appropriate the use of the Fund for frontier basin purposes. True synergy (not conflict) is needed between the Commission and the NNPC if the aims of the PIA in relation to the frontier acreages are to be realized.

a. Security Measures in Frontier Regions

Many of Nigeria's frontier acreages, such as the Chad Basin and parts of the Benue Trough, are in areas facing significant security challenges, including insurgencies and communal conflicts. The Nigerian government should collaborate with private security firms, the military, and local authorities to improve security in these regions. Ensuring a safe environment is crucial for attracting investment and enabling exploration activities without the risk of disruption from violence or sabotage.

b. Invest in Infrastructure Development

Frontier regions often lack the necessary infrastructure, such as roads, pipelines, power supply, and communication networks. To facilitate exploration and production, the government should prioritize building essential infrastructure in these areas. Public-private partnerships (PPPs) could be a viable model, where oil companies contribute to infrastructure development in exchange for favourable exploration terms. A focus on infrastructure will reduce operational costs for companies and improve the overall feasibility of frontier acreage development.

c. Clarify Legal and Land Ownership Frameworks

Legal disputes over land ownership and resource control are common in frontier acreages due to conflicting customary and statutory land rights. The government should streamline the Land Use Act and provide clearer legal guidance on land ownership, particularly in rural and underexplored areas. Additionally, better consultation with local communities and traditional leaders is necessary to resolve land disputes before they escalate. Clear and transparent legal frameworks will help reduce delays and foster smoother exploration activities.

d. Strengthen Environmental Protection and Compliance

Frontier regions in Nigeria are often environmentally sensitive, and oil exploration poses risks such as deforestation, water contamination, and oil spills. The government should enforce Environmental Impact Assessments (EIAs) for all exploration activities and ensure that oil companies adhere to strict environmental regulations. Establishing a robust monitoring framework, including penalties for non-compliance, will help protect local ecosystems and ensure that exploration is sustainable. In addition, companies should invest in advanced technologies that minimize environmental harm.

e. Foster Local Community Engagement and Benefit Sharing

Engaging with local communities in frontier regions is crucial for the success of exploration activities. The Host Community Development Trust (HCDDT) provisions under the PIA 2021 should be fully

implemented to ensure that community's benefit from oil and gas development. This includes fair compensation for land use, equitable revenue sharing, and investment in social projects such as healthcare, education, and water supply. Active community engagement and development can reduce tensions and opposition from local populations, creating a more favourable environment for exploration.