

Agricultural Sector Development and Economic Growth of Nigeria

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Abstract

Agriculture in Nigeria has been in existence since time immemorial. As the sector faced series of challenges, governments in response formulate and implement various policies to tackle these challenges and to ensure that agricultural sector contributes immensely to economic growth, however, the sector remains underdeveloped. Owing to this, this study conducted research to know if the development of agricultural sector can stimulate Nigeria's economic growth or not. The study gathered annual data from 1986 to 2022 in order to identify patterns in agricultural development and their consequences for economic growth. The data was analyzed using the multiple regression method. However, the results indicate that agricultural output, climate change, and the agricultural loan guarantee scheme fund have a negative impact on economic growth, but government capital expenditure has a favorable impact. As a result, the study suggests that the government provide the required infrastructure facilities in the agriculture sector to support economic growth.

Keywords: Agriculture, Economic Growth, Climate Change, Government Capital Expenditure.

1. Introduction

The expansion of an economy's agricultural sector is one of the most potent tools for eradicating severe poverty and ensuring food security. It is also crucial in economic growth and development. The agricultural sector can be considered as the most indispensable and beneficial sector in any economy, owing to its numerous benefits. According to World Bank (2023), agriculture contributes about 4% of global gross domestic product (GDP). The relationship between agricultural sector and economic growth has been debated widely. Some believe that agriculture can help improve economic growth, while some argued against this. It has however been discovered that there are some critical determinants of agricultural sector development in stimulating economic growth of a nation. Some of these determinants are climate change, agricultural infrastructures, improved seedlings,

employing modern technology and so on. Brazil's agricultural sector has been developed during the previous four decades as a result of the country's reliance on research. This allows Brazil to change inputs and adapt to changing climatic and land conditions. Additionally, research expenditures of about 1% of GDP resulted into 300% increase in agricultural production in Brazil (PricewaterhouseCoopers, 2016).

The contributions of agriculture to a nation's economy in relation to revenue generation cannot be overemphasized. For example, a nation like Nigeria, endowed with fertile soil, is able to cultivate a wide range of products, which, when exported, bring in a consistent flow of revenue and so raise the GDP of the nation. In the area of job creation, agriculture can help engage millions of people. Nigeria agricultural sector is a key economic sector that has a very high potential. It contributes about 24.4% to GDP in 2016 and employs higher percentage of people. Also, in 2020 and 2021, the sector accounted for about 22% and 26.84% of the total real GDP respectively.

Having discovered the high potential of agriculture, and its capability of enhancing economic growth, Nigeria government designed different policy measures. Some of these policy initiatives are Agriculture Promotion Policy (APP) and Economic Recovery and Growth Plan (ERGP). All of these initiatives aim to raise farmer incomes, increase food security, create jobs, raise the standard of agricultural products, and position the nation as a major contributor in the global food market. Although, the policy measures boosted agriculture output, and commercial banks' credit to agriculture between 2011 and 2014, agricultural sector still remains underdeveloped (PwC, 2016). This is not unconnected from the fact that the interventions focused more on producing goods that improve value addition along value chain segments (PwC, 2016).

Nigeria agricultural sector is faced with myriads of challenges, which range from inadequate funding, poor climatic condition, poor research development, weak linkages with manufacturing sector specifically, inability to access and sustain intervention schemes for farmers, insufficient agricultural productivity to meet population growth and food demand (PwC, 2020). This study therefore examines how Nigerian agricultural sector contributes to economic growth.

Research Questions

- i. What is the impact of agricultural sector development on economic growth in Nigeria?
- ii. How has government capital expenditure on agriculture impacted economic growth in Nigeria?
- iii. What is the impact of climate change on economic growth in Nigeria?
- iv. To what extent does agricultural credit impact economic growth in Nigeria?

2. LITERATURE REVIEW

2.1. Theoretical Framework

The New (Endogenous) Growth Theory

Paul Romer proposed the new growth hypothesis in 1994. He asserts that technological advancement, invention, and the application of new ideas or innovations in manufacturing increase labor and capital productivity, leading to economic expansion. Relating this theory to agriculture, adopting a new method of production or advancement in technology for production can help to increase agricultural output, thereby, enhancing economic growth. The adoption of technology for production however requires capital funding which is one of the challenges facing the Nigerian agricultural sector.

2.2. Review of Empirical Literature

While a lot of empirical works abound in the literature, the most recent and relevant ones are discussed in this paper.

Uche et al. (2023) used OLS to examine the effect of agric-based small and medium enterprise fund on GDP of Nigeria from 2000 to 2020. The results demonstrate that lending by ACGSF to small and medium-sized agricultural enterprises (SMEs) has a favorable effect on both the national gross domestic product and agricultural GDP. The impact of agricultural financing on Nigeria's growth from 1981 to 2019 was studied by Mbelu & Ifioma (2022). Using error correction, it was discovered that the money from the agricultural loan guarantee scheme had a long-term positive impact on Nigeria's GDP.

Ikubor et al.'s (2022) empirical study examined the effects of government capital expenditures in the economic services sector of Nigeria her growth from 1981 to 2020. The results of the study, which used ARDL, showed that capital investment in agricultural positively affects economic growth in Nigeria.

The impact of agricultural development on growth of Nigerian economy was examined by Etale et al. (2021). The study used bivariate regression analysis of the variables and covered the years 2000 to 2018. The results showed a positive linear relationship between the variables and that the country's GDP increased proportionately with the contribution of the agriculture. Victor (2019) conducted an empirical study on impact of agriculture sector performance on economic growth in Nigeria. The study, which covered the years 1977 to 2012 and used VECM, found that total employment has a negative influence, while agricultural domestic production and ACGS have a positive impact.

Comparably, Idisi et al. (2019) adopted an OLS approach to study how the agricultural sector influenced Nigeria's economic growth from 2008 to 2017. The findings showed that government spending on rural road networks, rural electrification, and total agricultural output all had a positive and significant impact. Nonetheless, government spending on rural health had a negligible and unfavorable effect. In a related study, Adesanya & Ajala (2019) looked at how agricultural financing affected Nigeria's economic expansion. The study covered the years 1985 to 2016, using the three-stage least square analysis technique to examine the variables. The results showed an inverse relationship. The study also showed that agricultural financing is a helpful instrument for countercyclical agricultural output, non-oil export, and GDP stabilization in the Nigerian economy, even though the GDP value declined at the conclusion of the period.

Jonathan and Emmanuel (2017) conducted a study that examined the effects of climate change on total growth of Nigerian economy from 1981 to 2014. Using OLS estimation technique, the results showed that carbon emissions have a negative influence on growth in the medium and long terms, and that deforestation has a negative short-term impact on growth. Using a OLS, Akaninyene & Sunday (2017) evaluated the impact of the Agricultural Credit Guarantee Scheme Fund on the development of the agricultural sector in Nigeria

between 2001 and 2016. The study found that the scheme had provided more funds and had a greater impact on the crop sector than the livestock and fishery sectors. Research on the agriculture sector's impact on Nigeria's economic growth from 1981 to 2013 was conducted by Sertoglu et al. (2017). In the investigation, a VECM was used. The study's findings showed that the output of agriculture sector had a favorable effect on economic growth of Nigeria. Nigeria's agricultural exports and economic growth were examined experimentally by Victor (2015). The study employed the ECM over the years 1970 to 2012. The ECM results have shown that agricultural exports have a favorable economic impact on Nigeria.

The Granger causality test was utilized in a study by Odetola & Etumnu (2013) to look at how much agriculture contributes to economic growth in Nigeria. The study spanned from the period of 1960 to 2011. It was established that the agriculture sector drives GDP growth, not the other way around. Yilson et al. (2012) looked into the connection between agriculture and Nigeria's economic expansion. The primary finding of the study, which encompassed the years 1986 to 2020 and used ECM method of analysis, was that, although, crop production and forestry had a negative and negligible impact on economic growth, fisheries and livestock had a favorable impact. Agricultural impact of climate change on Southeast Asia economy was studied by Zhai and Zhuang (2009). The data series was done to assess the impact from 2004 through 2008, using general equilibrium analysis. The study found that agricultural impact of climate change is moderate on the economy of Southeast Asia.

3. Methodology

3.1. Model Specification

The multiple regression model is adopted for this study to examine the impact of agriculture on economic growth in Nigeria. This method is more amenable to *ceteris paribus* because it permits to control explicitly for many other factors that simultaneously influence the dependent variable. In the study, the model of Sertoglu et al. (2017) is adapted and the model is specified as;

$$RGDP/CA = f(AGOOUTPUT, OR) \quad (1)$$

Where, RGDP/CA is real gross domestic product per capita; AGOOUTPUT = agricultural output (% of GDP); OR = oil rent (% of GDP).

Since capital financing, weather conditions, agricultural credit all matter for agricultural sector development, which in turn stimulates economic growth, the variables such as government capital expenditure on agriculture, agricultural credit guarantee scheme fund, climate change (proxied with annual mean temperature) and agricultural output are introduced as the explanatory variables while real gross domestic product is used as a proxy for economic growth. The model for this study is thus specified in its functional and econometrical forms respectively as;

$$RGDP = f(AGOU, GCEX, CLCH, ACGS) \quad (2)$$

$$RGDP_t = \beta_0 + \beta_1 AGOU_t + \beta_2 GCEX_t + \beta_3 CLCH_t + \beta_4 ACGS_t + \varepsilon_t \quad (3)$$

3.2. Estimation Procedures

The cointegration test is run after the unit root test, which uses the Augmented Dickey-Fuller test to verify stationarity. The Johansen cointegration test is used to perform the cointegration test, which is the long-run test. The multiple regression approach is used once the long-term link has been established. After that, a few diagnostic tests are conducted to demonstrate the validity and dependability of the study's model.

3.3. Nature and Sources of Data

Based on annual time series, this study compiles data from CBN Statistical Bulletin and National Bureau of Statistics.

4. Results of Data Presentation

This section presents the results of the tests carried out to establish the objectives of this study, and also interprets the results for clarity and to empirically ascertain the relationship between the explanatory variables and the dependent variable.

Stationarity Test

Table 1: Summary of the ADF Unit Root Test

Variables	ADF Stats	Critical	Order of Integration	Remarks
		Value @5%		
RGDP	-6.13216	-2.94840	I(1)	Stationary
AGOU	-5.64501	-2.94840	I(1)	Stationary
GCEX	-7.78253	-2.94840	I(1)	Stationary
CLCH	-7.97511	-2.95113	I(1)	Stationary
ACGS	-5.33806	-2.94840	I(1)	Stationary

Source: E-views 10 Output.

The results of unit root test carried out are summarized and presented in Table 1. The variables all show stationarity at first difference and it is concluded that the null hypothesis that the model has unit root can be rejected.

Cointegration Test

Table 2: Summary of Johansen Cointegration Test

Hypothesize				
d	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.714536	100.5083	69.81889	0.0000

At most 1 *	0.548226	56.63090	47.85613	0.0061
At most 2	0.374282	28.82084	29.79707	0.0645
At most 3	0.203800	12.41088	15.49471	0.1383
At most 4 *	0.118995	4.434215	3.841466	0.0352

Hypothesize

d	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.714536	43.87742	33.87687	0.0023
At most 1 *	0.548226	27.81006	27.58434	0.0468
At most 2	0.374282	16.40996	21.13162	0.2018
At most 3	0.203800	7.976660	14.26460	0.3811
At most 4 *	0.118995	4.434215	3.841466	0.0352

Source: Eviews 10 Output.

Two cointegrating equations for both trace and max-eigen statistics are shown in Table 2. This suggests that Nigeria’s economic growth and the development of its agriculture sector are correlated over the long term. We reject the null hypothesis that there is no long-term association.

Parameters Estimation Test Result

Table 3: Summary of Multiple Regression Model

Dependent Variable: RGDP

Variable	Coefficien t	Std. Error	t-Statistic	Prob.
C	10.02745	12.83722	0.781124	0.4405
AGOU	-1.077089	0.550006	-1.958324	0.0590
ACGS	-0.063814	0.145488	-0.438623	0.6639
GCEX	1.222556	0.145135	8.423568	0.0000
CLCH	-4.454457	9.017094	-0.494001	0.6247
R-squared	0.937002	Mean dependent var	2.467731	

Adjusted squared	R-	S.D. dependent var	0.758186
	0.929127		-
S.E. of regression	0.201844	Akaike info criterion	0.237555
			-
Sum squared resid	1.303711	Schwarz criterion	0.019864
			-
Log likelihood	9.394777	Hannan-Quinn criter.	0.160809
F-statistic	118.9880	Durbin-Watson stat	1.563961
Prob(F-statistic)	0.000000		

Source: Eviews 10 Output.

The constant value in the multiple regression result indicates that on average, when all the explanatory variables (agricultural output, agricultural credit guarantee scheme fund, government capital expenditure and climate change) are held fixed, the value of economic growth will be 10.03. This conforms to a priori expectation.

Agricultural output which is the proxy for agricultural sector development has a negative value of -1.077 and it implies that the growth of Nigeria’s agriculture sector and economic expansion are negatively correlated. In reality, agriculture has been the mainstay of Nigeria and has contributed to the growth of the economy in numerous ways. Thus, the negative impact agriculture has on economic growth might be as a result of the neglect of the sector when oil was discovered in commercial quantity, which makes the sector less effective than it was in the 70s. This finding is far from what is expected and does not also support the findings of Etale et al. (2021) and Idisi et al. (2019).

The Agricultural Credit Guarantee Scheme fund has a negative impact on Nigeria's economy. A 1% increase in ACGS is expected to result in a 0.06 percent decrease in economic growth, according to the coefficient, which is -0.064. ACGS is also not statistically significant at 5 percent because the p value (0.6639) is greater than 0.05. The reason for having the negative impact might be due to diversion and mismanagement of the fund which Nigeria is known for. This however has serious implication on the growth of the economy. The findings of Uche et al. (2023); Mbelu and Ifioma (2022) however found a positive impact between ACGS and RGDP in Nigeria.

Conversely, government capital expenditure on agriculture is positive with economic growth. According to the findings, economic growth will rise by 1.22 percent for every 1% increase in government capital investment on agricultural. It is also statistically significant at 5 percent since the p value is below 0.05. According to this finding, government expenditure is seen as a catalyst to economic growth because it can encourage investments in various sectors of the economy. This supports the a priori expectation and also corroborates the findings of Ikubor et al. (2022).

The annual mean temperature serves as a proxy for climate change, and its coefficient value is -4.455. The implication of the negative value is that annual mean temperature in Nigeria during the periods covered in this study reduces agricultural output, which tends to reduce economic growth. Therefore, on average, 1 percent increase in the annual mean temperature will result in a 4.45 percent decrease in economic growth. This is in tandem with reality and theoretical propositions by scholars, because when the weather becomes hotter, there is every tendency for agricultural seedlings to die, which results in low agricultural production. This will then affects economic growth as the contribution of agricultural sector to GDP is reduced. Zhai and Zhuang (2009) also found a moderate impact of climate change on agriculture in Southeast Asia.

The R^2 shows a value of 0.9370. This is quite high and suggests that our model fits the data well, thus, our findings can be used to predict economic situations. The statistic simply indicates that AGOU, ACGS and CLCH account for 94% of fluctuations in economic growth. The F-statistic value of 118.98 supports the variables' joint significance, indicating that the variables are statistically significant at 5%. A Durbin-Watson value of 1.56 demonstrates that the model has no autocorrelation.

Post Estimation Diagnostic Tests

Normality

Test

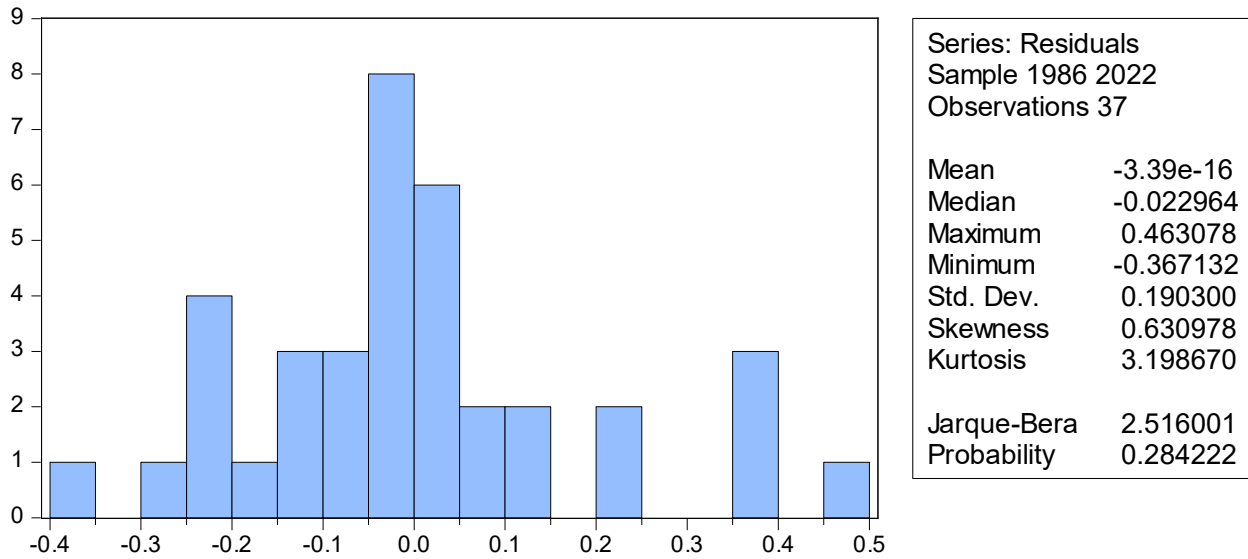


Figure 1: Histogram Normality Test

Source: Eviews 10 Output.

The normality test in Figure 1 affirms a normal distribution as the probability value of Jarque-Bera which is 0.2842 is greater than 0.05. The study therefore concludes that the model is normally distributed.

Heteroscedasticity Test

Table 4: Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.781104	Prob. F(4,32)	0.5458
Obs*R-squared	3.291255	Prob. Chi-Square(4)	0.5103
Scaled explained SS	2.706376	Prob. Chi-Square(4)	0.6081

Source: Eviews 10 Output.

The model is tested for constant variance and mean. From the result, the probability value of F-statistic is 0.5458 and it is greater than 0.05. Based on the decision rule, which states that a model is homoscedastic if the probability value of F-statistic is greater than 5 percent, the study therefore concludes that the model is homoscedastic.

5. Discussion and Conclusion

The main objective of the research is to analyze how Nigeria's agricultural sector development influences the country's economic growth using time series data from 1986 to 2022. The model's parameters were estimated using the multiple regression approach. Real GDP was a measure of economic growth, whereas agricultural output was a proxy for agricultural sector's development. In addition, the model includes the ACGS, capital expenditures by the government on agriculture, and the annual mean temperature as a proxy for climate change. The study's findings show that AGOU, CLCH, and ACGS do not contribute to economic growth. However, GCEX has a beneficial and considerable impact on economic growth. The study concludes that, during the period covered, agricultural sector has not helped to enhance economic growth despite all the policy initiatives of government. This was because emphasis has been shifted from agricultural sector since oil boom era. Thus, in order to address the problems of agriculture in enhancing economic growth in Nigeria, the following suggestions are provided.

- i. Government should see the need to develop this important sector by ensuring that capital budget allocations for agriculture are increased and the funds are expended efficiently.
- ii. A more clean energy source such as solar should be adopted in industries, every sector whose activities contribute to climate change and in homes. This will reduce the amount of heat released to already heated atmosphere that affects seedling to germinate properly. When seedlings/crops are affected due to hot weather, agricultural produce will also be affected. This will as well reduce the contribution of the sector to growth.
- iii. Agricultural credit guarantee scheme fund should be extended to the target audience, that is, farmers, and not be diverted by the manager (CBN) of these funds for other purposes. There should be an upward review of the initial 75% of the amount in default net of any security realized that can be released to farmers to 90%. This will increase the number of farmers that can access the fund, agricultural produce, and economic growth alike.

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