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Managing Nigeria's Natural Resources for Sustainable Development

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Abstract: *Nigeria is a blessed nation, endowed with substantial quantities of natural resources, the effective utilization of which can be a viable path to sustainable development. Sustainable development is the desired result if renewable resources are managed in a manner that benefits all concerned without compromising the availability of those resources for future generations, and in a manner that does not threaten the continued existence of other species. Consequently sustainable development propagates that exploitation of natural resources must be done in a responsible manner. We often wonder how natural resource depletion affects the environment, how do we process and exploit natural resources without leaving a damaging effect on generations to come? Summarily, that a relationship exists between natural resources and development is not in doubt, what remains yet unknown in our case is the extent to which growth and subsequently development is affected by the presence/ size of the said resources. This paper casts a critical look on the management of natural resources and how it impacts on Nigeria's sustainable development. We observe that Nigeria's over dependence on the oil sector has led to the non exploitation of other resources and we recommend that there is an urgent need to diversify Nigeria's economic base in a strategic manner.*

Keywords: Natural resources, sustainable development, exploitation, Nigeria

1. INTRODUCTION

> "In Israel, a land lacking in natural resources, we learned to appreciate our greatest national advantage: our minds. Through creativity and innovation, we transformed barren deserts into flourishing fields and pioneered new frontiers in science and technology."
>
> **— Shimon Peres**

Development economists and social scientists have for years been faced with the recurring question of how nations can adequately utilize their natural resources to kick start development. It is an irony that most resource-endowed developing nations appear unable to efficiently manage their resources such that today, there is an urgent need to address this anomaly. Rather than improving life outcomes, natural resource endowments across some developing countries, Nigeria included, have contributed to tyranny, misery, and insecurity (Patrick, 2012).

Economists adduce that natural resources along with human resources, capital goods and technology are important ingredients that facilitate the attainment of economic growth (Samuelson & Nordhaus, 2000). Summarily, natural resources are viewed as crucial must haves, and thus, key determinants of development. This does not mean that the absence of natural resources will render a nation "undevelopable" as Japan has proven that a country can in fact develop despite not being endowed with natural resources. It is thus worrisome that the worst development outcomes as measured by rates of poverty, deprivation and inequality are to be found mostly in resource abundant nations. Recent economic theories and empirical evidence suggest the presence of a strange paradox where resource rich countries do not invest the proceeds from resource exploration wisely and tend in the long run to be worse off. "Boom and bust", "Resource Curse" or the paradox of natural resources (Auty (1993), Sachs and Warner (1999, 2001), Stiglitz (2005), are just some of the terms used to explain the pattern of development or lack thereof in such countries.

Sachs and Warner (1999) tested the resource curse hypothesis using data drawn from several countries for the period 1970 to 1990, and interestingly find natural resources to be negatively correlated with economic growth. Humphreys, Sachs and Stiglitz (2007) suggest that resource curse is more likely to be found in resource-abundant countries with large endowments of resources such as oil, gas and even precious metals. The curse materializes as an apparent inability to translate natural resource to collective wealth. Resource-rich countries like Nigeria, Sudan, Congo, and Angola are common examples, often characterized by an array of political, civil and economic problems. Conversely, other countries (south east Asian countries like Taiwan, Hong Kong and Singapore) have managed to attain and sustain rapid economic growth without large natural resource reserves. Gylfason (2001) noted a decrease in the gross national product per capita among OPEC countries between 1965 and 1998 by about 1.3 % as against an average of 2.2% across other developed "natural resource poor" economies. Additionally, Weinthal and Luoug (2006) in support of the resource curse theory observe that more resource-reliant economies tend to experience slower growth rates. They provide empirical evidence after studying specific economies

between 1960 and 1990, showing that while the GDP per capita across resource-abundant countries increased by only 1.7%, the GDP of countries classified as mineral-poor increased by 2.5-3.5%. Collier and Hoffler (2002) extend the resource curse view and proffer that in addition to the absence of sustained growth, the prospect of civil conflict is increased for countries that are resource endowed, thus noting a strong and non-linear effect of traded natural resources on conflict. Isham Pritchett, Woolcock, and Busby (2003) opine that the channel through which resource abundant countries are affected by their resources can be traced to the weakening effect of the resource curse on economic institutions. The nexus found to exist between resource abundance and development across developing countries appear to support the resource curse theory, manifesting as a myriad of problems - conflicts, the Dutch disease, high levels of corruption as well as a marked increase in the number of low quality institutions.

In terms of natural resource endowment, Nigeria rates as possibly the wealthiest country (Stiglitz, 2005) in Africa as it is blessed with diverse natural resources across multiple locations. Nigeria's natural resources include crude oil, tin, coal, gas, cocoa, iron ore, timber, columbite, gold, lead-zinc, tantalite, limestone, kaolin, clay, wolfram, shale, marble, radio-active minerals, bartyles, cassiterite, lignite, petroleum, natural gas and hydro-electric power (Adesopo &Asaju, 2004). Nigeria is however most known for its abundant crude oil reserves than for all the other resources combined

Nigeria is Africa's largest producer of oil in Africa, and globally ranks among the ten largest producers of both crude oil and gas in the world. (Jack, Nkwocha and Odubo(2016)) The Nigerian economy is often described as a mono product economy because of its heavy dependence on the oil and gas sector which accounts for 95% of the export revenue and 76% of government revenue (Adesopo &Asaju, 2004). Repeated efforts by the government to improve non oil contributions to the GDP have not produced significant results. For over 50 years, Nigeria has engaged in oil and gas production and current oil reserves are estimated at about 35 billion barrels while the recoverable natural gas reserve is estimated to be around 187 trillion cubic feet (Nigerian National Petroleum Corporation [NNPC], 2017). Sadly Nigeria's abundant resources are yet to result in sustainable development. Instead, from an enviable position of being among the 50 richest countries in the world in the 1970s, Nigeria is now ranked as the poverty capital in the world (Kazeem, 2018). Stiglitz (2005) observes that there have been nations for whom the resource curse theory has not held true. He notes:

> "Thirty years ago, Indonesia and Nigeria - both dependent on oil - had comparable per capita incomes. Today, Indonesia's per capita income is four times that of Nigeria. Indeed, Nigeria's per capita income (as measured in constant dollars circa 1995) has fallen. A similar pattern holds true in Sierra Leone and Botswana. Both are rich in diamonds. Yet Botswana averaged 8.7% annual economic growth over the past thirty years, while Sierra Leone plunged into civil strife."

Given this background, there is a need to appraise the resource curse hypothesis in the Nigerian context and subsequently, generate possible solutions if indeed the theory is found relevant to the Nigerian case. In discussing how natural resources can affect the development process, some key questions come to mind. First, how does natural resource depletion affect the ecological services we expect from the environment, and second, how to process and exploit natural resources without leaving a damaging effect on generations to come. Indeed, when we speak of greenhouse effect and saving the environment, it always seems so far off, as though it were or should be the sole concern of the G20 or some remote countries in the western hemisphere. We often fail to recognize that Nigeria with its abundant natural resources equally has some responsibility. How have we handled our natural resources? Have we made a conscious effort to exploit and enjoy the benefits of resource abundance in ways that do not limit the ability of future generations to breathe, live and simply function? This then is the major objective of this paper. While we have discussed how natural resources can be managed to promote economic development, our focus should be not just on development but on sustainable development. As such, the topic has been modified to reflect this reality.

2. IS NIGERIA RESOURCE CURSED?

Yes would be the obvious answer. A number of markers for identifying a resource cursed economy include, but are not limited to, the following:

1. Increased poverty
2. Higher levels of corruption
3. Marked inequality
4. Very weak institutions
5. Fluctuations in earnings
6. Over dependence on one sector

In 1970, prior to the oil boom of the early 1970s, Nigeria had a 36% poverty rate which had soared to 70% by 2000. Presently as of 2018, Nigeria is ranked the poverty capital of the world despite its vast resources (Kazeem, 2018).

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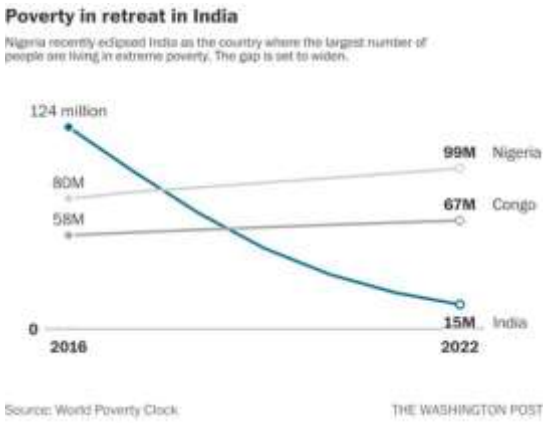

Figure 1: Increasing poverty rates in Nigeria

An additional indicator that Nigeria is resource cursed is the presence of the Dutch disease, the effect of which is apparent in Nigeria. The Dutch disease arises (Kurecic and Seba, 2016) when increasing productivity and exports from a sector shift to a preferred resource to the detriment of all other sectors. Consequently, the revenue returns from the traded sector becomes the bulk of that nation's revenue. In this case, a country's resource revenues raise exchange rates thereby hurting the ability of other sectors to compete favorably. The resulting volatility has a long term effect which manifests as the inability to develop manufacturing and other related sectors. Fluctuations in that market (as prices are of course far from static) are transmitted directly to the economy which is now largely dependent on that one commodity. At this point, the over reliance on that one sector means that price fluctuations affect revenue and make the smooth functioning of government difficult. Ultimately the fluctuations affect GDP and thus, economic growth (Le Billon, 2008). The effects of the Dutch disease are far reaching and eventually cause a fall or weakening of trade, as well as the depreciation of natural capital, thereby further squeezing the sectors that are not the resource sector. Rent seeking creeps in and the stage is now set for all manner of bad and misguided economic and social policies.

The pattern of Dutch disease manifestation is the story of Nigeria as this was the case starting from the early 1970s when Nigeria began to enjoy super returns from the international oil market. In due course, all other sectors were sacrificed at the altar of oil gains and by the early 1980s when the oil revenue had dwindled, other productive structures that could have sustained the economy were considerably weakened and unable to offer any long term assistance to the already destabilized economy. Indeed the largest oil producing nations such as Angola, Algeria, Saudi Arabia, Venezuela, Iran and of course Nigeria, have seen significant declines in their respective per capita income. Nigeria's case is currently such that more than 70% of the population lives on less than a dollar per day(Kazeem, 2018. It thus seems impossible to comprehend that Nigeria has earned well over 340 billion dollars in revenue from the production and export of oil since 1970 (Schubert, 2006). In Nigeria's case, the windfall from crude oil sales caused the currency to first appreciate and then, subsequently fluctuate non- stop, reflecting the market conditions in the international oil market. The currency appreciation eventually caused local products to become more expensive relative to other costs and imports to become cheaper. The cheaper imports fueled the desire for foreign goods and the overall effect is that there gradually developed a crowding out of other economic sectors.

Going further, Diamond (2005) observed that among oil exporting nations, there appears to be an established positive relationship between resource wealth and authoritarianism. Diamond thus suggests that easy revenue from resources weaken accountability principles to the extent that corruption is facilitated and patronage networks spring up. The incentive to do things properly weakens and the revenue that could have been derived from tax and other productive purposes are reduced. The end result is that income inequality gets aggravated and political reform is stifled by those who have benefitted from the faulty system and who fear that reforms would cut off their stream of earnings. Again, this particular characterization by Diamond appears to match Nigeria.

Another example of an economy suffering from the Dutch disease is Angola. Despite being massively resource endowed, oil rich Angola consistently measures below average when its development indicators are compared to that of other countries. As if the Dutch disease is not sufficient cause for worry, there is the increased possibility of conflict across resource endowed countries. The fight is often about who has control of the resources and this suggests that the very presence of that resource exacerbates the possibility of violent conflicts. Angola, Sierra Leone, Nigeria and Sudan confirm the hypothesis that conflict is more likely in a resource endowed area than in one that is resource poor. Rent seeking, the finance of illegal activities/groups and of course the ubiquitous corruption, are all factors that predispose an environment to conflict. The crisis prone Niger Delta region of Nigeria which has seen increasing levels of militancy also supports this hypothesis.

One long term effect of the resource curse is the reduction in the quality of institutions and in the government itself. Boschini, Pettersson, and Roine (2007) contend that for the resource curse theory to be true in the first place there must be a dearth of strong institutions capable of countering any negative effect associated with the abundance of natural resources. Consequently, resource abundant countries are not cursed as long as there are strong institutions capable of directing actions and managing resources properly. Resource abundance becomes a curse only in the absence of institution quality.

Another unfortunate effect of the resource curse is the widening of the income gap. In the absence of strong institutions, government ceases to bother itself about the unfair and unequal distribution of income. It is this very attribute of the resource curse that encourages rent seeking

and criminality, and ultimately breeds conflict. Indeed the resource curse appears to be a vicious cycle.

3. THE FEASIBILITY OF SUSTAINABLE DEVELOPMENT

Nigeria's abundant natural resources can be a viable path to development. But then development does not mean the absence of poverty, rather it means that there are better living standards for everyone, that quality of life is enhanced, that there's more to life and its expectancy improved. Indeed development means many things and connotes different expectations. So our task is simple, how do we get from where we are to where we want to be? Are there challenges that persist and that make Nigeria's goal to industrialize seem more of a mirage? Gyang, Nanle and Chollom (2010) identified the following challenges to Nigeria's goal of sustainable development:

1. Weak regulatory framework
2. Policy inconsistency and lack of adequate legislation,
3. Poorly equipped laboratories and research tools
4. Health hazards and risk
5. Inadequate machinery and technology
6. Inadequate capital
7. Unwholesome practices of stakeholders and inadequate trained personnel
8. Environmental degradation and pollution

As more nations seek routes to industrialization, it is expected that the exploitation of both renewable and non-renewable resources will increase. If resources are not used wisely, then an "unsustainable situation" could arise where natural capital (the sum total of nature's resources) gets used up faster than it can be replenished. Sustainability thus requires that resources are used at a rate at which they can be replenished naturally.

Economic growth, the precursor of development profoundly changes the relationships among societies, economies, and we surmise in this paper that natural resources are necessary determinants of economic development. And so there is no downplaying the role of natural resources in economic growth and development. The question now is which development exactly are we referring to: economic or sustainable? Can we have both? Does the presence of one imply the absence of the other?

Today, there is the realization that the dependence on natural resources for economic growth coupled with the manner in which these resources are derived has had a negative impact on the environment. Indeed there is an abundance of literature on the numerous effects resource exploitation and management has had on the climate, such as forest depletion, water scarcity, and atmospheric emissions to name a few. If unchecked, these have strong implications on future generations. Sustainable development thus relates to the management of renewable resources in a manner that is responsible and will be for the good of the human and natural community. The ultimate objective of sustainable development is to devise means through which present generations can enjoy the resources without compromising the availability of those same resources for generations to come and more importantly, to do so without damaging the environment and eco system. Resources must then be utilized in a manner that does not diminish so that it is renewable and available for future generations.

4. NIGERIA AND NON OIL GROWTH - IS THERE ANY HOPE?

The key for Nigeria is diversification. The need to shift focus becomes even more apparent following Nigeria's slide into recession in 2015 simply because of shocks and dwindling oil revenue. Apart from oil, a significant portion of Nigeria's resources remains untapped. This is directly attributable to Nigeria's unhealthy dependence on oil. It must be said that the contributions of non oil resources to GDP is dependent on their being exploited in the first place. The mining and quarrying sub-sector contributed 33.13% in 1971 compared to 36.0% for Agriculture and Allied sector. Its share increased from 39.3% in 1971/1972 to 43.4% in 1972/1973 and to 45.5% in 1974/1975. In 1975 to 1976 however, there was a drastic fall in the share of GDP to 21.9% (Anyanwu et al, 1997) compared to 26.9% by the agricultural sector. In 1976 to 1977, mining and quarrying resumed the lead in contribution to GDP and maintained that status until the second decade of Nigeria's independence.

Furthermore, the production of solid mineral in Nigeria has been increasing. For example, the production of solid minerals was 763,511 tonnes in 1970, but increased to 2,069.233 tonnes by 1973, representing a 171.1% increase (Anyanwu et al, 1997).

The top traded items for Nigeria as shown in the table 1 below lends credence to the need to further diversify Nigeria's base. Petroleum and allied products hold sway as top earners for Nigeria still contributing 89.52% of Top ten exports in Q1 of 2018. Agricultural products and minerals remain low down accounting for only 1.09% and 0.75% respectively.

Table1 Top traded items as at Q1, 2018

2018-Q1 TOP TEN TRADED ITEMS (EXPORT)

S/N	Item Code	Item	Value
1	2709000000	Petroleum oils and oils obtained from bituminous minerals, crude	₦ 3,580,015,944,725.12
2	2711110000	Natural gas, liquefied	₦ 482,538,390,571.90
3	8904000000	Tugs and pusher craft	₦ 362,333,495,500.00

4	2711290000	Other petroleum gases etc in gaseous state	₦ 30,753,674,222.76
5	1207400000	Sesamum seeds, whether or not broken	₦ 26,647,478,311.14
6	1801000000	GOOD FERMENTED NIGERIAN COCOA BEANS - MAIN CROP 2015/2016	₦ 23,297,981,962.48
7	8908000000	Vessels and other floating structures for breaking up	₦ 22,594,367,141.00
8	2707400000	Naphthalene	₦ 17,881,832,745.16
9	3102100000	Urea, whether or not in aqueous solution	₦ 16,531,440,111.40
10	2716000000	Electrical energy (optional heading)	₦ 9,731,157,055.78

Source: National bureau of statistics

Table 2 below presents Nigeria's oil and non oil exports before, through and well after the oil boom years. We find that although there have been improvements in the volume of non oil exports; there remains a lopsided situation with the dependence on oil and allied exports.

Table 2. Nigeria's Oil and Non-oil Export from 1975 to 2012 (NMillion)

Year	Oil Export	Non-oil Export	Year	Oil Export	Non-oil Export
1975	4,563.1	362.4	**1994**	200,710.2	5,349.0
1976	6,321.	6 429.5	**1995**	927,565.3	23,096.1
1977	7,072.8	557.9	**1996**	1,286,215.9	23,327.5
1978	5,401.6	662.8	**1997**	1,212,499.4	29,163.3
1979	10,166.8	670.0	**1998**	717,786.5	34,070.2
1980	13,632.3	554.4	**1999**	1,169,476.9	19,492.9
1981	10,680.5	342.8	**2000**	1,920,900.4	24,822.9
1982	8,003.2	203.2	**2001**	1,839,945.3	28,008.6
1983	7,201.2	301.3	**2002**	1,649,445.8	94,731.8
1984	8,840.6	247.4	**2003**	2,993,110	94,776.4
1985	11,223.7	497.1	**2004**	4,489,472.2	113,309.4
1986	8,368.5	552.1	**2005**	7,140,578.9	105,955.9
1987	28,208.6	2,152.0	**2006**	7,191,085.6	133,595.0
1988	28,435.4	2,757.4	**2007**	8,110,500.4	199,257.9
1989	55,016.8	2,954.4	**2008**	9,861,834.4	252,903.7
1990	106,626.5	3,259.6	**2009**	8,105,455.1	296,696.1
1991	116,858.1	4,677.3	**2010**	11,136,167.8	405,856.1
1992	201,383.9	4,227.8	**2011**	13,742,623.6	497,608.6
1993	213,778.8	4,991.3	**2012**	14,526,757.0	476,110.7

Source: CBN Statistical Bulletin (2010, 2012).

5. THE WAY FORWARD

Despite the pervasive effects of the resource curse in Nigeria, a lot can still be done to grow the economy from non oil resources. We can do the following:

i. Innovative agricultural entrepreneurship:

Specifically, agricultural entrepreneurship can be encouraged. Entrepreneurial agriculture is the strategic cultivation of crops and rearing of animals with a view to generate earnings. Innovative agricultural entrepreneurship needs to be encouraged with special funding and training programs. Truth be told, agriculture presents the most viable path to non oil growth, as it not only provides food for Nigeria's teeming population, but also, constitutes a serious foreign exchange earner. Funding and government policies are required to drive the process of growth from this sector where a lot can be done. SMEs and state governments can go a step further by encouraging the adoption of newer practices.

ii. **Adoption of sustainable farming systems and the use of modern inputs, technologies and efficient practices**

This is closely linked to the first suggestion. Research provides empirical evidence of what has worked and what has not. The role of institutions like the International Institute of Tropical Agriculture (IITA) cannot be stressed enough. Agricultural research would provide better high yielding production techniques. Mechanized and plantation style farming should be encouraged and rather than continually pursuing cattle ranches, government needs to encourage and possibly lease land for large scale farming. Incentives need to be provided and further training on packaging and preservation would ensure that these farm

products do not waste because of the inadequacy of modern storage techniques. Recently, we all saw the video of young men who were lacing beans with sniper, an insecticide. While I am not in support of the practice, you will agree with me that they just wanted their products to last longer, and thus erroneously assumed that by the time the beans are finally consumed, the insecticides will miraculously leave. More government action is needed.

I'd like to introduce a new dimension here- civil society, often called the fourth arm of Government; CSOs have the ability to reach far and wide and tend to complement government's efforts across all spheres. CSOs can embark on widespread publicity on new farming techniques as well as attract funding from donor agencies to support non oil growth.

iii. Metal recycling

Metal recycling has been identified as another path through which Nigeria's economy can grow. Nigeria is abundantly blessed with solid minerals and given that each state is blessed with deposits of at least one solid mineral, government could aggressively pursue a project of recycling steel which would save 1,115kg of iron ore, 625kg of coal and 53kg of limestone and further reduce the CO_2 emissions by about 200 million tonnes yearly (Ojonimi, Onimisi, Ocheri, and Onuh, 2018). Ojonimi et al go further to provide evidence of how recycling would further result in 76%, 40% and 86% reduction in water pollution, water usage and air pollution respectively. In addition, energy savings derivable from recycling would yield 39% aluminum, 31% copper, 74% lead, 42% steel and 20% zinc are 95%, 85%, 60%, 62-74% and 60% respectively. Clearly, metal recycling would provide much needed means for economic growth as well as sustaining the nation's solid mineral deposits especially the metallic ores for the benefit of future generations.

There is also an urgent need for further investment in the steel industry as this would aid local manufacturing capacity.

iv. Good, development-oriented leadership.

Ghana was the first country in sub Saharan Africa to halve its extreme poverty rate. Possibly learning from Nigeria's experience, Ghana used its oil wealth to set up stronger institutions that provide a system of accountability, where they regulate and monitor each other. So all hope is not lost for Nigeria. It is however important to have good development oriented leadership. Additionally, Nigeria needs to further strengthen its institutions. A review of resource rich countries with successful and developed countries confirms the need for government policies and institutions. Torres, Afonso, and Soares (2013) posit that there is absolutely no doubt as to the importance of strong institutions. Apart from oil exploration, government and private sector should embark on domestic refining of crude as this not only creates jobs and adds further value to the petroleum industry. Still on boosting oil production, government needs to generate lasting solutions to the Niger Delta conflict.

v. Responsible exploitation of resources

Natural resource exploitation ought to be pursued within the context of sustainable development. Environment friendly practices should be adopted and government should empower agencies that would strictly enforce environmental protection laws and policies that will guide operations of the extractive industry. Furthermore, all accruals from natural resources should be accounted and transparency and accountability must be associated with those charged with the responsibility of monitoring and managing the different aspects of natural resource exploration and exploitation. Proceeds from oil sales have remained a likely conduit for the movement of funds and this must be checked if Nigeria is to attain development.

vi. Diversification

Finally diversification cannot be over emphasized as it promotes competitiveness, innovation, and investment opportunities. Embarking on a wide spread diversification scheme would help by providing better funding for renewable natural resources-based sectors, and thus, ensure the existence of adequate fiscal bases, which are critical ingredients for poverty reduction and sustainable economic growth. Increased investments in agriculture, mining, and even tourism would provide incentives and Social Overhead Capital (SOC) for private investors. Indeed government needs to encourage non oil sectors by removing some of the bottlenecks and challenges that come with doing business in Nigeria.

6. Conclusion

In conclusion, we note that there is no law that says resource curses cannot be reversed. What is needed as a matter of urgency is a concerted development program to grow the non-oil resources for Nigeria. That option remains Nigeria's only viable path to true sustainable development.

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