

## Diversification of Agriculture and Power Sector Reforms in Nigeria; Impetus for Economic Growth and Development

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### Abstract

Agriculture plays a significant role in the development of a nation's economy and hence should be diversified. Aside from stimulating economic growth, it has the power to cut down poverty and hunger as the sector offers employment for a large labour force and accounts for more than one-third of total Gross Domestic Product (GDP) in Nigeria. The strategic position of Agricultural diversification necessitated the formulation and implementation of requisite framework and policies for sustainable economic growth and development in Nigeria. However, it is apt to recognize agriculture cum its' diversification as an all-important remedy to the insufficient power supply experienced by developing countries as such Nigeria. Electricity can be generated using Bio-energy; consisting of solid biomass (wood residues), liquid bio-fuels (bio-ethanol, biodiesel) and gaseous bio-fuel (bio-gas, syn-gas). Adequate power supply is extremely strategic to any nation's growth and development, and should be pursued vigorously. Efficient power delivery services to all the nooks and crannies of the country tend to have a multiplier effect on the economy of nations, hence stimulating economic growth and development. Thus, power supply in Nigeria has been insufficient and erratic; posing a big threat to economic growth and triggering power sector policy reforms. Hence, agricultural diversification opportunities should be well explored to harness its attendant gains while the proposed solutions to effective power service delivery should be taken into full consideration.

**Keywords:** Diversification; Agriculture; Power Sector; Service Delivery; Reforms; Economic Growth; Development

## Introduction

Agriculture occupies a central position in the Nigerian economy despite the significance of the oil industry. Aside from stimulating economic growth, it has the power to reduce extreme poverty and hunger (Osuji, 2017). The sector offers employment for a large labour force and accounts for more than one-third of total Gross Domestic Product (GDP) in Nigeria (FAO, 2003). The share of agriculture to GDP has been on wane since early 70's. Empirical analyses pointed that it dropped from 90% before independence in 1960 to 56% in 1969 and has remained less than 40% since 1986 (CBN, 2008). Production chains are expected to produce food for a global population of about 9.1 billion people in 2050 and over 10 billion by the end of the century (UN, 2003). This can be achieved by increasing the productive base of the small holder farmers occupying about 80% of the agrarian work force (Osuji et al. 2017). Greater attention has been drawn to some soil management technologies which have the capacity to drive convincing farm output and surpass farmers' expectations. Associated benefits of these technologies are; increasing food production without depleting soil and water resources, restoring soil fertility, increasing the resilience of farming systems to climatic risk, and improving their capacity to sequester carbon and climate change mitigation (Osuji et al. 2019). Intensification of agricultural technologies also generate both private and public benefits and thus constitute potentially an important means of generating "win-win" solutions to addressing poverty and food security as well as environmental issues (Pretty, 2011). Improved agricultural techniques contribute to improved soil fertility and structure, addition of high amounts of biomass to the soil, causing minimal soil disturbance, conserving soil and water, enhancing activity and diversity of soil fauna, and strengthening mechanisms of crop residue cycling (Osuji et al. 2019). These successively results to greater system resilience, increased water retention capacity, better plant nutrient content, and better soil structure, potentially leading to higher yields and, thus contributing to increased land productivity, food security, poverty reduction and improve rural livelihoods (FAO, 2003). Again, adoption of agricultural techniques have the prospect to generate significant public environmental goods inform of carbon mitigation, biodiversity conservation and improved watershed functioning. The technical potential for mitigation from agriculture by 2030 is estimated to be between 4,500 and 6,000 MtCO<sub>2</sub> / year (Smith, 2003), which can be reached by reducing emissions of which agriculture is an important source representing 14% of the global total and increasing soil carbon sequestration which constitute 89% of agriculture technical mitigation potential (IPCC, 2007). For some times now, Nigeria economy had depended so much on oil which had plunged the economy into an economic mess coupled with the incessant outage of power supply which also had collapsed chains of businesses in Nigeria leading to poverty, hunger, insecurity, economic downturn, unemployment, etc. It is

against this backdrop that this paper sought to examine the diversification of agriculture and power sector reforms in Nigeria.

## Agricultural Policy and Reforms in Nigeria

Nigeria Agricultural Policies which provides the framework for the implementation of programs and guidelines for agricultural growth and development in Nigeria has the following objectives;

- The actualization of self-sufficiency in basic food supply and attainment of food security
- Increased production of agricultural raw materials for industries and other uses
- Eradication of hunger and poverty
- Development of the market structure and rural economy
- Protection of environment from degradation

This is expected to be achieved through the:

- Creation of a conducive macro-environment to stimulate great private sector investment in agriculture
- Rationalization of the roles of the three tiers of government in their promotional and supportive activities to stimulate growth
- Articulation and implementation of integrated rural development as a priority
- National programme to raise the quality of life for rural people
- Increased agricultural production through increased budgetary allocation and promotion of the necessary developmental, supportive and service-oriented activities
- Increasing fiscal incentives and promotion of increased use of agricultural machinery and inputs through a favourable tariff regime (FAO, 2010).

## Agricultural Land Laws and Reforms in Nigeria (The Land Use Act)

The Land Use Act was promulgated by the Federal Government of Nigeria on March 29, 1978. It is a reform essentially aimed at encouraging proper productive and efficient use of land (FMA, 2004). The Act stipulated that individuals can only use a piece of land for 99 years after which the land reverts to the government. It also stated that farmers should not be allocated more than 500 hectares of land for crop production or 5,000 hectares for grazing. According to the Land Use Act 1978, all land users must acquire certificate of occupancy (C of O) / land ownership once the person is above 21 years. Subsequently, the Land Use Act of 1978 is the principal legislation that regulates contemporary land tenure in Nigeria. Upon its enactment, the law brought about radical, if not revolutionary, changes in the erstwhile land tenure systems in the country (FMA, 2004). The law was

aimed, among other things, at reducing unequal access to land and land resources, a development that had brought untold economic asperity to the populace (Osuji et al. 2018). Unhindered access to land and its resources by the citizens could stir the needed economic growth and development in an economy that relies strongly on agriculture and its associated mineral resources. The Land Use Act was equally aimed at cutting down the high cost of land required for industrial estates and mechanized agriculture. For these reasons, the law appeared to nationalize land when it placed it in the hands of the government as a custodian, to hold in trust and administer for the use and common benefit of all Nigerians (FMA, 2004). However, after more than three decades of the operation of the law, it is evident that most of the problems it sought to remedy have re-emerged and certain provisions of the law had themselves triggered adversity on the citizens and inclined to occlude economic growth and development in the country.

### Diversification of Agricultural sector in Nigeria

Agricultural diversification relates to the “the entrepreneurial use of farm resources for a non-agricultural purposes for commercial gain”. It is the re-allocation of some of a farm’s productive resource, such as land, capital, farm equipments and labour to other products (non-farming activities). Agricultural diversification involves movement of resources from low value commodity mix to high value commodity mix. It focuses mainly on horticulture, dairy, poultry and fisheries sector (Culas et al. 2005). Amongst developing countries such as Nigeria, diversification primarily involves substituting of one crop or other agricultural product for another or an increase in the number of enterprises, or activities, carried out by a particular farm. Factors leading to decisions to diversify are many, but include: responding to external shocks, responding to changing consumer demands or changing government policy, reducing risk, and more recently, as a consequence of climate change (Culas et al. 2005). The great majority of diversification activities amongst the small holder farmers in Nigeria simply involved the renting out of farm buildings for non-farming use, compared to other developing countries with 9% of farms involved with processing or retailing, 3% with provision of tourist accommodation or catering, and 7% with sport or recreational activities (Birthal et al. 2007). The concept of diversification in Nigeria is applied both to individual farmers and to different regions, with government programmes being aimed at promoting widespread diversification. This is seen as referring to the “shift from the regional dominance of one crop to regional production of a number of crops which takes into account the economic returns from different value-added crops with complementary marketing opportunities (Singh et al. 2010). Diversification can be a response to both opportunities and threats;

### Opportunities

- Changing consumer demands: As consumers get richer, food consumption patterns noticeably changes. People deviate from a diet based on staples to one with a greater content of animal products (meat, eggs, and dairy) and fruits and vegetables. As a result dynamic farmers diversify to meet these needs
- Changing demographics: Adaptation to new farming techniques is required to meet higher demands of consumers as rapid urbanization affects consumption patterns
- Export potential: Farmers have had considerable success by diversifying into crops that can meet export market demands
- Adding value: Agricultural diversification tends to bring added value benefits and unseen advantages along the production line
- Changing marketing opportunities: The changing of government policies that control the way in which farmers can link to markets can open up new diversification possibilities
- Improving nutrition: Diversifying from the monoculture of traditional staples can have important nutritional benefits for farmers in developing countries such as Nigeria (Singh et al. 2010).

### Threats

- Urbanization: This is a threat, in that the expansion of cities put pressure on land resources and raises the value of the land. For farmers to remain on the land, they need to make higher income from that land. This explains why farmers close to urban areas tend to diversify into high-value crops
- Risk: Farmers face risk from bad weather and from fluctuating prices. Diversification is a logical response to both. For example, some crops are more drought-resistant than others, but may offer poorer economic returns
- External threats: Farmers who are dependent on exports run the risk that conditions will change in their markets, not because of a change in consumer demand but because of policy changes
- Domestic policy threats: Agricultural production is sometimes undertaken as a consequence of government subsidies, rather than because it is inherently profitable. The reduction or removal of those subsidies, whether direct or indirect, can have a major effect on farmers and provide a significant incentive for diversification or, in some cases, for returning to production of crops grown prior to the introduction of subsidies.
- Climate change: The type of crop that can be grown is affected by changes in temperatures and the length of the growing season. Climate

change could also modify the availability of water for production (Singh et al. 2010).

However, it is pertinent to know that agriculture is a crucial solution to the insufficient power supply experienced by developing countries as such Nigeria. Electricity can be generated using Bio-energy; consisting of solid biomass (wood residues), liquid bio-fuels (bio-ethanol, biodiesel) and gaseous bio-fuel (bio-gas, syn-gas). In the early human civilization, solid biomass was used for cooking and heating as we have in most rural areas in the developing nations. Today, the technology is well developed with high efficiency and low emissions. Modern biomass technologies include gaseous fuel used to power combined heat and power (CHP) to simultaneously produce heat and electricity. Liquid bio-fuels are used to power automobiles and bio-refineries used to generate electricity. An example is the Belize's Biogases Power Plant in Central America which generates 31.5 MW of power (Birthal et al. 2007).

### **Chronicles of Power Sector and Reforms in Nigeria**

Power is an essential fabric of a country and too many developing nations still struggle with consistent power shortage (Okoro and Madueme, 2006). Electric power generation in Nigeria began in 1896. In 1929, the Nigeria Electric Supply Company (NESCO) was established. In 1951, the Electric Corporation of Nigeria (ECN) was equally founded to take over the assets of NESCO. In 1962, NDA (Nigeria Dams Authority) was established to develop the hydropower potentials in Nigeria (ECN, 2003). In 1972, ECN and NDA were merged to form NEPA (National Electric Power Authority), which later metamorphose to Power Holding Company of Nigeria (PHCN), in 2005 as a holding company for its imminent unbundling and subsequent privatization (ECN, 2003). Before then NEPA was in charge of the generation, transmission and distribution of electric power in Nigeria. It operated as a vertical integrated utility company and had a total generation capacity of about 6, 200 MW from 2 hydro and 4 thermal power plants. This resulted in an unstable and unreliable electric power supply situation in the country with customers exposed to frequent power cuts and long period of power outages and an industry characterized by lack of maintenance of power infrastructure, outdated power plants, low revenues, high losses, power theft and non-cost reflective tariffs (Okoro and Madueme, 2004). It could be recalled that the Federal Ministry of Power oversees the electric power sector in Nigeria. It served both as the policy making body and the regulator; doing the latter mostly through the Electrical Inspectorate Services, a department in the Ministry. Overthrown by events, Nigeria power sector was later controlled by state-owned power holding company of Nigeria (PHCN), formerly known as National Electric Power Authority (NEPA) and due to abysmal power crises in the whole of Nigeria, the government of President Olusegun Obasanjo made efforts through the council for Privatization / Bureau for Public service to

reform the sector which has seen no investment or major government attention since the 1980s (Onohaebi and Lawal, 2010). Subsequently, in March 2005, President Olusegun Obasanjo signed the power sector reform bill into law enabling private companies to participate in electricity generation, transmission and distribution. The government later separated PHCN into eleven distribution firms, six generating companies and a transmission company which were later privatized. The distribution companies were as follows;

Distribution (11 companies):

- Abuja Electricity Distribution Company plc
- Benin Electricity Distribution Company plc
- Eko Electricity Distribution Company plc
- Enugu Electricity Distribution Company plc
- Ibadan Electricity Distribution Company plc
- Ikeja Electricity Distribution Company plc
- Jos Electricity Distribution Company plc
- Kano Electricity Distribution Company plc
- Kaduna Electricity Distribution Company plc
- Port Harcourt Electricity Distribution Company plc
- Yola Electricity Distribution Company plc

Generation (6 companies):

- Afam Power plc
- Egbin Power plc
- Kainji Hydro-Electric plc
- Sapele Power plc
- Shiroro Hydro-Electric plc
- Ughelli Power plc

### **Major Reforms in the Power Sector in Nigeria**

Major issues within the Nigerian power sector, principally concerning power outages and unreliable service, compelled the Nigerian government to take radical action. It enacted the Electric Power Sector Reform Act of 2005, which called for unbundling the national power utility company into a series of 18 successor companies: six generation companies, 11 distribution companies covering all 36 Nigerian states, and a national power transmission company (Onohaebi and Lawal, 2010). The act stipulated that ownership of these companies be granted to the Bureau of Public Enterprises (the privatization arm of the federal government) and the Ministry of Finance Incorporated. This unbundling paved the way for an ambitious privatization program to be carried out by the Bureau of Public Enterprises in Nigeria (Awosope, 2003). In 2007, the Bureau of Public Enterprises hired CPCS Transcom Limited, an international consulting firm based in Ottawa, Ontario, Canada to provide advice about the best ways to move forward with the privatization of the country's 11 distribution companies and the 6 generation companies. On 30 September 2013, following the privatization



process initiated by the Goodluck Jonathan regime, PHCN ceased to exist. In its stead, the Nigerian Electricity Regulatory Commission (NERC) was formed (ECN, 2010). The independent regulatory agency, as provided in the Electric Power Sector Reform Act of 2005 was tasked with monitoring and regulating the Nigerian electricity industry, with issuing licenses to market participants, and with ensuring compliance with market rules and operating guidelines. NERC regulates over 40 licensees in Nigeria (ECN, 2010). It is also responsible for permitting the construction of network of transmission lines by the Transmission Company of Nigeria, the transmission monopoly in Nigeria formed as a successor company of the PHCN. NERC works closely with the Nigerian Ministry of Environment and other related bodies in reviewing the safety, security and environmental impacts of proposed power plants and transmission networks. The Electric Power Sector Reform (EPSR) Act of 2005 established NERC's authority to impose mandatory reliability standards on the transmission system and to impose penalties on companies that manipulate the electricity markets (ECN, 2010). The EPSR Act of 2005 gave NERC additional responsibilities as outlined in NERC's wide important goals. As part of that responsibility, NERC:

- Regulates the generation, transmission, distribution and marketing of electricity in Nigeria and with Nigeria;

- Licenses and inspects private and corporate electric power projects 10MW and above; where 1-10MW are issued Captive Licenses;
- Ensures the reliability of generation plants, high voltage transmission system and the zonal distribution system;
- Ensures occupational health and safety of persons involved with electricity in the whole sector.
- Monitors and investigates energy markets;
- Uses civil penalties and other means against energy organizations and individuals who violate NERC rules in the energy markets;
- Administers accounting and financial reporting regulations and conduct of regulated companies. (ECN, 2010).

### Power Generation and Consumption in Nigeria

Table 1: shows the relationship between the generated electricity and per capita energy consumption of Nigeria with reference to that of Ghana. The electricity consumption in Nigeria as regards to this data is totally unacceptable and ridiculous considering the volumes of money pumped into the power sector by the Olusegun Obasanjo administration. This challenge further confirms the reason behind poor performances of Nigeria economy with respect to other world economies.

**Table 1:** Nigeria and Ghana Power Sector Relationship

Country	Population Millions	No of States	Generation (MW)	Per Capital Consumption (KW)	Status
Ghana	30.42	10	Over 4, 000	354.7	Still Developing
Nigeria	Over 120	36	Below 4,000	0.03	Under-Developed

Source: Claudius, (2014)

### Major Challenges of the Power Sector Impeding Effective Service Delivery in Nigeria

From the above presentation, the following are some of the most critical challenges of the power sector responsible for the generation short falls, transmission bottlenecks, and distribution problems in Nigeria:

- Regular vandalization of the gas lines, and cable lines, associated with low level of the surveillance and security on all electrical infrastructure
- High prevalence of inadequate working tools, vehicles and spare-parts for operating and maintaining the power system;
- Poor utilization of existing assets and deferred maintenance
- Erratic supply of gas domestic resources for power generation
- Delays in the implementation of new projects
- Vulnerable and overloaded existing transmission system
- Poor voltage profile to the tail-end consumer

- Poor technical staff recruitment, capacity building and training programme
- Inappropriate tariff that would enable the utility to get adequate funds to maintain and expand the infrastructure.
- Low customer satisfaction (load shedding, poor voltage profile, inaccurate billing, difficulties in paying bills, no-notice disconnections)
- There is a serious lack of required modern technologies or communication and monitoring of the generation, transmission and distribution infrastructure (Ebewele, 2011).

### Solutions to the Challenges of Power Sector in Nigeria

Below are proposed solutions to tackle the challenges of power sector listed above. This required a forceful and innovative strategy to implement. In that respect, the following should be undertaken:

- A detailed cost implication on a phased development and operating the power supply system on state-by-state basis is required
- A detailed and practicable power generation, transmission and distribution master plan for Nigeria for today and the next 25 years should be produced
- A detailed national load demand study should be carried out with a view to providing reliable information on the current practical and detailed power requirements and a futuristic forecast for the next 25 years
- Provision of adequate funds for maintenance activities
- Provision effective surveillances and water tight security to safe guide electrical installation
- Efficient policy formulation and implementation by the organs of the national assembly against over billings and other unnecessary charges
- A cost sharing formula for all tiers of government to fully participate in the development of national power supply and delivery services
- Provision of adequate working logistics targeted at improving power generation and supply

## Conclusion and Recommendations

Agriculture occupies a central position in the Nigerian economy despite the significance of the oil industry. Production chains are expected to produce food for a global population of about 9.1 billion people in 2050 and over 10 billion by the end of the century. This can be achieved by increasing the productive base of the small holder farmers occupying about 80% of the agrarian work force. However, the issue of agricultural diversifications calls for concern as it breeds diverse opportunities, thus stimulating economic development. Power can be generated through the conversion of Bio-energy and it's by products. Hence; adequate power supply is extremely strategic to any nation's growth and development. Efficient provision of power to all the nooks and crannies of the country tends to have a multiplier effect on the economy of nations. Although power supply in Nigeria have been insufficient and extremely erratic; posing a big threat to economic growth and development. Hence, agricultural diversification opportunities should be well explored to harness its attendant gains while the proposed solutions to effective power service delivery should be taken into full consideration.

## References

Awosope, C. O. A. (2003). Power demanded but not supplied: The agonizing roles of emergency power supply and transmission system inadequacy, University of Lagos Inaugural Lecture Series, 23-26

Birthal, P., Singh, J. P., Roy, D., and Thorat, A. (2007). Diversification in Indian agriculture towards high-value crops. International Food Policy Research Institute, Washington, D.C.

CBN (2008). Central Bank of Nigeria Annual Report and Statement of Accounts, Abuja, Nigeria

Claudius, A. A. (2014). Nigeria electricity industry: issues, challenges and solutions. Covenant University Ota Ogun State, Nigeria. 38th Public Lecture Series, 3(2):33-39

Culas, R. and Mahendrarajah, O. (2005). Causes of diversification in Agriculture over Time: Evidence from Norwegian Farming Sector, (Retrieved on 2011-9-27)

Ebewele, J.O. (2011). Electricity sector reform and the challenges of power generation in Nigeria, Paper presented at the Summit on Energy and Sustainable Economic Growth, Energy Commission of Nigeria Organized workshop at LadiKwali Hall, Sheraton Hotel and Towers, Abuja, Nigeria

Energy Commission of Nigeria (ECN), (2003). Electricity generation in Nigeria. Energy Resources Review, 4(3): 7-10

FAO (2003). Agricultural investment and productivity in developing countries, FAO, Economic and Social Development Paper, No. 148, ed. FAO, Corporate Document Repository

FAO (2010). Sustainable crop production intensification through ecosystem approach and an enabling environment: Capturing efficiency through ecosystem services and management, FAO, Committee on Agriculture, Rome, Food and Agriculture Organization of the United Nations, Rome Italy. 10-14

Federal Ministry of agriculture FMA (2004). Bulletin of the Federal Ministry of agriculture, Abuja, Nigeria

Inter-Governmental Panel on Climate Change (IPCC). (2007). "Climate change 2007: Impacts, adaptation and vulnerability". Inter Governmental Panel on Climate Change Cambridge: Cambridge University Press

Okoro, O. I. and Madueme, T.C. (2004). "Solar energy investments in a developing economy" Renewable Energy, 29: 1599-1610

Okoro, O. I. and Madueme, T.C. (2006). "Solar Energy: A necessary investments in a developing economy", International Journal of Sustainable Energy, 25(1):23-31

Onohaebi, O.S and Lawal Y.O. (2010). Poor maintenance culture; the bane to electric power generation in Nigeria, Journal of Economics and Engineering, 2(1): 28-33

Osuji, E. E. (2017). Impacts of sustainable soil management techniques on land productivity and poverty levels of arable crop farmers in Imo State, Nigeria. Unpublished PhD dissertation. Department of Agricultural Economics, Michael Okpara University of Agriculture Umudike, Nigeria

Osuji, E.E., Anyanwu, U.G., Ehirim, N.C., Eze, E.U., Tim Ashama, A. (2017). Economics of processed cassava products in Imo State, Nigeria. Journal of Research in Business and Management, India, 5(3):09-19

Osuji, E.E., Okwara, M. O., Essien, U. A., Agu, C. G., Oguegbuchulam, M.N. (2019). Sustainability of climate change adaptation measures in South-South, Nigeria. Agriculture and Food Sciences Research, 6(1): 120-126

Osuji, E. E., Anyanwu, U. G., Effiong, J.A.L., Okwara, M. O., Tim-Ashama, A. and Praise, C.N. (2019). Agricultural land management policies in South-South, Nigeria. Implications for sustainable environment and agriculture. Direct Research Journal of Agriculture and Food Science. 7(3):54-61

Osuji, E.E., Okwara, M. O., Anyanwu, U. G., Effiong, J.A.L., Praise, C.N., Irebuisi, D.C (2018). Economics of farm outputs of arable crop farmers using improved soil management techniques in Imo State, Nigeria. International Journal of Agriculture and Earth Science. 4(3): 1-7

Pretty, J. (2011). Editorial: Sustainable intensification in African". International Journal of Agriculture, 9(1): 3-4

- Singh, A., Lakhdar., B. and Michelle, M (2010). Diversification in agriculture Archived June 21, 2010, at the Wayback Machine. In: Encyclopedia of Earth. Eds. Cutler J. Cleveland (Washington, D.C.: Environmental Information Coalition, National Council for Science and the Environment).
- Smith, V. H. (2003). An Ex-Post evaluation of the insurance and other governmental programs: Program Participation and Soil Erosion. *Journal of Agricultural and Resource Economics*, 28 (2): 201-216
- United Nations (2003). "World reports, on poverty and its devastating effects on the populace".23-31