Original Research Article

Effect of Agricultural Sector Expenditure on Nigerian Economy Growth

ABSTRACT

The study examined the Effect of Government Agricultural Expenditure on Nigerian Economy Growth. Time series data (1981 – 2015) generated from the Central Bank of Nigeria (CBN), Federal Ministry of Agriculture and Rural Development, World Development Indicators and the National Bureau of Statistics were used in the study. Descriptive Statistics and Econometrics Model were used to analyze the data. A unit root test was carried out to ascertain the stationarity of the series. Johansen cointegration test was carried out to ascertain co-integration status of the variables. Vector Error Correction Model was used to analyze the data. after taking first differences in the data series to make them stationary. For valid inference, estimated coefficients were also subjected to normality, autocorrelation, heteroskedasticity and dynamic stability tests. The result shows that, for almost a decade, public spending on agriculture consistently decline and was below the 10% benchmark of the Maputo declaration. The findings showed the Error Correction coefficient of the model (ECM) had the expected negative sign (-0.02) and was significant at the 5% probability level, confirming the existence of a long-term relationship between Gross Domestic Product (GDP), Agricultural Output (AGOUT) and Government Agricultural Expenditure (GAE). The long-term estimates showed that GAE was positively and significantly related to GDP in the long run. It was also found to be positive and significant for three years lagged period at a 5% probability level in the short run. The coefficient of GAE indicated that 1% increase in the variable GAE caused a 31% increase in GDP. Since government expenditure has positive and significant effect on economic (GDP) growth, it is therefore recommended that government should review upward agricultural expenditure to stimulate growth in Nigerian economy, which will trigger more employment opportunity, increase per capita income and reduce poverty

Keywords: Agricultural Expenditure, Economy or Gross Domestic Product Growth

Comment [u1]: Remove all abbreviations from this section

Comment [u2]: REMOVE

Comment [u3]: Replace with could

1. INTRODUCTION

Nigeria until independence was majorly an agrarian based economy with agriculture accounting for about 64% of total Gross Domestic Product (GDP) and more than 60% of the adult work force. Its favourable and diverse agro-ecological conditions support farming of various crops, part of which formed key inputs for the manufacturing sector. Nigeria was the largest net exporter of agricultural produce in West Africa. Some of its major export produce included groundnut, soya beans, coca and palm oil. However, the discovery of oil and the civil war (1967-1970) coupled with the oil boom of the 1970s saw government expenditure to agriculture declined and consequently, agricultural sector contribution to the total GDP gradually declined to 48%. The sector began suffering from poor management, poor funding and inadequate adoption of new technologies to facilitate mechanized farming (Ukeje, 2003).

Soon after, the economy became oil dependent enjoying the gains from favourable volatilities in oil prices. This saw government total expenditure increase largely by about 83%. Unfortunately, this was short-lived by the oil crisis of 1973 (Arab oil embargo) and 1979 (Iran – Iraq war), which saw global oil prices falling, leaving Nigeria with declining foreign earning and reserves due to its heavy reliance on oil and poor fiscal policies at the time (Gbadebo, 2008). The Dutch Disease effect soon began to set in with government huge wage bills, overzealous and imprudent expenditure, and an overvalued currency that made exportation expensive and encourage import of cheaper alternatives for consumption and manufacturing inputs (Adelowokan, *et al*., 2015 and Sekumade, 2009). Nigeria recorded a negative annual GDP growth

Comment [u4]: Provide source

Comment [u5]: on

Comment [u6]: provide the year and relevant source of the information

Comment [u7]: there is not flow and link.

Comment [u8]: Provide source to avoid plagiarism

rate between 1980 to 1983, and 2016 to 2017. Also, inflation rate went high in these periods of negative annual GDP.

With negative growth rate of -2.24% at the end of 2016, it became imperative for the current government to intensify diversification efforts with agriculture at the forefront of its development plan. This gave rise to the Economic Recovery and Growth Plan (ERGP) which provides the country with a strategic growth plan to build key sectors such as the agricultural sector through infrastructure investment, accessibility to credit by the SMEs, revitalizing the fertilizer Programme and promoting local production (ERGP, 2017).

The improvements recorded by the sector in recent times can be attributed to the government's concerted efforts to diversify the economy. These include various allocations to the sector in terms of lending and budgetary provisions. Many financial windows have been made available through the intervention of the Central Bank of Nigeria (CBN), Bank of Industry (BOI), Bank of Agriculture (BOA), and Federal Government Small and Medium Enterprises (SMEs) loans. The Anchor Borrower programme of CBN / FMARD which is aimed at funding critical value chains of rice, tomato, wheat, etc. Also, the Youth Empowerment in Agriculture Programme (YEAP) is providing opportunities to the youths and women to embark on bankable enterprises in agriculture (Ogbeh, 2016). To ensure improved funding in line with its diversification drive the Federal Government budgeted ₦123.44 Billion for 2017 as against ₦75.80 Billion Agricultural budgets for 2016 (Federal Government Appropriation Bill, 2017). These efforts were further strengthened with the launch of an Agriculture Promotion Policy (APP), which seeks to address the drawbacks of the Agricultural Transformation Agenda (ATA) set by the previous administration. Unfortunately, many challenges still continue to hinder development in the sector such as inadequate access to credit, domestic consumption, forex and poor technology adoption. Other specific challenges include insufficient access to variety of seeds, access to land for investment, infrastructural deficiency majorly in power and transportation, poor commodity exchange /off-take agreement (Agricultural Promotion Policy, 2016).

In view of the above, this paper is intended to describe the trend of government agricultural expenditure and examine the effects of the government agricultural sector expenditure on economic growth. The findings from the study would provide opportunity for the government to make inform decision towards allocation of public expenditure to the agricultural sector of Nigerian economy.

Comment [u9]: Buttress your point with statistical data and citation as required.

Comment [u10]: Add ed

Comment [u11]: Add the

2. METHODOLOGY

The study employed secondary data spanned a period of 1981 to 2015 for analysis. The key sources of the secondary data include: Central Bank of Nigeria; National Bureau of Statistics; World Development Indicators.

Comment [u12]: Increase the scope to 2018. This will make this study more relevant.

2.1 Model Specification

The specification of the economic growth model is given below:

$$GDP_t = F(AGOUT_t, GAE_t) \quad \ldots\ldots (1)$$

Where,

- GDP = Gross domestic product (₦),
- AGOUT = Agricultural output (₦),
- GAE = Government Agricultural Expenditure (₦),

The stochastic form of the model is as follows:

$$\ln GDP_t = \ln \delta_0 + \delta_1 \ln AGOUT_t + \delta_2 \ln GAE_t + \mu_t \quad \ldots\ldots (2)$$

- δ0 = intercept (constant)

δ_1. δ_2 = Parameters

• μ = Error-Term.

2.1.1 Unit Root Test

Empirical research based on time series presumes that observed data are stationary. That is, such a series has a mean, variance and autocorrelation structure that do not change over time (Newbold and Granger, 1974). However, most macroeconomic and financial time series variables exhibit trends, thus making them non-stationary (Granger, 1981). When included in a regression model, non-stationary variables may result in a spurious regression problem except in the case of co-integrated regressions. With spurious regression, forecasting and policy implication drawn from such spurious regression analysis would be misleading (Nelson and Plosser, 1982). In order to check for the stationarity or otherwise of the variables in the model, this study employed the use of unit root testing procedure. This study adopted Augmented Dickey-Fuller (ADF) method propounded by Dickey and Fuller (1981). The general form of the unit root test is given below:

ADF equation:

$$\Delta \boldsymbol{Y_t} = \boldsymbol{\beta_1} + \boldsymbol{\beta_2 t} + \boldsymbol{\delta Y_{t-1}} + \sum_{i=1}^{m} \boldsymbol{\alpha}_i \, \Delta \boldsymbol{Y_{t-1}} + \boldsymbol{\varepsilon_t} \quad \textbf{..... (3)}$$

Where, ΔY= Change in the variable series to be tested; Y_{t-1}= the variable in Lagged depended form, t= trend; β, δ= estimable parameters.

2.1.2 Co-integration Test and Vector Error Correction Model (VECM)

The Johansen Cointegration Test was employed to examine the long-term relationship between the variables under study after establishing the stationarity of the variables. A linear combination of two or more I(1) series may be stationary or I(0), in which case the series are cointegrated. The null hypothesis for the Johansen Cointegration test (H_0 : r = 0) implies that cointegration does not exist, while the alternative hypothesis (H_a : r > 0) implies that it does. If the null for non-cointegration is rejected, the lagged residual from the cointegrating regression is imposed as the error correction term in a Vector Error Correction Model (VECM) given below as:

$$\Delta \mathbf{Y_t} = \prod \mathbf{Y_{t-1}} + \sum_{i-1}^{k-1} \Gamma_i \, \Delta \boldsymbol{Y_{t-1}} + \boldsymbol{\mu} + \boldsymbol{\varepsilon_t} \quad \textbf{... (4)}$$

Where: ΔY_t = First Difference of An (n x 1) Vector of the n Variables; Π = (n x n) Coefficient Matrix; Y_{t-1} = Lagged Values of Y_t; Γ = (n x (k-1)) Matrix of Short-Term Coefficients; μ = (n x 1) Vector of Constant, ε_t = (n x 1) Vector of White Noise Residuals

The underlying principle of the Johansen Cointegration Test is that if the coefficient matrix (∏) has been reduced in rank (r < n), it can be decomposed into a matrix (n x r) of loading coefficients and a matrix (n x r) of cointegrating vectors. r is the number of cointegrating relations (the cointegrating rank). The loading coefficients () indicate the cointegration relationships in the individual equations of the system and of the speed of adjustment to disequilibrium. This represents the causality in the system and the direction of the causality flows, while the cointegrating vectors represent the long-term equilibrium relationship. Johansen (1988) considered two likelihood ratio tests, namely the Trace and the Maximum Eigen Value statistic tests, which are used to determine the number of cointegrating equations given by the co-integration rank (r). The Trace statistic tests the null hypothesis of r-cointegrating relations against the alternative of k-cointegrating relations, where k is the number of endogenous variables for r = 0, 1,.., k – 1. The Maximum Eigen Value statistic tests the null hypothesis of r-cointegrating vectors against the alternative of (r + 1)- cointegrating vectors.

3 RESULTS AND DISCUSSION

3.1 The Trend of Government Agricultural Expenditure

The Figure 1 describe the trend in government agricultural expenditure. The Figures 1 showed that in the 1980s and 1990s the agricultural spending as a share of total federal spending was relatively better than that of the 2000s. Also, based on the Maputo Declaration, which recommends that 10 percent of the national budget be allocated to agriculture, Figure 1 showed that the percentage of federal agricultural spending in 1983, 1985,1986, 1990, 1997, 1999 and 2001 was above the 10 percent benchmark of the Maputo declaration by 10.8%, 17.2%, 15.8%, 10.1%, 11.1%, 39.5% and 10.9%. The outlier in 1985, 1986 and 1999 was as a result of a renewed attention of the government within the period through various reform programmes which includes Structural Adjustment Programs (SAP) in 1986 and National Economic Empowerment and Development Strategy (NEEDS) in 1999 (Innocent, 2008). Figure 3.1 showed that between 2000, 2002 – 2015 the percentage of federal government agricultural spending declined. However, between 2008 and 2010, the actual expenditure on agriculture rose from ₦55.00billion in 2007 to ₦175.72billion in 2008 (264%) through 2010, but it also consistently declined after that to 2015. Also, for the period of 2002 – 2015 agricultural spending as a share of total federal spending averaged only 3.63 percent. This figure is less than the 10 percent target set by the Comprehensive Africa Agriculture Development Programme (CAADP), (Aderibigbe *et al*., 2014). Therefore, compared with other African countries, Nigeria's Federal Government expenditure on agriculture as a share of total government spending is small.

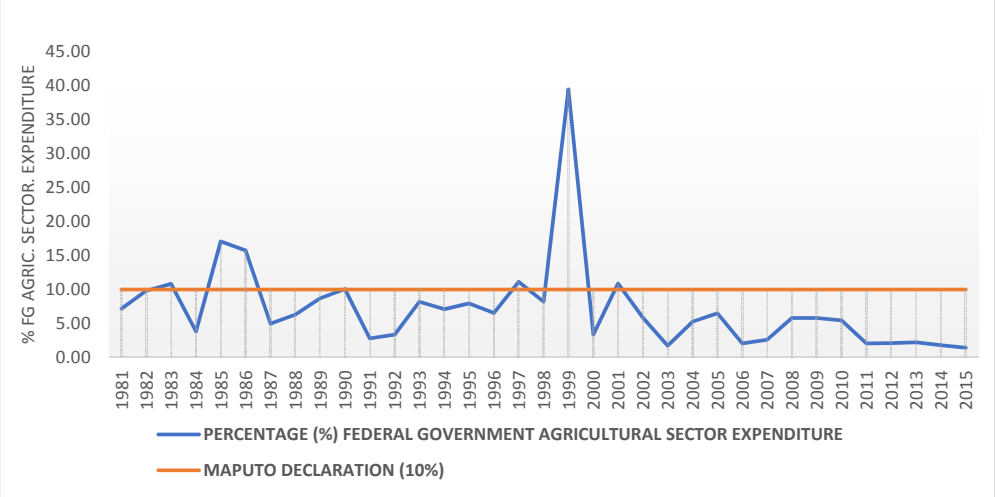

Figure 1: Trend of Government Agricultural Expenditure
Source: CBN Statistical Bulletin 2015 and FMARD

3.2 Unit Root Test Result

Table 1 shows the variable LGDP (Gross Domestic Product) was stationary at its level form. While for variable LAGOUT (Agricultural Output) and LGAE (Government Agricultural Expenditure) were not stationary at their level forms using ADF tests, indicating non-stationarity in level form. To establish stationarity property of variables: LAGOUT and LGAE, first differences of the variables were taken, and they became stationary at 1%. In summary, Table 1 shows that the order of integration of the series are mixture of I (0) and I (1) variables.

Table 1: Unit Root Test for Variables

Variable	Level ADF	First Difference ADF	t-Statistics @ 5% Critical Value
LAGOUT	-1.341	-4.024***	-2.951
LGAE	-0.711	-6.866***	-2.951
LGDP	-5.324**		-2.951

Note: (**) and (***) denote level of significance at 5% and 1% respectively

3.3 Johansen Co-integration Test Result

In Table 2, estimated cointegration result shows that there are three co- integrating equations at 5% level of significance, the Trace statistics (53.08, 22.05, 6.39) and the Max-Eigen Statistics (31.03, 15.65, 6.40) was higher than the critical value (29.80, 15.49, 3.84) and (21.13, 14.26, 3.84) indicating that there is a long-term relationship between government agricultural expenditure, agricultural output and economic growth in Nigeria; therefore, a Vector Error Correction estimation was carried out to examine the short-term relationship between the variables under study. The estimated result satisfied no autocorrelation as shown in Table 3 and was confirmed for dynamic stability through CUSUM of Square test as indicated by Figures 2. The lag length selection for the equation was determined through minimum value of Schwarz Information Criterion to choose the optimum lag length. The coefficients of the logged variables were subjected to Joint significant-test (Wald Test).

Table 2: Johansen Cointegration Test Result for variable in a Model for Economic Growth

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value
None *	0.620811	53.08270	29.79707	31.03102	21.13162
At most 1 *	0.386886	22.05168	15.49471	15.65456	14.26460
At most 2 *	0.181196	6.397119	3.841466	6.397119	3.841466

Trace and Max-eigenvalue test indicates 3 cointegrating equation(s) at the 0.05 probability level.

Table 3: Breusch-Godfrey Serial Correlation LM Test

Dependent Variable	K	F- Statistic	Remarks
$LGDP_t$	2	0.244	H_o is not rejected

K = exogenous variables in each equation

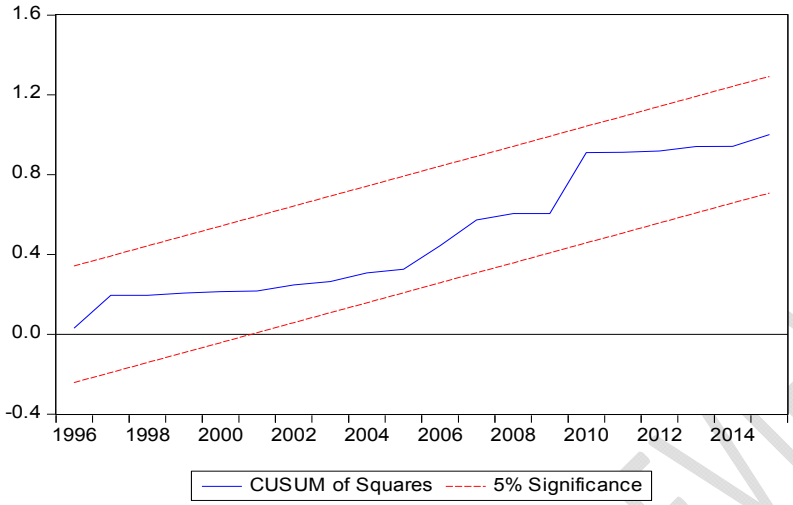

Figure 2: Dynamic Stability Test for Variables in a Model for Economy Growth

3.4 Vector Error Correction Model (VECM)

The existence of a cointegrating relationship between the dependent and independent variables as indicated by the Johansen Cointegration Test necessitated examining the short-term dynamics between the variables in the cointegrating equation by estimating the error correction model.

3.4.1 The Effects of Government Agricultural Sector Expenditure on Economy Growth

The result of the Vector Error Correction as shown in Table 4 contain long-term estimates, short-term estimates and diagnostic statistics. The R square value 0.56 implies that 56% of the variation in the Gross Domestic Product (GDP), which is the proxy for economic growth, was explained by variations in Agricultural Output (AGOUT) and Government Agricultural Expenditure (GAE). The Error Correction (ECM) coefficient of the model had the expected negative sign and was significant at the 5% probability level, confirming the existence of a long-term relationship between GDP, AGOUT and GAE. The Error Correction coefficient indicates a feedback of a about 2% of the previous year's disequilibrium from the long-term values of the independent variables. The long-term estimates showed that GAE was positively and significantly related to GDP in the long run and therefore consistent with a priori expectation. The coefficient of GAE indicated that 1% increase in the variable caused a 31% increase in GDP. Also, the long-term estimates showed that AGOUT was positively related to GDP in the long run, however, AGOUT is not significant in influencing economic growth in the long run. In the short run, all the four-years lagged period of GAE was positive in influencing economic growth. The first to third-year lagged period was significantly influencing economic growth (GDP) at 5% probability level. In addition, AGOUT was positively related to GDP in all the four lagged values and was significant in influencing economic growth (GDP) in the third and fourth-year lagged period in the short run at 5% probability level. This result is confirmed by Oyakhilomen *et al.,* (2013), who found that the relationship between government agricultural expenditure and economic growth in Nigeria is positive but not significant in the long run, while the relationship is positive and significant only for the two-year lagged value of agriculture's budgetary allocation. Ebere *et al.*, (2014) findings also collaborated this results in observing that agricultural output, government expenditure and GDP are positively related.

Table 4: Estimated Result for the Effects of Government Agricultural Expenditure on Economy Growth.

Variable	Coefficient	Std. Error	T-Statistics
Long run			
C	-5.097		
lnGDP(-1)	1.000		
lnAGOUT(-1)	0.557	0.034	-0.187
lnGAE(-1)	31.340	6.651	4.986***
Short run			
C	6.580	3.310	1.988
ΔlnGDP(-1)	0.046	0.276	0.166
ΔlnGDP(-2)	0.187	0.255	0.734
ΔlnGDP(-3)	0.047	0.264	0.176
ΔlnGDP(-4)	0.048	0.076	0.637
ΔlnAGOUT(-1)	0.019	0.021	0.920
ΔlnAGOUT(-2)	0.036	0.022	1.634*
ΔlnAGOUT(-3)	0.047	0.021	2.232**
ΔlnAGOUT(-4)	0.048	0.019	2.544**
ΔlnGAE(-1)	0.598	0.285	2.094**
ΔlnGAE(-2)	0.808	0.297	2.716**
ΔlnGAE(-3)	1.009	0.316	3.198**
ΔlnGAE(-4)	0.109	0.286	0.382
ECM(-1)	-0.019	0.007	-2.620**

R-squared	0.560	Mean dependent var	3.290
Adjusted R-squared	0.203	S.D. dependent var	3.730
S.E. of regression	3.330	Akaike info criterion	51.599
Sum squared resid	1.770	Schwarz criterion	52.254
Log likelihood	-759.99	Hannan-Quinn criter.	51.809
F-statistic	1.567	Durbin-Watson stat	1.814
Prob(F-statistic)	0.196		

Note: (*) (**) (***), denote level of significance at 10%, 5% and 1% respectively.

4 CONCLUSION AND RECOMMENDATIONS

The result shows for almost a decade, public spending on agriculture consistently decline and was below the 10% benchmark of the Maputo declaration. However, the study has been able to establish that government agricultural sector expenditure was positively and significantly related to economic growth in both long run and the short run. It was found to be positive and significant for three years lagged period at a 5% probability level in the short run. It is therefore recommended that government should review upward agricultural expenditure to stimulate growth in Nigerian economy, which will trigger more employment opportunity, increase per capita income and reduce poverty.

Comment [u13]: Your recommendation is journalistic. All recommendations should emerge on the basis of empirical findings. This is because, your model did not capture poverty, employment or even PCI.

REFERENCES

1. Adelowokan Oluwaseyi, A. and Osoba Adenike, M. (2015). Oil Revenue, Government Expenditure and Poverty Rate in Nigeria: *Global Journal of Management and Business Research: Economic and Commerce*. 15(10):2249-4588.
2. Aderibigbe, O., T. M. and Tolulope, O. (2014). Stengthening National Comprehensive Agricultural Public Expenditure in Sub-Saharan Africa: *www.worldbank.org/afr/agperprogram,* 1-16.

3. Agricultural Promotion Policy, (2016-2020). Building on the Successes of the ATA: Federal Ministry of Agriculture and Rural Development (FMARD)
4. Dickey, D.A. and Fuller, W.A. (1981). Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root. Econometrical: *Journal of the Econometric Society*. 49:1057-1072.
5. Ebere, C. and Osundina, K. (2014). Government Expenditure on Agriculture and Economic Growth in Nigeria*. International Journal of Science and Research*. 3(9): 2319-7064.
6. ERGP, (2017). Federal Republic of Nigeria Economic Recovery and Growth Plan.
7. Gbadebo, O.O. (2008). Crude Oil and the Nigeria Economic Performance: Paper Presentation to Department of Economics and Development Studies, College of Business and Social Science, Covenant University.
8. Granger, C.W.J. (1981). Some Properties of Time Series Data and their Use in Econometric Model Specification. *Journal of Econometrics*, 16(1):121-130.
9. Johansen, S. (1988). Statistical Analysis of Cointegration Vectors. *Journal of Economic Dynamics and Control*, 12:231-254.
10. NBS, (2016). National Bureau of Statistics: Nigerian Gross Domestic Product Report.
11. Nelson, C. R. and Plosser, C. R. (1982). Trends and Random Walks in Macroeconomic Time Series: Some Evidence and Implications. *Journal of Monetary Economics*, 10(2):139-162.
12. Newbold, P. and Granger, C. W. (1974). Experience with Forecasting Univariate Time Series and the Combination of Forecasts. *Journal of the Royal Statistical Society*. Series A (General), 137:131-165.
13. Ogbeh, A. (2016). An Address by Honorable Minister of Agriculture at the General Assembly of Northern Traditional Rulers' Council (NTRC) titled "Agriculture in a Recessionary Economy: Challenges and Prospects". 29th November, Abuja.
14. Oyakhilomen, O., Abdulsalam Z. and Rekwot G.Z. (2013). Agricultural Budgetary Allocation and Economic Growth in Nigeria: Implications for Agricultural Transformation in Nigeria Consilience: *The Journal of Sustainable Development*, 10(1):16-27.
15. Sekumade, A. B. (2009). The Effects of Petroleum dependency on Agricultural Trade in Nigeria: An Error Correlation Modeling Approach: *Research & Essay Journal.* 4(11):1385-1391.
16. Ukeje, R.O. (2003). Macroeconomics: An Introduction. Davidson Publication. Port-Harcourt.