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# Nigeria beyond Oil: Options for Sustainable Development

**Ezirim Onyekwere N***
Department of Urban and Regional Planning, Federal Polytechnic, Nekede, P.M.B. 1036 Owerri Imo State, Nigeria

***Corresponding author**
*Ezirim Onyekwere N*

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**Abstract:** Nigerian economy is largely dominated by a single commodity called crude oil or simply, oil. The management of revenues from this single commodity-driven oil sector has proven ineffective in driving the economy to the required level of development. As a result, the non-oil sector of the economy has been relegated to the background. This scenario, no doubt, indicates serious negative implications on the nation's development equation after five decades of oil exploration activities in Nigeria. The problems inherent in this dominating single commodity are that it is not only subject to international price shocks and unfavourable quota arrangement but also depletion. The predicted rate of depletion of the oil reserve has cast doubt on the sustained development of the oil sector. Available statistics show that a good percentage of Nigerians live in abject poverty, unemployment is double-digit and productivity is at its lowest ebb. The economic development periscope of Nigeria has turned towards the non-oil sectors and the promotion of diversification. Diversification does not occur in a vacuum. The paper is purely based on literature from secondary sources, mostly review of available reports, studies and conference presentations, and also conceptual issues. The objective of this paper therefore is to seek possible ways of diversifying the productive base of Nigerian economy in order to achieve sustainable development. It zeros in on 'agriculture', 'infrastructure' and 'human capital development' as options for sustainable development in Nigeria.

**Keywords:** Oil, development, sustainable development, diversification.

## INTRODUCTION

Nigeria is a multi-ethnic and culturally diverse society, and a political federation that consists of 36 autonomous states. With 2017 estimated population of 190 million, population density of 211per $Km^2$, total land area of 910,802 $Km^2$, and 49.9 % urban population, the country accounts for 47% of West Africa's population and has one of the largest populations of youth in the world [1]. According to Akogun [2] and African Development Bank [3] Nigeria is also Africa's biggest oil exporter with the largest natural gas reserves on the continent.

Crude oil was first discovered in commercial quantities at Oloibiri in the Niger Delta area of Nigeria in 1957 by Shell. In 1958, the company started production. The Federal Government in 1961 issued ten oil-prospecting licenses on the continental shelf to five companies. Each license covered an area of 25,600 square kilometres subject to the payment of N1m. With these generous concessions, full-scale onshore and offshore oil exploration began. The first oil well on the Nigerian continental shelf was struck by Gulf Oil Company (now Chevron), at the Okan field, off the coast of Bendel (present day Delta State). This was followed by more offshore wells drilled by other companies such as Agip, Elf, Mobil, etc. Further discoveries at Afam and Boma established the country as an oil-producing nation. Production rate rose year after year and oil became a major foreign exchange earner and contributor to GDP while the non-oil sector of the economy was relegated to the background [4, 5]. This continued and the non-oil sector stagnated until the global oil glut of 1980s stemmed the trend [6].

However, Nigeria has remained a mono-cultural economy, depending on the exportation of crude oil as its main source of foreign exchange earnings over a long time. According to GTI Research [7] crude oil constitutes only 20% of the country's Gross Domestic Product, accounts for over 80% of government revenue and 90 per cent of its foreign exchange earnings. As noted by Ameh [8] Onwualu, [9] and Riti, *et al*. [10], the revenues from oil have been ineffectively managed to stimulate desired growth levels and required sustainable economic development. Consequently, many of the youth population have been unemployed and majority of the citizen still living in poverty.

GTI Research [7] noted that Nigeria's economy grew by 2.7% in 2015, significantly below its growth of 6.3% in 2014 due to the combination of new supplies coming on stream from non-members of the organization of Petroleum Exporting Countries, as well as lower imports from the United States (our largest market). Since then, Nigeria's economy has been exposed to unstable and fluctuating global oil prices. In the last few months, there has been over 24% decline in the price of oil in the international market [11].

To address the problems inherent in the economy, a number of programmes have been put in place by various governments to restructure and diversify the productive base of the economy with a view to reducing dependence on the oil sector and imports [10, 6]. As observed by GTI Research [7], the current administration led by President Muhammadu Buhari took office amid a severely weakened economy, narrow fiscal space, large gaps in infrastructure, and poor service delivery. The administration has maintained its policy priority areas as fighting corruption, increasing security, tackling unemployment, diversifying the economy, enhancing climate resilience, and boosting the living standards of Nigerians. Sadly, the full-anticipated benefits of the efforts are far from being realized. None the less, repeated occurrence of economic index of lower growth rates of the Nigerian economy has resulted in the administration's recent renewed focus on economic diversification, promotion of growth in the private sector, and the drive for job creation, to reduce her over-dependence on oil and minimize the country's vulnerability to macro-economic risks. The objective of this paper is to seek possible ways of diversifying the productive base of Nigerian economy in order to achieve sustainable development.

## METHODS

The data and information used in this paper are entirely from secondary sources, mostly, review of available literature, reports, studies, seminars, workshop and conference proceedings. The deductive and inductive statements are purely based on review of literature and conceptual considerations.

## LITERATURE REVIEW

### The Oil Sector

The need to conserve foreign exchange, create job opportunities and to harness the gains from multiplier effects derivable from oil production, the Federal Government in 1962 awarded a contract for the construction of a refinery at Alesa-Eleme, near Port Harcourt. The refinery was commissioned in 1965 with an initial designed production capacity of 350,000 barrels a day. This volume was considered insufficient to meet domestic consumption of products for many years to come. Between 1970 and 1978, the nation experienced an upsurge in demand for petroleum products, averaging a-yearly increase of 23.4%. Thus in 1978, the Warri refinery was officially opened with a capacity of 260,000 barrels per day. The Kaduna refinery was established in 1980 with an initial capacity of 110,000 barrels per day while new Port Harcourt refinery was established in 1989 with an initial capacity of 150,000 barrels per day [12, 13]. Dangote Refinery is currently under-construction with a designed capacity of 650,000 barrels per day. The Federal Government uses some of the products from the refineries as feedback in its petrochemical projects located at Ekpan, Port Harcourt and Kaduna [7].

As observed by GTI Research [7], Nigeria's economy grew by 2.7% in 2015 significantly below its growth of 6.3% in 2014. Since the fall in oil prices in mid-2014, growth has been on a downward spiral, and the economy is currently in recession. In 2016, it continued to deteriorate further after recording negative growth in the first two consecutive quarters (-0.4% and -2.1% year-on-year in real terms, respectively). In the third quarter, Gross Domestic Production contracted by 2.2% driven by a significant decline in the country's oil output, shortages of power, fuel, and foreign exchange. Inflation doubled to 18.8% (projected) at the end of 2016, from its level of 9.6% at the end of 2015, mainly as a result of fuel and electricity price increases and the depreciation of the Nigerian naira during the year. Oil sector growth slowed by -11.64% (year-on-year) in the first quarter of 2017 representing a decline of -4.81% relative to the rate recorded in the corresponding quarter of 2016. The oil sector contributed 8.90% of total GDP in the first quarter of 2017, down from the figures recorded in the corresponding period of 2016 (10.02%) and up from the preceding quarter (6.75%). GTI Research [7] predicted an average inflation likely to remain in the double-digits over 2017/2018. Nigeria's economy is also expected to grow by about 1% at the end of 2017 and 2.5% in 2018, based on an expected increase in oil output, as well as the accelerated implementation of public and social investment projects by the Federal Government.

Sanusi [14] noted that the collapse of the global oil market has triggered recessionary pressures in Nigeria which is characterized by: lower government revenues with attendant budgetary pressures at various levels of government; decline in export revenues; deterioration of macro-economic variables with naira exchange rate devaluation, rising inflation and higher interest rates; and volatile economy and revenues incapable of generating the required jobs to address the growing problem of unemployment – particularly among the youth.

Studies by Eko *et al*., [6] and African Development Bank [3] reported that the responsible factor for the despicable performance recorded by Nigerian economy over the years has been the dominance of the oil sector and the consequent neglect of the non-oil sector. As submitted by African Development Bank [3], the dominance of the oil sector has made agricultural products less competitive and led to the importation of cheap agricultural food and capital items.

The key lesson from the foregoing is that Nigeria must move away from the dominance of oil sector (an enclave) to ensure sustainable growth and development

**Non-oil sector**

The non-oil sector of the Nigerian economy includes those groups of economic activities which are outside the petroleum and gas industry or not directly linked to them. These include [15,16] agriculture, manufacturing, environmental services, building and construction, health activities, mineral activities, power, telecommunication services, financial sector, information and communication technology, wholesale and retail, research and development activities etc. Each of these activities consists of various businesses which engage a large chunk of the population. The potentials of the non-oil sector are great as shown by the Table-1.

**Table-1: The Potentials of Non-oil Sector in Nigeria**

| S/N | Economic Group | Description of Activities |
|---|---|---|
| 1 | Agriculture | Cultivating, harvesting, handling, processing, storage, distribution of various crops (cocoa, oil palm, sesame seeds, groundnut, maize), rearing, processing and distribution of livestock, fishery and domesticated animals. |
| 2 | Manufacturing | Various activities in the ten sectors of MAN: Production, packaging, distribution lines, marketing, export line, etc. |
| 3 | Environmental Services | Cleaning of offices and homes, urban waste collection and recycling, street cleaning, energy generation from waste, etc. |
| 4 | Building and Construction | Metal works, supplies of building materials, block and roofing works, plumbing and electrical, finishing (tiling, paintings, decorations, gardening, etc.) |
| 5 | Health Activities | Hospitals, Pharmacies, pharmaceutical industries, drug supplies, accessory services (equipment maintenance, equipment supplies, etc.) |
| 6 | Mineral Activities | Exploration, mining , processing , marketing, mineral testing, transportation, etc. |
| 7 | Power | Power generation and distribution, meter reading, production and supply of electrical accessories, installations, maintenance, renewable energy investments(solar, wind and hydro) etc. |
| 8 | Telecommunication Services | Telecommunication engineering services, installations, telephone wholesale and retail services, marketing services, etc. |
| 9 | Financial Sector | Banking, insurance, installation maintenance , marketing services, transportation, etc. |
| 10 | ICT | Business centers, corporate communication, defense and security communication, installations and maintenance, satellite services, internet services etc. |
| 12 | Wholesale and Retail | Warehouses, major distributors, supermarkets, corner shops, kiosks, open market shops, various forms of retail (mobile trading, internet trading etc.) |
| 13 | Research & Development (R&D) Activities | Contract R&D, market driven R&D, R&D management (commercialization of R&D results, linkage management, fund sourcing consultancy etc. |
| Source: Adapted from Onwualu [16]. | | |

National Bureau of Statistics [17] reported that the non-oil sector grew at 9.07% in Q4 2011 higher than the 8.93% recorded in Q4 2010. When compared with the corresponding quarter in 2010, the sector recorded 9.07 percent growth. The report also stated that the non-oil sector was a major driver of the Nigerian economy in the fourth quarter of 2011 in real terms. This growth was largely driven by improved activities in the telecommunications, Building & construction, Hotel & Restaurant, Business services and other sectors.

The same trend reflected in the first quarter of 2015, which was also largely driven by the activities of the Agriculture Sector (Crop Production), information & communication, manufacturing, transportation, and other services. The sector grew by 0.72% in real terms during the reference quarter [17]. As indicated by GTI Research [7], the non-oil sector contributed 91.10% to the nation's GDP, higher from the share recorded in the first quarter of 2016 (89.98%) but lower than the share recorded in the fourth quarter of 2016 (93.25%). The construction sector grew by 21.25% in nominal terms (year-on-year) in the first quarter of 2017, an increase of 20.11% points compared to the rate of 1.14% recorded in the same quarter of 2016. It contributed 4.17% to the total real GDP in the first quarter of 2017, higher than its contribution of 4.14% in the previous year. The real estate sector grew by 10.57% in the first quarter of 2017 in nominal terms, higher by 9.95% points than the growth rate reported for the same period in 2016 and also higher by 8.67% points compared to the preceding quarter. According to African Development Bank[3], in the first quarter of 2017, the sector contributed 6.32% to real GDP lower than the

6.48% it recorded in the corresponding quarter of 2016 and still lower than the 7.63% in the preceding quarter.

The nominal year-on-year growth rate of trade in the first quarter of 2017 stood at 9.58%. This indicates a drop by 3.92% points and 4.99% points when compared to the first and fourth quarters of 2016 respectively. Trade's contribution to the GDP was 17.78%, lower than the 18.25% it represented in the previous year, but higher than the 16.73% recorded in the fourth quarter of 2016. In the first quarter of 2017, Agriculture contributed 18.00% to nominal GDP, which is lower than the rates recorded for the first and fourth quarters of 2016 at 19.19% and 21.35% respectively.

According to Onwalu [16] productivity in the sector has remained low due to weak infrastructure base and undeveloped human capital. The sector has continued to rely on refurbished equipment and primitive methods to sustain a growing population without efforts to add value. This has reflected negatively on the productivity of the sector and its contributions to economic growth as well as its ability to perform its traditional role of providing the basic ingredients to mankind and raw material for industrialization and economic growth.

Informed by the nation’s monolithic economy since 1980’s which has been continuously threatened by the instability in crude oil prices in the international market , government of Nigeria has come to terms that Nigeria has so far been dependent on food imports and there is need for economic diversification. President Muhammadu Buhari, as quoted by Fayemi [18].

*“Our government came into office at a time when many people had abandoned the country’s manufacturing, agricultural and mining sectors. We are doing our utmost best to encourage diversification into these sectors which can employ a lot of people...”*

Therefore, economic diversification has become necessary to address the challenges of rising unemployment and social crisis by expanding the horizon of employment generating activities especially in the non-oil sector where the potentials remain great and largely unexploited.

**The Non - Oil Sector under Different Policy Regimes**

These policies are categorized into three, namely: Protectionism policy, Trade liberalization policy and Export promotion policy [19-22].

***a). Protectionism policy***

The Protectionism Policy was formulated in early 1960 and it aimed at expanding the industrialization-base and enhancement of cash crop exports, with guaranteed external markets by the marketing boards and the introduction of trade barriers to control imports. The ultimate goal was to protect domestic industries that were set up to produce import substitutes.

***b).Trade liberalization policy***

Trade liberalization policies since 1986 were aimed at the achievement of greater openness and integration with the world economy. Within the ambit of Trade Liberalization Policy is the Export Incentive and Miscellaneous Provisions Decree of 1986 promulgated to encourage exports. The policy provided for the abolition of marketing boards, introduction of the second tier foreign exchange market (SFEM), various export expansion incentive schemes, and establishment of the Nigeria Export- Import Bank. As a result of the various policy supports, significant growth was experienced in the agricultural, telecommunication and business sub-sectors.

***c). Export promotion policy***

One of the incentives of the Export Promotion Policy has been the Export Expansion Grant (EEG) Scheme, which operates under the legal context provided under the reformed Export Incentives and Miscellaneous Provisions Act of 2006. The Nigerian Export Promotion Council (NEPC) is responsible for the administration of the policy. The aim is to facilitate the diversification of the economy. The objective is to ensure a rapid transformation of the non-oil sector, by intensifying support for Small and Medium Enterprises (SMEs) and to enhance the export of their products.

Coincidently, the African Growth and Opportunity Act (AGOA) enacted by United States on 18 May 2000 as Public Law 106 of the 200th Congress ( renewed to 2025), provided market access to the US for qualifying Sub-Saharan African (SSA) countries. Government of Nigerian took this opportunity and through the Bank of Industry intervenes in the non-oil sector, especially, in the textile industry to improve the export of its products. Another positive fall out of the non-oil export expansion was the emergence of export processing clusters. Such were Challawa industrial estate in Kano, cocoa processing clusters in south Western part of the country, rubber processing in Sapele in Delta State, and large scale shrimp processing in Lagos. The private companies located in these clusters invested in plant and machinery and infrastructure, almost substituting the role of the government, to meet international quality standards and provide employment to hundreds of thousands directly and indirectly.

**Development challenges**

Inequality, in terms of income and opportunities and the vast inequities in terms of access to quality of services in the health, education, and water has been growing rapidly and has adversely affected poverty reduction. Staring in our faces are joblessness, growing numbers of frustrated unemployed youth and high levels of poverty. With a teeming young population, there is a need to promote job creation and achieve inclusive growth. Providing physical and economic infrastructure and enacting social policies that would increase opportunities for the poor and vulnerable are challenges.

The efforts to restore the macro-economic resilience and growth to stabilize the economy and recover from shocks, including efforts to combat corruption, and improve the quality and efficiency of social service delivery at the all levels to promote social inclusion are also challenges.

Nigeria continues to face terrorist attacks in the Northeast, a restive insurgency in the Delta region, and the perennial inter-communal violence across the middle belt. The North-South divide has widened in the face of insecurity and a general lack of economic development across the country. At the root of the security challenges are the degradation of natural resources and climate stressors. The welfare of the internally displaced people, host communities, and population in the Northeast and continuous efforts to find workable strategies to address climate change and other stressors are critical and immediate challenges.

The private sector is the main driver of the economy but its potential has not been fully exploited as it faces significant challenges, mainly; power, a poor regulatory environment, and a lack of access to finance. Promoting diversified growth and accelerating the creation of productive jobs through private sector growth and improvements remain visible challenges.

## CONCEPTUAL CONSIDERATIONS

### Concept of Development

Esterline [23] proposed the economic growth concept of development. The concept described development as a rapid and sustained rise in real output per head and attendant shift in the technological, economic, and demographic characteristics of a society. It is a type of development where the individuals involved in the development process becomes completely unimportant compared to the total volume of commodities produced and the proportion put aside as savings for further investment [24]. Lerner [25] identified the modernization concept of development whose emphasis is on how to inculcate wealth-oriented behavior and values in individuals. This form of development enhances the appetite for the consumption of certain modern goods and services which it stimulates and creates considerable disaffection with traditional conditions in communities [24].

Another concept of development is the distributive justice introduced by Harvey [26]. It expresses the concern for equity and social justice in the distribution of resources. The concept brought to the forefront the factor of nature and accessibility of public goods produced and how the burden of development (defined as externalities) can be shared among the classes in the society [24]. Yet the concept of development as socio-economic transformation was identified by Cairncross [27]. There are three important implications of the socio-economic transformation concept [24]. First, it emphasizes that development is essentially a human issue with a concern to develop the capacity of individuals to realize their inherent potentials to effectively cope with changing circumstances of their lives. Second, development involves the total and full mobilization of a society, in a comprehensive manner, with the task of changing the institution in which the thinking of the individuals finds expression. Third, development means development of man, which is the unfolding and realization of his creative potential, enabling him to improve his material conditions and living, through the use of resources available to him. According to Offong [28], the development that can bring about socio-economic transformation really constitutes true development.

A recent concept is Citizen-Driven Development (CDD) introduced by Maldonado [29] and amplified by Avis [30]. The development philosophy includes citizens and their institutions as assets and partners in the search for sustainable development. It involves empowering citizens so that they fully participate in the development process and take responsibility for the developments that affect them. CDD operates on the principles of inclusive governance. The aim of inclusive governance is to create an inclusive society, where the voices of the most vulnerable in society are heard in decision-making at whatever level - national, urban or local level.

### Concept of Sustainable Development

The most-quoted definition of sustainable development is that by World Commission on Environment [31] which described sustainable development as development that meets the needs of the present generation without compromising the ability of the future generations to meet their own needs. Viewed from project perspective, Valadez and Bamberger [32] described sustainable development as the ability of a project to maintain an acceptable level of benefit flows beyond its economic life. For the oil sector, it means exploration, production, sales and revenues would continue to be available, in the same quantity and quality, beyond the period for which they were designed, implemented and commissioned. For example**,** constructing an oil facility (e.g. refinery or pipes in the ground) is an event and it is essentially technical in nature and requires little human interaction. Providing a service (e.g. flow of refined crude oil and revenues) is an on-going complex process requiring a great deal of interaction among providers and consumers. In other words, the construction of the oil facilities is just a phase in the process of service provision. Where the construction of the facilities enjoys more attention than the provision of the service, then the project is hardly sustainable. Therefore, for any designed oil or non-oil sector project to be sustainable, it must be judged by its ability to sustain flow of services and improve the quality of life overtime.

**Concept of Diversification**

There are three types of diversification: concentric, horizontal, and conglomerate [33-35]. Concentric diversification means that there is a technological similarity among the economies, and one out of the lot is able to leverage its technical know-how to gain some advantage. An example is the massive investment of the oil sector in gas production sold via local and international retailers. Horizontal diversification requires the economic unit to add new products or services that are often technologically or commercially unrelated to current products that may appeal to current customers. An example is when the oil sector invests in any of the non-oil sector activities as a way of business expansion. Conglomerate diversification is a growth strategy that involves adding new products or services that are significantly different from the organization's present products or services.

The issue is that diversification does not occur in a vacuum. An enabling environment is what makes diversification possible. It usually requires acquisition of new skills, knowledge and facilities in chosen area of further development [35]. According to African Development Bank [36], diversification promotes growth and development through the mobilization of savings from surplus sectors for use in the development of deficit sectors of the economy and a number of key drivers include: investment, trade and industrial policies; a dynamic growth performance; macroeconomic stability; a competitive exchange rate and expansionary but responsible fiscal policy as well as institutional variables such as good governance and absence of conflict and corruption.

**Justification for Diversification**

The diversification of the Nigerian economy is necessary for important reasons. First, the renewed emphasis on the production of alternatives to fossil-fuel energy, such as solar, wind and bio-energy in the advanced economies will reduce oil demand and further weaken Nigerian earnings. Thus, in the absence of concerted efforts to shore-up and widen the revenue base, there will be reduction in crude oil revenue and excess crude oil receipts savings in the coming years.
Second, the performance of the non-oil export sector in the past three decades leaves little or nothing to be desired. The share of non-oil export in the country's total export earnings has remained very low and the policy concern over the years has been to expand non-oil export in a bid to diversify the nation's export base [37]. Third, the volatility of the international oil market with the attendant volatility of government revenue gives credence to diversification of exports. Fourth, the fact that crude oil is an exhaustible asset makes it unreliable for sustainable development of Nigerian economy [38]. Finally, the continued unimpressive performance of the non-oil sector and the vulnerability of the sector dictate the urgent need for a reappraisal of the contents of the development policies, the mobilization of savings from surplus oil sector for use in the development of deficit non-oil sectors of the economy and commitments to the implementation.

Nigeria has a lot to benefit from diversification and these are: maximum utilization of her abundant resource base to rebuild the economy; enjoyment of the benefits of all the linkages, synergy, economies of scale, and growth in national technology and foreign investment profile; building of human capital and infrastructure; exploration and exploitation of new opportunities; lessening averagely operational costs; increased national competitiveness; and growth in the standard of living and confidence of the citizens for national renaissance.

## OPTIONS FOR SUSTAINABLE DEVELOPMENT

In Nigeria the options for sustainable development abound in the non-oil sector. The pendulum of thought on diversification swings favourably towards agriculture. However, it is worthy of note that country-specific circumstances should be considered in choosing among the options in order to achieve the maximum contributions to the growth of the economy. Be that as it may, sustainable agricultural development requires proper investments in human resources and infrastructure. With the major objective of inter-generational equity- the substance of sustainable development- this paper zeros in on 'agriculture', 'infrastructure' and 'human capital development' as imperatives. See the conceptual framework on causality among the economic units as depicted in Figure-1.

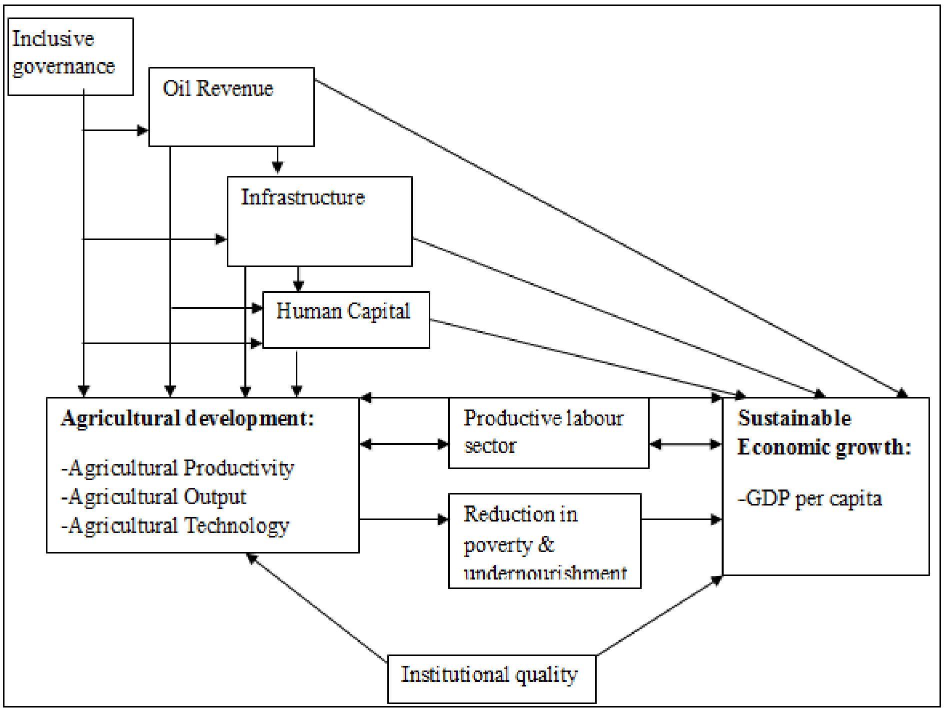


**Fig-1: Conceptual framework on causality among the economic units**

## Agriculture

It is estimated that about 84 million hectares of Nigeria's total land area has potential for agriculture and only about 40% of this is under cultivation [39]. In addition to diverse and rich vegetation that can support heavy livestock population, it also has potential for irrigation with a surface and underground water of about 267.7 billion cubic meters and 57.9 billion cubic meters respectively. Agriculture employs about two-thirds of Nigeria's labour force, contributing significantly to the GDP and providing a large proportion of non-oil earnings [40]. Obviously, Nigeria's growing population provides a potential for a vibrant internal market for increased agricultural productivity.

There is abundant evidence of positive correlations between agricultural productivity increases and economic growth [41,42]**.** According to World Bank, 2012 agriculture makes its contribution to economic development in several ways, viz.,: contribution to national income; source of food supply; pre-requisite for raw material; provision of surplus; shift of manpower; creation of infrastructure; relief from shortage of capital; helpful in reduction of inequality; supporting democratic notions; creating effective demand; helpful in phasing out economic depression; source of foreign exchange for the country; contribution to capital formation; employment opportunities for rural people; and improving rural welfare. The conclusion reached by Ayodele *et al.*, [42] is that increased agricultural productivity has significant positive effects on economic growth. This implies that changes affecting agriculture have large aggregate positives effects on economic growth and development over a long time.

## Infrastructure

Infrastructure has been described as the components of interrelated systems providing commodities and services essential to enable a country enhance and sustain societal living conditions [43]. Infrastructure can be categorised into two, such as public services and public works [44]. Public services include both facilities and services (e.g. water, electricity, telecommunication etc.) generally provided by government. Public works generally include government-owned physical assets needed to deliver public services. Examples of public works are schools; highways, streets, roads, and bridges; mass transit; airports and airways; water supply and water resources; wastewater management; solid-waste treatment and disposal; electric power generation and transmission; telecommunications; and hazardous waste management.

Development economists recognize the growing importance of infrastructure as not only limited to agricultural development but also economic development of a country [45, 46, 3]. Mabogunje [45] described infrastructure as the crux of modern development which has the potential to transform the existing traditional system into a most modern, commercial and dynamic system. A study by Ncube [46] revealed that adequate infrastructure raises farm productivity and lowers farming costs and its fast expansion accelerates agricultural productivity as well as economic growth rate. African Development Bank [3] confirmed that deficiencies in transportation, energy, telecommunication, and related infrastructure translate into poorly functioning domestic markets with little spatial and temporal integration, low price transmission, and weak international competitiveness. The organisation further estimated that a 1% increase in the stock of infrastructure is associated with a 1% increase in GDP across all countries and inferred that infrastructure plays a strategic role in producing larger multiplier effects in the economy with agricultural growth.

**Human capital Development**

The important role of human capital in economic growth and the associated model has been discussed in detail by Lucas [47] and Griliches [48]. In the study of the human capital models, Lucas [47] reported that education adds to an individual's productivity and therefore increases the market value of his labour. According to Griliches [48], the meeting point of the models is that human capital development is a veritable growth factor in increased labour productivity and reduction in income inequality and poverty. Deininger [49], stated that human capital is a production function input and its development through education improves human skills, knowledge and competence, raises per capita Gross National Production and reduces poverty. Various studies have established strong positive relationship between educational attainment and human capital development; the preponderant factors being improved individuals' skills and capability to be more flexible in their responses to price and technology shifts, which reflect in efficiency and increased productivity [50]. Emphasizing on the importance of human resources to an organization, Oruta [51] remarked that both capital and buildings are important in business but it takes adequate and appropriately educated people to build a business. Thus, human capital is a means of production, in which additional investment yields additional output. Impliedly, level of growth in an economy depends on the development of human capital. Anya [52] observed that Nigeria's present incapacity for modern development is founded on her failure to adequately invest in human capital development in qualitative and quantitative dimensions. According to United Nations Development Programme [50], the key to accelerated and sustainable development in any nation is provided by the quality and quantity of its human capital. This takes us to the role of polytechnic education.

**The Role of Polytechnic Education**

Polytechnic education in Nigeria was established by the Act of 1979 Cap 139 of the National Assembly (as amended by the Federal *Polytechnics* (Amendment), Decree No. 5 of 1993 and now Federal *Polytechnics Act* CAP F l7, Laws of the Federation of Nigeria, 2004), to provide full-time courses in technology, applied science, management and other fields of studies, and to make provisions for the general administration of such polytechnics. The principal aim is to turn out the manpower needed for industrial and technological development of the country. Consequently, students are trained in courses and programmes such as engineering, urban and regional planning, architecture, arts and design, agricultural technology, science technology, estate management, hospitality management, management science and technology. Polytechnic education offers not only an opportunity for students to personally practice the theoretical models in the classroom but also to enhance their chances of securing employment after graduation, to be self-employed and reliant, and even to train others. As a matter of historical transmission of knowledge, Polytechnic education was conceived by the French, and perfected by the British and the Russians. It was aimed at discouraging elitism and geared toward the practical preparation of its recipients to fulfill prescribed norms of the economy which the other higher education arrangements do not address. The polytechnic education ideology is to produce highly trained technological manpower capable of responding to the new demands generated by expected high rates of economic growth. Structured on a mandatory one-year industrial attachment or internship to complete the Higher National Diploma programme, polytechnic education is designed to emancipate the citizens of Nigeria from technological mediocrity. Unfortunately, the greatest challenge of Polytechnic education is the embarrassment the holders of its certificates (National Diploma and Higher National Diploma) face in the society. The embarrassment even exists in the oven that bakes the certificates with no recourse to individual talent and competence. The worse-case situation is the erroneous perception of some policy makers that the certificates are inferior without subjecting the holder to the appropriate tests. All these and more have greatly contributed not only to the undermining of the achievements in this all-important educational sector but also to the erosion of the value of its products to the development of the nation [53].

According to Ita [54], the present information age and the associated globalization effect have re-oriented the faculties of progressive-minded educationist to expand the frontier of higher education beyond the restricted areas of teaching, research, and postulation of theories to a more utilitarian and functional demands for technology development, transfer and application; human and institutional capacity building; entrepreneurship; citizen empowerment and the drive for social change and sustainable education programme.

The concern in polytechnic education is to accord the system its pride of place for it to be part of the technological development of the nation. The genuine concern is not necessarily the technology of neutron bombs, rather, the technology that makes it possible for India's almost five billion populations to feed itself cheaply and comfortably; that enables Japan, South Korea, Taiwan, Singapore, Malaysia and Romania to invade Europe and America with high quality and cheaply prized manufactured and even agricultural products. The take here is that adequate investment in the Polytechnics education will make the sub-sector alive to its responsibilities, being active in the areas of reception and adaptation of ideas and products to the local needs, and the generation, propagation and transmission of same. This will make the desirability of its products (human and materials), in principles and in practice, widely accepted. In this wise, the development of Polytechnic education and the production of practically-oriented and innovative graduates will help substantially in accelerating sustainable national development.

## RECOMMENDATIONS

Government should create conditions for domestic and foreign direct investment in agriculture, infrastructure and human capital. Some principles are recommended as follows:

a. Stimulation of investment in non-oil sectors with agriculture and agro-processing industries in the priority list. This will accelerate growth in the agriculture sector and greater contribution to the economy**;**
b. Promotion of infrastructure development and maintenance. In addition, is the decentralization of the provision and management of public services, with appropriate funding at the local government and community levels so that communities can contribute directly to their own betterment and that of the country at large;
c. Formulation of deliberate government policies to enhance human capital development and capacity building for value addition.
d. Creation of Polytechnic Commission to elevate commitment to Polytechnic Education, particularly among youth;
e. Encourage transformation of local entrepreneurship to spur job creation at all levels of the space economy; and
f. Creation of transparent public institutions that provides a level playing field for the exercise of rule of law.

## CONCLUSION

Inter-generational equity is the substance of sustainable development. To achieve this, it calls for the planning, design and implementation of: technology-supported agriculture, technology-driven human capital development, expansive and inclusive infrastructure base, and citizen-friendly institutions. Beyond oil, diversification in these priority areas is a veritable option for sustainable development, provided that the supporting policies operates on the principles of inclusive governance, where the voices of the most vulnerable in society are heard in decision-making at every level - national, urban or local level.

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