

An Assessment on Relationship of Agricultural Sub-Sectors with GDP in Nigeria

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Abstract: *This study is majorly concentrated on the various agricultural subsectors in Nigeria, how the subsectors has influenced the economic growth of Nigeria using econometric procedure to estimate the parameters of the model, and also the various shortcomings encountered by the agricultural subsectors in Nigeria and possible solutions. It also emphasize on the sector that has been abandoned, whereas, the growing recognition is directed toward the major resources (crude oil) which generated diminishing returns in agriculture contributions in regards to the economic growth in Nigeria. Moreover, the paper emphasized on the relationship of agricultural sub-sectors with Gross Domestic Product (GDP) which the sub-sectors entails crop production, fishery, livestock and forestry. The Intention of this research presents the conclusion that the agricultural part is a concrete sector of the economy and cannot be underrated or trivialized seeing that agricultural sector output is important to economic activities in Nigeria. Therefore, the general growth of the country's economy depends on the progress of agriculture. If there's availability of credit facility to the agricultural sector, it will enhance the boosting of the country's GDP and thereby causing growth in the economy. An additional objective of this paper attempts to carry maximum value for public officials and legislators.*

Index Terms: *Agriculture, Development, Economic growth, Econometric procedure, Sub-sectors.*

I. INTRODUCTION

Nigeria, an African country situated in the Western region spanning the latitude of 40-140N and longitude of 30-150E, bordering Chad in the northeast, Niger in the north, Benin in the west and Cameroon in the east. It contains 36 states along with Abuja, its designated Federal Capital Territory. Nigeria possesses more than 250 ethnic groups, which the larger ones are Yoruba, Hausa/Fulani and Igbo and are chiefly found in the western, northern and eastern regions of the country, respectively, and are identified with different types of culture. Nigeria became a formally independent country in 1960, and at that time the agricultural portion of the economy provided more than 50 percent of GDP (Gross Domestic Product), in addition to this it was responsible for a sizable part of the revenue stream in exports and government revenue. It is worth mentioning the importance of marketing boards in directing the efforts of this agricultural work at that time. Nevertheless, the dominant position of these boards in economic terms was later replaced with the national oil company, the Nigerian National Petroleum Company, also known as NNPC.

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According to data published by the Central Bank of Nigeria (2003) [1], Crude Oil or unrefined petroleum continued to be responsible for the larger earnings (suitable for about 80 percent) and nearly 100 percent of the exports revenue. Nigeria is acknowledged as the world's 20th largest economy as of 2015 [2], with a nominal GDP greater than \$500 billion and \$1 trillion in regards to purchasing power parity (PPP). Moreover, Agricultural activity (particularly fishing, forestry and livestock) appears as the primary work of a larger portion of the Nigerian population. It is clear that humans engage in agricultural activity as a result of our instinct to survive and not a predetermined plan to power up the economy, and this is the source of the issue. Agricultural development has helped in the economic stability of the country. It is considered a vital and clearest way for developing and sustaining the economy. It contains every element of human identity and work that is manifested in an interconnected network which guarantees the satisfaction of the society and the demands of the economy. This network is represented in art, the cultural aspect, and all the way to the stage of production of goods. The agricultural aspect is a salient component for humans, and this is apparent through historical evidence that nations always attempt to make good use of its potential in terms of developing their economy and increasing the population growth. Nigeria enjoys a great prospect in this regard, starting from the diversity of seeds all the way to the diversity of stock and cattle as well as favorable aspects such as water, trees and soil. To this extent, the Minister of Agriculture and Federal Government of Nigeria took significant steps in portraying agriculture as major issue for the livelihood of the Nigerian economy. The larger part of Nigerians reside and work in the countryside. In numbers, 75 percent live in the countryside when compared to only about 25 percent who live in cities. Likewise, the agricultural industry employs more than 58 percent of workers. In the pre-oil period the industry provided a record of 75 to 80 percent of GDP, while later it reached around 55 percent of gainful employees and nearly 40 percent of GDP. These figures are considered significantly excessive when contrasted with the average contribution recorded as 27 percent from low-income countries in the Sub Sahara [3]. As for the dilemma of how much development can agriculture provide for economic growth and industrialization, Nigeria is not really moving forward due to its inability to raise the food production to efficient levels for its local consumption, these factors carry significant effects on the likelihood of growth in foreign exchange reserves and surplus of exports for the country.

The argument for the promotion of agricultural sectors in developing countries such as Nigeria rests primarily on substantial indications that developing nations carry a comparative advantage in agricultural production than economically advanced countries.

It is also argued that this sector reigns in significance because all other sectors have a dependency on agriculture either directly through food supply or indirectly through the processes made available by the sector. Consequently, the sector can do this by supplying comparatively inexpensive food for the consumption of workers residing in cities, which makes the urban industrial sector check inflationary tendency of workers “wages where inadequate food supply may lead to rising food prices as a result industrial unrest as workers continue to demand for increase in wages to meet the basic needs of life. Food importation lacks feasible arguments to support it for countries aspiring to be politically and economically independent. Therefore, it is recommended for the agricultural industry to raise the food production above the marketable surplus level. Finally, the significant factors anticipated from a country like Nigeria in regards to agriculture cannot be over-emphasized. The fact remains that agriculture plays a vital part in the growth and development operation. Although this information and arguments put forward in support of this view, nevertheless, this stance has not been taken seriously by public officials and lawmakers in Nigeria, and it has reached a degree where they are heavily dependent on the non-renewable energy such as unrefined petroleum as a way to support the economy and its future political interests and security. On another note, to the best of the researchers knowledge, many research studies that have worked on this issue struggled with one methodological problem or the others most especially omission of variables bias by excluding the important variables in the analysis of agricultural productivity viz a viz the economic growth which are Labour and Capital [4], [5], [6], [7], [8], [9], [10].

A. Agricultural Sector Policies in Nigeria

According to the Nigerian Agricultural Policy document, the roles of the Nigerian agricultural sector includes provision of food for the growing population, earnings of foreign exchange, employing a significant part of the labor force, and provision of income for farming households. Moreover, to achieve agricultural-sector goals, different policies were formulated and implemented during the post-independence years. The injection of vigor into the agricultural sector carries the possibility to fasten the invention of self-reliance, self-sufficiency and self-contentment (Which will be translated to National sufficiency). Adequacy in the supply of raw materials for industries, growing foreign reserves; and expansion of exporting non-oil goods and development in living standards of the general population remains a central problem that only an industrialized agricultural economy can provide solutions for. This adequacy has the ability to promote a more healthy worker which enjoys environmental awareness. Moreover, the growth of this sector carries promising results for the economy to flourish and generate diversified revenue and move away from its dependency on nonrenewable energy, a major issue known as the ‘Dutch disease’ version of Nigeria. It is further argued that if these steps are taken, the improvements in agriculture and diversification of national revenue streams will surely move Nigeria to a better position on the global stage and strengthens

its geopolitical weight. Another beneficial consequence for developing this sector is the potential improvement in the standard of living in cities and the countryside, their employment, and monitoring of urban migration. In this study we summarize some key policies to better understand their linkages to the productivity obstacles to be recognized further throughout this paper. Throughout the period of 1970 – 85, the major capital for agricultural production and post-harvest operations was primarily dependent on the budget assigned by the state and secondarily from existing lending institutions [11]. However, as observed [12], “from the first through the fourth National Development Plans, government spent less than 10 percent of its total capital expenditures on agriculture, which contributed more than 60 percent of the GDP.” And, with the poorly developed capital markets,

The financial means of most farmers in that period was dependent on casual sources at prohibitive interest rates. Productivity, agricultural production, and postharvest operations were low and little affected by improved technologies. The major monetary economic tools utilized before 1985 involved loan ceilings, selective credit controls, and interest rate controls. By the time it was 1972, commercial and merchant financial institutions found themselves capable of supplying a designated minimum allocation of credit for agricultural purposes. However, these compulsory loan percentages allocations to agriculture have received mixed reviews [13]. Noted that these compulsory measures of controlling credit was only successful in the manner that it offered a secondary substitute to the rare and underdeveloped sources of funds which was available at the time for financing agriculture. The authors move forward with the motion that compulsory measures such as loan percentages contradicts the principles of economic reform and can give incentives for loans misallocation. In their study, [14] further noted that “both commercial and merchant banks consistently lent short of the prescribed limits under the credit allocation policy.” This approach was scrapped in late 1996. Preceding the establishment of the Structural Adjustment Programmer (SAP) in 1986 [15], The rates of loans in the agricultural industry were influenced by major subsidies by the government. In 1970s, they witnessed very low interest rates that fail to promote the wellbeing or the potential of investing in capital markets. Lenders were not willing to raise money from the available money markets and hand out loans which are dependent on the same low loan rates. Rates of inflation throughout that period soared up to double digits every years. Even though, rates of lending for agricultural purposes went under deregulation in 1987, the high rates of inflation that became effective during the economic reform laws, Topping 40 percent per annum in the early- to mid-1990s (CBN 1998a), caused the real lending rates for agriculture to become negative. This type of lending rates for agricultural operations along with high inflation presumably partially caused by SAP failed to encourage investors throughout this period. (CBN 1998b). It is worth noting that the majority of non-oil export goods for Nigeria were originally agricultural products. Based on this, it is important and salient to put forward elaborative strategies which can bring forth maximum utility under the SAP program. Under the rural credit scheme.

B. Agricultural Sub-Sectors In Nigeria

WE HAVE FOUR AGRICULTURAL SUB-SECTORS IN NIGERIA AND THEY ARE DISCUSSED BELOW:

- **Crop Production Sub-Sector:** This sub-sector is involved in production of various crops like wheat, cotton for textile industries, sugarcane, rice, beans, maize, melon, yam, cassava, onions, potatoes, orange etc. the crop production contributes about 85.62% to the agriculture GDP in Nigeria [16].
- **Livestock Sub-Sector:** This has contributed 8.44 percent values added to agriculture gdp. it also provides a significant part in the improvement of the economy and it is also a source of foreign revenue. in this sub-industry, the domestic demand of meat, milk, and eggs are met. nigeria is one of the largest countries in africa in terms of milk production [17]. moreover, in this sector, specifically in the northern part of nigeria, more than 8 million households who reside in the countryside are engaged in raising cattle. the cattle industry provides significant efforts to decrease poverty and has the capacity to develop and monitor the growth of the socioeconomic state of minor agricultural labor and poor workers who don't own land and reside in the countryside.
- **Fishery Sub-Sector:** This sub-industry carries important consequences for nigeria's economic state and it is also stream of export revenue. this sub-industry provided around 3.94 percent in agricultural worth. this sub-industry is also providing the most valuable effort in poverty alleviation and increment in food security [18].
- **Forestry Sub-Sector:** Forests are identified as a crucial element of our planet and the breakdown of forests harmony and wellbeing can carry extreme socio-economic consequences for the succeeding generations. the share of forestry sub-industry to agriculture gdp is 2.00 percent with primary elements of forestry, timber for construction and firewood [19].

Figure 1 illustrates the inclination of production output in agriculture, RGDP and the price of oil covering the time interval. The chart shows that production in agriculture demonstrates an increment in the trend. The RGDP was higher in the 1980s and 1990s just shortly before agricultural output reached its tip. The following diagram illustrates an intense drop in the production output in 2009. The main reason for this drop was due to a fall in state subsidies for the industry.

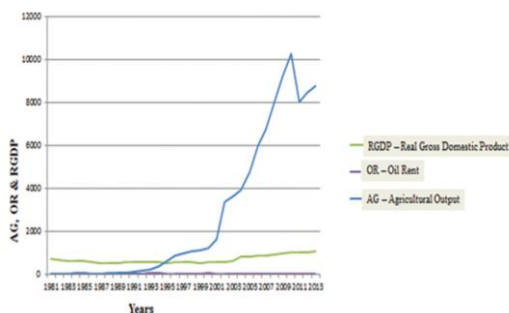


Fig.1. Agricultural output trend and real gross domestic product per capita 1980-2013[20]

II. METHODOLOGY

A. Model and Data

In this chapter, the presentation of data source and methodology about the relationship of agricultural sub-sectors with GDP in Nigeria was made. The section 1. contained a discussion of the framework of analysis, this provides ample insight on the econometric model and its respective variables needed for regression analysis. Section 2. provides insight on the sources of data:

1. Framework of Analysis In this study

Investigation was made using the time series data to get the relationship of agricultural sub-sectors with GDP in Nigeria. RGDP per capita are the variables used in the model specification that is utilized for computation of the growth in the economy as the dependent variable while the explanatory variables are agricultural output and oil rent. The model formula is presented in the following way:

$$RGDP/CA = F(\text{Agoutput}, \text{OR})$$

The Stochastic form of the model is as follows:

$$RGDP/CA_t = \beta_0 + \beta_1 \text{Agoutput}_t + \beta_2 \text{OR}_t + U_t \quad (1)$$

Where:

RGDP/CA= Real gross domestic product per capita

β_0 = Intercept (Constant)

Agoutput = Agricultural output (% GDP)

OR = Oil Rent (% GDP)

U_t = Stochastic term (Unobserved)

Where our expected sign for β_1 and β_2 is positive

Econometric Model: To test hypothesis empirically model can be specified as follows:

Unit Root Test- The common version of the unit root test is provided here:

ADF Equation

$$\Delta Y_t = \beta_1 + \beta_2 + \delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-i} + \epsilon_t \quad (2)$$

Cointegration Test- The Johansen (1988) cointegration test lags is provided in the following equation:

$$\Delta Y_t = \Gamma_1 \Delta X_{t-1} + \dots + \Gamma_{k-1} \Delta X_{t-k+1} + \Pi X_{t-k} + \mu + \epsilon_t \quad (3)$$

2. Data Sources

In this study, the secondary data source was utilized from the database of the World Bank. The series covered a period of more than 25 years.

III. DISCUSSION AND RESULTS

Unit Root Test result: In Table 1, it was stated that every variable was not stationary at their accepted levels. The null hypotheses of ADF and PP test could not be rejected, indicating non stationarity. During the test for KPSS, a null hypothesis at 5% was rejected, and reached a conclusion that the variables were non-stationary. This is due to KPSS having a reverse hypothesis relative to ADF and PP test. Therefore, Table 1 illustrates how every series utilized in this paper is stationary following initial differencing and is integrated of order I (1). Since the series are of order (1), these necessitate us to carry out Johansen cointegration test. Moreover, it's performed as an investigation on the basis that if possible long-run relationship exists among the series.

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Cointegration Results: From Table 2, the counteracting vectors for the theory were found to be 2. The scenario of rejecting the null hypothesis that there is not a cointegration vector. Therefore, it was accepted that the alternative hypothesis which is defined as 2 cointegration vectors through the performance of Johansen trace statistic. The results suggest the existence of a long-run causality relationships between RGDP per capita, agricultural output and oil rent.

Error Correction Model (ECM): In terms of a long-run association, the integration of variables necessitates existing in the same order, and counteraction illustrates that there exists a possible cointegration in the long-run among series. Series gain the equilibrium level in the long-run when adjustment time is considered.

Table I

Stationarity	LRGDP	Lag	Lagout	Lag	LOR	Lag
Statistics (level)						
$\tau_T (ADF)$	-1.8252	(0)	0.175	(0)	-3.096	(0)
$\tau_\mu (ADF)$	0.4239	(0)	-1.657	(0)	-2.328	(0)
$\tau (ADF)$	1.0414	(0)	2.139	(0)	0.4057	(0)
$\tau_T (PP)$	-1.824	(0)	0.175	(0)	-2.981	(3)
$\tau_\mu (PP)$	0.140	(3)	-1.657	(0)	-2.289	(3)
$\tau (PP)$	0.847	(2)	4.043	(3)	-0.408	(3)
$\tau_T (KPSS)$	0.19**	(3)	0.159**	(4)	0.1730	(3)
Statistics (First difference)						
$\tau_T (ADF)$	-4.893*	(0)	-3.884**	(4)	-5.842	(1)
$\tau_\mu (ADF)$	-4.201*	(0)	-3.587**	(0)	-5.786*	(1)
$\tau (ADF)$	-4.144*	(9)	2.585**	(2)	-5.837*	(1)
$\tau_T (PP)$	-4.843*	(4)	-3.750**	(3)	-6.172*	(3)
$\tau_\mu (PP)$	-4.187*	(1)	-3.621**	(3)	-6.084*	(3)
$\tau (PP)$	-4.092	(2)	-2.246**	(4)	-6.191*	(3)
$\tau_T (KPSS)$	0.082	(4)	0.180	(5)	0.050	(1)
$\tau_\mu (KPSS)$	0.499	(4)	0.3040	(2)	0.135	(1)

Unit root for RGDP, agricultural output and oil rent [20]

Where:

LGDP= natural log value of real gross domestic product.

Agoutput= natural log of agricultural output.

OR=natural logarithm of oil rent.

RGDP=Real Gross Domestic Product.

ADF= Augumented Dickey fuller.

PP= Phillip-perron.

KPSS= Kwaitowski-Phillips-Schmidt-Shi.

TableII

Johansen multivariate cointegration result

Null hypothesis: H_0	Eigenvalue	Trace statistic	0.05 critical value	Probability
$r=0$	0.5627578	43.20402*	29.79707	0.0008
$r\leq 1$	0.368360	17.21504	15.49471	0.0273
$r\leq 2$	0.091435	2.92546	3.841466	0.0847

Where:

*= Rejection of the hypothesis at 0.05 level.

Table III

Error Correlation Model (ECM).

Short-long Causality	Coefficient	Standard error	t-statistics
Short-run causality			
LNOR01(-1)	52.45313	(14.2658)	[-3.67684]
LA output	<0.00000	<0.00000	<0.00000
Long-run causality			
LGDPC	0.007747	(0.00265)	[2.92346]
LAoutput	-0.004961	-0.004961	[-0.58057]
LOR	-0.023798	(-0.01197)	[-1.98740]

Where:

GDP= Gross Domestic Product

Hence, this study empirically examined the contribution of agricultural sector to economic growth in Nigeria and the much-awaited development

IV. CONCLUSIONS

It was revealed in this paper that in the short run, a positive statistical relationship exists between natural logarithm value of agricultural output and RGDP. This illustrates the significance of Nigerian economic growth to be used a viable source. Moreover, from the Johansen multivariate test, the study also found out that there is a long run relationship between all variables. It was observed on the long run, the effect of agriculture on RGDP is limited to 0 when oil rent is accounted for, which means that the negligence of the agricultural industry for the petroleum industry in Nigeria has negative long run implication as oil has a negative statistical relationship with RGDP. Moreover, this study postulated some solution to the problems been faced by the agricultural subsectors and if the government will act on solving these problems then this will slightly restore the honor of the agricultural sector in Nigeria, with the help of Johansen co-integration test, the study was able to trace a long-run relationship between agricultural output and oil rent, more budgetary allocation will assist in developing and revitalizing the industry and the rest of the economy. The creation of agricultural fund to provide funds and facilitate medium/large scale agricultural production, various agricultural subsectors that are ready and willing to start a medium/large scale farming should be granted credit to enhance employment, production for local consumption and for export in order to generate foreign exchange revenue for the Nigeria.

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