



# Impact of Government Expenditure on Agricultural Productivity in Nigeria

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## Abstract

This study examined the impact of government expenditure on agricultural productivity in Nigeria within the period 1981 to 2018. The motivation for this study is the need to understand whether such impact affects agricultural productivity positively or negatively, and by implication, agricultural value chain through government spending on agriculture, health, infrastructure, and food imports. The study employed the Ordinary Least Square (OLS) technique for the analysis of the time series data with the Augmented Dickey Fuller (ADF) Unit Root Test amongst others for the preliminary tests. The Error Correction Mechanism (ECM) was used to determine the speed of adjustment of the dynamic short-run to the long-run equation, while the post diagnostic tests were performed using the ARCH, Breush-Godfrey LM, Jarque-Bera and the CUSUM of square tests. The study found that a positive and significant relationship exist between government expenditure (on agriculture, health & infrastructure) and agricultural productivity in Nigeria. Although, the result showed that government expenditure on agriculture has positive and significant impact on agricultural productivity, the coefficient of 18.34% is not strong enough as compared with the importance of the agricultural sector to the Nigerian economy. On the other hand, food imports have a negative impact on agricultural productivity in Nigeria with a coefficient of -17.50% and probability value at 0.3890. Based on the findings, the study recommends amongst others that more budgetary allocation should be channeled to the agricultural sector, which will help in subsidizing the cost of farm inputs and machineries such as fertilizer, seedling, agro-chemicals, tractors, harvesters, processing machines etc. Government should also implement policies that will encourage the production and consumption of domestic agricultural product, while discouraging or minimizing food imports, this can be achieved by placing embargo on the importation of certain food crops or high custom duty be taxed on food imports.

**Keywords:** Government expenditure; Agricultural productivity; Food imports.

## 1. Introduction

The agricultural sector had traditionally been expected to fulfill such roles as providing food for the growing population, generate foreign exchange earnings, employ part of the labour force, and provide income for farmers. Similarly, the role of government expenditure was to accommodate the expanding economic development or stimulate and induce expansion in the growth rate of the Nigerian economy. Nigeria has predominantly an agrarian economy. The importance of agricultural sector in the economy can be seen from the percentage of working population employed in this sector. Agriculture is the most inclusive occupation for the rich and the poor, for all ethnic and religious group. Agriculture continues to employ majority of the workers in the country although there has been a decline in proportion of workers engaged in agriculture (Daly, 2008). Nigeria is predominantly an agricultural society. Approximately 70% of the population engages in agricultural production at a subsistence level. Agricultural holdings are generally small and scattered. Agriculture provided 41% and 30% of Nigeria's total Gross Domestic Product (GDP) in 1999 and 2012 respectively (Haruna, 2015). This percentage represented a normal decrease of 24.7% and 35.7% from its contribution of 65.7% to the GDP in 1957. Nigerian is blessed with a wide range of climate variations, which allows it to produce a variety of food and cash crops. The staples food crop includes cassava, yams, corn, cocoyam, cowpea, beans, sweet potatoes, millets, plantains, bananas, rice, sorghum, and a variety of fruits and vegetables. The leading cash crops are cocoa, citrus, cotton, groundnuts (peanut), palm oil, palm kernel, benniseed, rubber and ginger. They were also Nigeria major export in the 1960s and early 1970s until petroleum surpassed them in the 1970s. Chief among the export destination for Nigerian agricultural exports are Britain, the United States, Canada, France, and Germany (Abdellah, 2010). Agricultural productivity is highly dependent on the way, which the farm is used, and the nature of ownership. For example in Developed Countries (DCs) such as the United Kingdom, many farms are owned by wealthy people who can afford to buy machinery. This enables the farm to run more efficiently as the processes on the farm can be completed at a quicker rate and therefore the labour efficiency becomes better as one person can perform more work in one day than if no machinery was available. This in turn then saves the employee money as less staff have to be hired so therefore the wage bill is

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lower. On the other hand, in many Less Developed Countries (LDCs) many farms are used to provide food for the family of the owner, and not primarily to create a profit (although this may occur during a good harvest). Therefore, so long as the farmer has enough labour and land to grow enough food for his family he will not try to increase the productivity. This means that it is highly likely that the productivity of farms in DCs is going to be higher than that of LDCs (Johansen, 1988). The amount of productivity is highly reliant on what the farm is used for, as shown in the example above, productivity will be lower if the intention is not to make money. However, when the intention is to make money as it nearly always is in DCs and even in many instances in LDCs where companies have set up businesses, the company/ farmer will try to exploit his land as much as he can so that it can become as efficient as possible. The food and agricultural organization (FAO) recommends that 25% of developing countries' budgetary expenditure be channeled/allocated to agricultural sector development. This has not been achieved by the various administration in Nigeria, thereby affecting government programmes and policies for the agricultural sector. Over the past years, oil prices have continued to fall, plunging the country into recession with states unable to pay salaries or execute capital projects. These figures are far cry from the 2003 AU-Maputo Declaration's Comprehensive Africa Agriculture Development Programme (CAADP) that requires African countries to allocate at least 10 percent of their annual budgets to agriculture and achieve six percent annual growth in agricultural GDP. CAADP is Africa's policy framework for agricultural transformation, wealth creation, food security and nutrition, economic growth and prosperity for all, which Nigeria is a signatory.

The Agricultural sector has witnessed remarkable policy changes since the Nigerian vision 20:2020 (NV 20:2020) was launched in 2009. The first implementation plan (2010 – 2013) was ongoing when the agricultural transformation agenda (ATA) came on stream in 2011 and lasted until 2015. In August 2016, the agriculture promotion policy (otherwise known as the Green Alternative) was launched. As the nation experienced these different phases of strategic plans there has been no systematic framework of reviewing the performance of the sector to provide evidence-guide policy decisions and development strategies (Olamola and Moques, 2018). A regular review is required for proper planning, identification of priorities and setting of targets not only to achieve meaningful transformation of the sector but also to synchronize the sector's development with the nation's medium and long-term development objectives. These policies blueprints together provide insights on national priorities in agriculture, guiding policies, policies strategies, and responsibilities of the Federal, State, and Local governments in delivery public agricultural goods and service. Budgetary allocation to agriculture compared with other key sectors is also low despite the sectors role in the fight against poverty, hunger, and unemployment, and in the pursuit of economy development (Olamola and Moques, 2018). Governments spending on health, infrastructure, and education also have replicated effects on the performance of the agricultural sector; this is stemmed from the fact that the health of the farmer and literacy level go a long way in improving the farmer productivity. Therefore, the share of government expenditure on agriculture in total government spending can be taken as an indicator to measure how much attention the government gives to the sector. Agricultural productivity has fluctuated widely and productivity has declined. In terms of contribution to GDP, available statistics from the Central Bank of Nigeria (CBN) shows that the agricultural sector's share of GDP increased from 28% in 1985 to 32% in 1988, dropped to 31% in 1989, rose to 37% in 1990 but fell significantly to 24 percent in 1992, it increased again to 37% in 1994. It was 32% in 1996 and rose to 40% in 1998, dropped again to 27% in 2000, increased to 37% and fell to 31% in 2002 and 2006 respectively. The percentage contribution of the agricultural sector to GDP fell persistently from 0.37 in 2009 to 0.22 in 2012 and to 0.20 in 2014 (Matthew and Mordecai, 2016).

## 2. Statement of the Problem

Nigeria is endowed with vast Agricultural land which supports both food and cash crops but the populace are starved due to low productivity and high price of imported foods, this has made government agencies at all level (Federal, state and local) to introduce various agricultural policies to boost agricultural productivity. However, the economy has failed to respond to these unending policies due to the inconsistency nature of the policies. The policy makers points accusing fingers to the citizens linking the failure of the policies to over-dependence on foreign goods and neglect of the agricultural sector by the citizens in search for white-collar jobs. The citizens points accusing fingers to the government linking the failure of policies to high rate of corruption, embezzlement and wrong policies by the leaders. All these made the agricultural sector stagnant and the economy is faced with problems such as unemployment, inflation, recession, low price of local produce, over-dependence on one sector, low agricultural productivity etc. Large percentage of Nigeria's farmer seems not to benefit from government expenditure in the agricultural sector. Thus, the intended objectives and goals of government expenditure have been largely defeated.

Nigeria has consistently had deficit spending over the years without equivalent rate of economic growth. Data shows that output of Nigeria has been fluctuating for some years and the sources of these shocks may not be clear. This has led to heavy importation of food crops to meet up with the country consumption over the years. In 2018, the federal government spent N172.8 billion on agriculture, representing 2 percent of its total budget of N8.6 trillion for the year. N53.8 billion is for recurrent, while N118.9 billion is for capital votes. In 2017, of the N7.3 trillion budgets for the year, the federal government voted only N123 billion (1.6 percent) for agriculture. Salaries and overheads got N31.7 billion while the remaining N91.6 billion was for capital projects. The central government spent N75.8 billion (1.26 percent) on agriculture in 2016 out of its total budget of N6 trillion. N29.6 billion of the amount was for bureaucratic expenses, leaving N46.17 billion for agric service (Nurudden, 2018). Agriculture, which accounted for 25% of GDP in 2017, grew by 4.23% in Q4 2017; the Federal Government estimated 3.5% growth in 2018 is quite achievable (Adekunle, 2018). It is expected that as the public expenditure expands, output is expected to expand also, because public expenditure should be translated into output growth. Alternatively, does it imply that much of the public expenditure finds their ways into some other paths different from the intended routes? In Nigeria, the key

challenge for the government has been to increase productivity of all agriculture and horticulture crops in the country to keep pace with the growing need of the population. However, efforts on the part of agriculture sector have not yet produced the desired outcome; this is partly due to the inconsistency in agriculture policies, low expenditure on agriculture, problem of food insecurity etc. Government expenditure results in more inefficiency and wasteful allocation of resources. Government expenditure has not succeeded in solving the problem of low agricultural productivity in Nigeria due to: poor incentives in public sector, lack of information, bureaucracy and administration costs higher in public sector and decision taken for political reasons. Therefore, the question arises if government expenditure in the country has any significant and positive impact on the agricultural productivity in Nigeria. This raises the question of what need to be done to improve the performance of the agricultural sector in order to realize its full potential. With the above problem at hand, we tried to analyze the impact of Government expenditure on agricultural productivity in Nigeria.

### 3. Research Questions

1. To what extent has government expenditure on agriculture impacted agricultural sector productivity in Nigeria?
2. Does Government expenditure impact significantly on agricultural value chain in Nigeria?
3. Does Government Expenditure has any short-run and long-run relationship with agricultural sector performance in Nigeria?

### 4. Aims and Objectives of the Study

The aim of this research is to investigate the impact of government expenditure on agriculture productivity in Nigeria over the period 1981- 2018. The findings of this study will be useful for the Economic planners who are responsible for allocating budgetary for the growth and development of the agricultural sector.

Specifically, this research aims to achieve the following objectives.

1. To assess the impact of government expenditure on agriculture on agricultural productivity in Nigeria
2. To determine whether government expenditure has impacted significantly on agricultural value chain in Nigeria.
3. To evaluate the short-run and long-run relationship between government expenditure and agricultural sector performance in Nigeria.

### 5. Hypotheses

**H<sub>0</sub>:** Government expenditure on agriculture has no significant impact on agricultural productivity in Nigeria.

**H<sub>0</sub>:** Government expenditure does not significantly impact on agricultural value chain in Nigerian.

**H<sub>0</sub>:** Government expenditure does not have short-run and long-run relationship with agricultural sector performance in Nigeria.

### 6. Literature Review

The Nigerian economy was primarily propelled by agriculture before the oil boom of early 1970s. It had been the main stay of the economy and a potent foreign exchange earner for the country. The advent of the oil boom in the 1970s led to diminishing returns in agricultural productivity in the country, agricultural output both for domestic consumption and exports began to decline. The decline in agricultural production was because of oil glut, which led to increase in economic activities particularly in the manufacturing sector. Despite the issues that have led to the declining power of agriculture in Nigeria, the sector is still important in providing employment to majority of the population who reside in the rural areas and it remains the main stay of the economy in the provision of food and raw materials for industries. There has been conscious effort in recent years about the size of government expenditure in agricultural sector. All these efforts are geared towards the expansion of government public expenditure for improvement in agricultural productivity. Such expansion, it is argued, would increase aggregate demand and would increase the ability of market forces to function in the allocation of resources (Abizadeh and Bailevsky, 2000). Government expenditure refers to the expenses, which the government incurs for its own maintenance and for the society, by expanding state activities. It is becoming increasingly difficult to classify the portion of government expenditure that includes the maintenance of government and those that go into benefiting the other sectors of the economy. Government expenditure is found to be continually increasing over time in almost all countries and with unprecedented growing importance in national economy especially in developed countries (Bawa, 2018). However, some government expenditures are in return for goods and services that are part of recurrent output while some represent sacrifice for future benefits.

There have been a number of studies on the impact of government expenditure on agriculture and general wellbeing of a group of people; however, they got different results depending on the sample or methods used.

Ugwu and Kanu (2012), estimated the effect of agricultural reforms on agricultural sector in Nigeria, using time series data. The study employed descriptive statistics as the technique of analysis such as: percentages, means, averages, frequency, tables, and chats. Result from the empirical findings shows the effect of budgetary reforms on agricultural sector to be unsatisfactory in view of its contributions to the sector. They concluded that increase in agricultural sector budgetary expenditure is needed before the agricultural sector could regain improve in productivity and regain its lost glory as the engine drive of Nigeria's economy.

Laudau (1986), examined the relationship between government expenditure, revenue, and economic growth using a cross section data of 96 countries covering 1961-1976. The government expenditure is divided into five categories: consumption, education, defense, transfers, and capital expenditure. He estimated his model by using ordinary least square (OLS) method. The results indicated that each type of government expenditure has either significant negative or insignificant positive effect on economic growth.

Evbuomwan (2013), focused on problems and prospects of budgeting and budget implementation in local government system in Nigeria. The study adopted a comparative empirical analysis as its method; in light of descriptive statistics. The study asserted that the basic issue affecting budgeting and budget implementation in Nigeria is that the governing body must adopt sound accounting procedures, maintain adequate and effective system of account for safeguarding assets, as well as devise a good system of internal control.

Bello (2005) explored the impact of public investment and FDI on economic growth, and he investigated the effect of public investment on FDI using panel data of 105 of developed and developing countries over the period 1970-2003. The results show that both public investment and FDI have a positive relationship with economic growth; however, the threshold results indicate that the growth effect of FDI on economic growth becomes weaker when public investment exceeds 8-9%. He explained the results by pointing out that an excessive public investment could hinder the benefit from FDI.

Ram (1988), has found positive relationship between government spending and economic growth. The work of Grossman (1988) utilized a simultaneous equation model making allowance for a non-linear relationship between growth in government spending and total economic growth, while that of Ram (1988) was based on a production function approach. Oyinbo, Zakari and

Rekwot (2013), estimated the effect of agricultural budgetary allocation on agriculture performance and economic growth in Nigeria: Implication for agricultural transformation in Nigeria, using time series data spanning from 1980-2010). The study employs augmented dickey-fuller unit root test procedure, and Error correction model as the technique of analysis. Result from the findings shows that there is a positive relationship between budgetary allocation and agricultural output in the long- run but not in the short-run.

Ekeocha and Chukwuemeka (2012), carried out an analysis of the federal budgeting process in Nigeria: implications for institutional reforms for achieving timeliness. In their findings, using content analysis techniques, they posited that ability to make timely and sensible fiscal choices is one of the hallmarks of good governance. They concluded that there is need for institutional reforms that will correct the identified lapses if timeliness is to be achieved in the budgeting process, thus making budget process effective.

Using empirical analysis (Abdullahi, 2011) says state government budget in Nigeria in its nature is a control device itself, which specifies expenditures for projects and expressed in monetary estimates and this will show the function of government budget as a clear tool for controlling the posture of government at all levels. In the end, he recommends, among others that budget should portray peoples' needs and not the wants of the elites thereby serving as the government policy thrust.

Demenongu *et al.* (2014), estimated the trends in budgetary expenditure on the agricultural sector in Nigeria, using secondary data. Secondary data in the form of budgetary expenditure were sourced from various publications of Central Bank of Nigeria (CBN) and Federal of Statistics (FOS). The study employed Johansson Co- integration test procedure and Ordinary Least Square (OLS) regression analysis. Result from the co- integration test showed a long- run relationship between budgetary expenditure and agricultural sector in Nigeria. While the fitted trends equations showed that budgetary expenditure on agriculture was generally low and insignificant at  $P > 0.05$ . They concluded that budgetary expenditure so far has been insufficient to stimulate the agricultural sector productivity in Nigeria.

Eghe and Paul (2015), in their study on "budget implementation of public policy in Nigeria," they found out that incessant budget failure often happen at the stage of formulation and implementation. They argued further that factors responsible for the failure were; delay in preparation, late submission, and appropriation, cumbersome bureaucratic process of securing release of funds, shortfall in revenue, poor implementation plan, and above all corruption. The study, which was done using content analysis, was concluded by suggesting ways forward. These include; effective monitoring, timely submission of budget to the legislature by the presidency, discouragement of unnecessary lobbying of national assembly by ministries departments and agencies as well as avoidance of temptations of allocating huge amount to new projects while the on – going projects are starved of funds.

Njoku *et al.* (2013), conducted an assessment of Nigeria expenditure on the agricultural sector: Its relationship with agricultural output, using secondary data. Time series data spanning from 1980-2011 were sourced from Central Bank of Nigeria (CBN), annual report and statement of account, Journal of Food Research and Federal Office of Statistics. It employs the Engle-Granger 2 step modeling (EGM) procedure to co-integration based on unrestricted Error Correction Model and Pair wise Granger Causality tests. From the analysis, their findings indicate that agricultural contribution to GDP (Gross domestic product) and total government expenditure on agriculture are co-integrated in the study. The speed of adjustment to equilibrium is 88% within a year when the variables wander away from their equilibrium values. Based on the result of granger causality, the paper concludes that a very weak causality exist between the two variables used in the study. Therefore, the policy implication of their findings is that any reduction in government expenditure on agriculture would have a negative repercussion on agricultural output in Nigeria.

Devaranjan *et al.* (1996), studied the relationship of public expenditure and economic growth using a sample of 43 developed and developing countries over the period 1970-1990. The results indicate that public capital expenditure has a negative effect on economic growth for developing countries, and the effect gets dramatically reverse for developed countries. They explained the results by suggesting that expenditures normally considered

productive could become unproductive if there is an excessive amount of them. They concluded by indicating that policymakers have been misallocating their resources by excessive public investment. The results are also supported by [Gregonous and Ghosh \(2007\)](#) in an optimal fiscal policy framework of developing countries.

[Iganiga and Unemhlin \(2011\)](#), estimated the impact of federal government agricultural expenditure on agricultural output in Nigeria, using secondary data spanning from 1970-2008 and Cobb Douglas Growth Model, Descriptive Statistics and Econometrics Model were used to analyze the data. Co-integration and Error Correction methodology were employed to draw out both long-run and short-run dynamic impacts of these variables on the value of agricultural output. Federal government capital expenditure was found to be positively related to agricultural output. With a one-year lag period, it shows that the impact of government expenditure on agriculture is not instantaneous and the adjustment mechanism was found to be slow. The policy impact of the study is that investment in the agricultural sector is very imperative and this should be complemented with monitored credit facilities.

[Ebere et al. \(2012\)](#), investigated the impact of government expenditure on agriculture and economic growth in Nigeria, using secondary data. Time series data of 33 years sourced from the Central bank of Nigeria was used. Ordinary Least Square (OLS) technique of data analysis was used in evaluating the secondary data. GDP was used as a proxy to economic growth, while agricultural output and government expenditure on agriculture were used as indicators of government expenditure on agriculture. From the findings; agricultural output, government expenditure, and GDP are positively related. It was found that a significant relationship exist between government expenditure in the agricultural sector and the economic growth in Nigeria. The findings also revealed that the sector still encounter some problems like inadequate finance, poor infrastructure, and others. Therefore, the study recommends that it is imperative for the country to develop its agricultural sector through sufficient government spending in order to set-up its economic growth.

[Eboh and Oduh \(2012\)](#), on their own part observed that the contemporary economic significance of agricultural sector is even more remarkable. They opined that in the past half a decade, the impressive growth rate of the nation's economy has been driven by the non-oil sector, particularly the agricultural sector.

[Adoful and Agama \(2012\)](#), estimated the effect of government budgetary allocation on agricultural output in Nigeria, using time series data. Using government budgetary allocation to the agricultural sector and commercial bank credit to the agricultural sector as their explanatory variables, they examined the effect of government budgetary allocation to the agricultural sector on the output of the agricultural sector. Data were obtained from CBN's Statistical Bulletin and NBS's Annual Abstract of Statistics. Employing the OLS regression technique, their results revealed that budgetary allocation to agricultural sector has significant effect on agricultural production in Nigeria and that the relationship between them is strong, positive, and significant. Thus, the study recommends that budgetary allocation to the agricultural sector should be increased and monitored to guarantee food security, employment and overall economic growth and development in Nigeria.

## 7. Theoretical Framework

This research is anchored on Wagner's theory of increasing government activities. According to Wagner, there is an inherent tendency for the activities of the government at different layers e.g. Federal, State and local government to increase extensively and intensively. As the time passes, various levels of government undertake new functions. This means that the range of activities carried out within the public sector is extended. This process of adding new activities may be termed as extensive growth in government services. On the other hand, the tendency of the governments to perform both old and new functions more efficiently and completely is called intensive growth in public activity. Wagner hypothesized that as per capita income increases due to industrialization; there is a secular growth in public sector economic activity. The growth of public sector is attributed to three factors: (i) Most countries have registered increasing urbanization. Urbanization implies a much larger per capita expenditure on civil amenities that are needed to deal with the increased population and urbanization. (ii) Societies are experiencing a growing population which leads to the increase in 'cultural and welfare' expenditures, particularly for education and the redistribution of income because of elastic nature of income elasticity of demand for cultural and welfare expenditures. (iii) Rise in public investment activity because of market failure and because of the monopolistic trends, which require state intervention in the form of nationalization or monopoly control.

Therefore, Wagner's Law refers only to those states in which income is rising because of industrialization and excludes explicitly the 'non-progressive' societies. In this connection [Bird \(1971\)](#) has pointed out that "the conditions under which one might expect the 'Law' to operate would therefore, seem to be (i) rising per capita income; (ii) technological and institutional changes of a particular sort; and (iii) at least implicitly, democratization in the sense of wider political participation of the polity" " ([Bird, 1971](#)). Wagner's model, while containing many insights, suffered from the drawback that it did not contain a well-articulated theory of public choice. Indeed, Wagner assumed away the problems of public choice by employing an organic theory of the state'. According to him, the state was assumed to behave as it were an individual existing and making decision independently of the members of society ([Bird, 1971](#)).

In spite of the criticism of Wagner's Law, it continues to play an important role in the study of public expenditure behaviors. According to Wagner's Law, there is a functional relation between the growth of an economy and the government activities with the result that the government sector grows faster than the economy. From the original version of this theory, it is not clear whether Wagner was referring to an increase in (a) absolute level of public expenditure, (b) the ratio of government expenditure to GNP, or (c) proportion of public sector in the total economy. Musgrave believes that Wagner was thinking of (c) above. Wagner's Law has been interpreted in terms of the concept of elasticity. It suggests greater than unity income elasticity for a number of public goods. According to

this Law, the percentage change in the public expenditure is greater than percentage change in GNP or national income.

## 8. Methodology

The Ordinary Least Square (OLS) technique in a multiple regression analysis is adopted for the purpose of this research. This is justified based on the time series data collected and the structure of the linear model formulated. This study adopts a time series, Ordinary Least Square (OLS) and dynamic (Error Correction Model) framework to evaluate the impact of government expenditure on agricultural productivity in Nigeria from 1981 – 2018. Multiple regression econometrics technique of analysis is adopted and applied to adequately capture and explain the impact of the explanatory variable, Government expenditure on the dependent variable, agricultural productivity. Government expenditure has components on health, infrastructure and food imports. Data is presented in the appendix.

### 8.1. Model Specification

The model for this study comprises one functional equation. The functional equation is of the form:

$$AOUTP_t = f(GEXAG_t, GEXHE_t, GEXIN_t, FDIMP_t) \quad (2)$$

Econometrically, equation (2) can be written as:

$$AOUTP_t = \alpha_0 + \alpha_1 GEXAG_t + \alpha_2 GEXHE_t + \alpha_3 GEXIN_t - \alpha_4 FDIMP_t + \mu_{2t} \quad (3)$$

With a priori expectations of  $\alpha_1 > 0, \alpha_2 > 0, \alpha_3 > 0, \alpha_4 < 0$ .

Where:

$AOUTP_t$  = Agricultural Output (Proxy by Agriculture Productivity) in period t

$GEXAG_t$  = Government Expenditure on Agriculture in period t.

$GEXHE_t$  = Government Expenditure on Health in period t.

$GEXIN_t$  = Government Expenditure on Infrastructure in period t.

$FDIMP_t$  = Food Imports in period t.

$\mu_{2t}$  = error terms that capture the other variables not included in equation (3).

t = time trends.

$\alpha_1, \alpha_2, \alpha_3$  and  $\alpha_4$  are the parameters.

In equation (3) above,  $\alpha_0$  is a constant while  $\alpha_1, \alpha_2, \alpha_3$  and  $\alpha_4$  are the parameters of the explanatory variables to be estimated in conformity with the first hypothesis which state that; Government expenditure on agriculture has no significant impact on agricultural productivity in Nigeria. The a priori expectations (sign) of the variables represented by their respective coefficients are expected to be positive while food imports (FDIMP) is expected to be negative. This implies that such explanatory variables as: Government Expenditure on Agriculture, Government Expenditure on Health, Government Expenditure on Infrastructure are expected to impact positively on Agricultural productivity (Agricultural Output), while Food Imports is expected to impact negatively on agricultural productivity. The analysis employed for this model is the multiple regression analysis.

### 8.2. Estimation Results

#### 8.2.1. Error Correction Mechanism (ECM)

Error Correction Mechanism (ECM) result is shown in table 1. The ECM shows the speed of adjustment from short-run to long-run equilibrium. The a priori expectation is that the ECM coefficient must be negative and significant for error to be corrected in the long-run. The purpose of ECM is to capture the short-run deviation that might have occurred in estimating the long- run co- integration equation. The ECM was estimated with respect to the dependent variable, AOUTP using the Ordinary Least Square (OLS). The higher the ECM, the more the speed of adjustment (Johansen, 1988).

Table-1. Error Correction Model (ECM) Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.189325	0.028119	6.732958	0.0000
D(LOGGEXAG)	0.045327	0.046735	0.969881	0.3399
D(LOGGEXHE)	0.025428	0.035307	0.720190	0.4770
D(LOGGEXIN)	-0.030330	0.059203	-0.512311	0.6122
D(LOGFDIMP)	0.020035	0.082968	0.241478	0.8108
ECM(-1)	-0.177255	0.072566	-2.442669	0.0207
R-squared	0.206908	Mean dependent var		0.200672
Adjusted R-squared	0.074726	S.D. dependent var		0.161039
S.E. of regression	0.154905	Akaike info criterion		-0.741000
Sum squared resid	0.719865	Schwarz criterion		-0.477081
Log likelihood	19.33801	Hannan-Quinn criter.		-0.648885
F-statistic	1.565330	Durbin-Watson stat		1.624208
Prob (F-statistic)	0.001014			

Source: Author’s Computation using Eviews 9

The ECM parameter as indicated in table 1 above is negative and significant at 5% level as expected. The ECM is an error correction term in the model to restore equilibrium and validate that there exist a long-run equilibrium

relationship between the variables. The value of the ECM is -0.177255%, meaning that the system corrects (or adjust) to equilibrium in the following year at speed of -17.73. This implies that the adjustment process to equilibrium is slow because of the lower ECM value. The ECM estimates the rate of occurrence at which the dependent variable, AOUTP becomes stable after a change in other such variables as: GEXAG, GEXHE, GEXIN, and FDIMP. In this case, a negative value (-0.177255) of the ECM implies that the state of stability of the model is restored in less than a year. This means that the model tends towards stability, but at a slow pace.

### 8.3. Ordinary Least Square (OLS) Result

The result of the estimated model using the OLS method is presented in table 2.

Table-2. Ordinary Least Square Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.103734	0.541578	11.27027	0.0000
LOGGEXAG	0.183400	0.088419	2.074224	0.0459
LOGGEXHE	0.460548	0.101282	4.547190	0.0001
LOGGEXIN	0.222136	0.111486	1.992500	0.0546
LOGFDIMP	-0.175019	0.200485	-0.872975	0.3890
R-squared	0.979141	Mean dependent var		7.047504
Adjusted R-squared	0.976613	S.D. dependent var		2.459980
S.E. of regression	0.376202	Akaike info criterion		1.004701
Sum squared resid	4.670434	Schwarz criterion		1.220173
Log likelihood	-14.08931	Hannan-Quinn criter.		1.081364
F-statistic	387.2638	Durbin-Watson stat		1.758327
Prob(F-statistic)	0.000000			

Source: Author's Computation Using E- views 9

### 8.4. Interpretation of Regression Estimates

Table 2 shows that all the OLS estimates have their expected sign, which conform with the a priori expectation stated in chapter four (4.6). From the OLS result, the multiple regression equation becomes:

$$\text{LOGAOUTP} = 6.103734 + 0.183400\text{LOGGEXAG} + 0.460548\text{LOGGEXHE} + 0.222136\text{LOGGEXIN} - 0.175019\text{LOGFDIMP}$$

**AOUTP (proxy Agricultural productivity) ( $\alpha_0$ )** is 6.103734 when all other variables are held constant.

**GEXAG ( $\alpha_1$ )** is 0.183400 and has a positive relationship with AOUTP; this conforms to the economic a priori expectation of a positive impact of government expenditure on agricultural productivity. If GEXAG increases by 1 percent, AOUTP will increase by 18.34 percent.

**GEXHE ( $\alpha_2$ )** is 0.460548 and has a positive relationship with AOUTP; this also conforms to the a priori expectation. Hence, if GEXHE increases by 1 percent, AOUTP will rise by 46.0548 percent.

**GEXIN ( $\alpha_3$ )** is 0.222136 and has a positive relationship with AOUTP; this also conforms to the a priori expectation. Hence, if GEXIN increases by 1 percent, AOUTP will increase by 22.2136 percent.

**FDIMP ( $\alpha_4$ )** is -0.175019 and has a negative relationship with AOUTP; this is in conformity with the a priori expectation. Hence, if FDIMP increases by 1 percent, AOUTP will fall by 17.5019 percent.

Test for Individual Significance

#### 8.4.1. Test of Significance for GEXAG

**H<sub>0</sub>:** Government expenditure on agriculture has no significant impact on agricultural productivity in Nigeria.

**H<sub>1</sub>:** Government expenditure on agriculture has significant impact on agricultural productivity in Nigeria.

If P- value > 5% (0.05), accept H<sub>0</sub> and reject H<sub>1</sub>

If P- value < 5% (0.05), reject H<sub>0</sub> and accept H<sub>1</sub>

P- value = 0.0459

**Decision:** Since P- value = 0.0459 < 0.05, the alternative hypothesis (H<sub>1</sub>) is accepted and it is concluded that Government expenditure on agriculture has significant impact on agricultural productivity in Nigeria at  $\alpha = 5\%$  level of significance.

#### 8.4.2. Test of Significance for GEXHE

**H<sub>0</sub>:** Government expenditure on health has no significant impact on agricultural productivity in Nigeria.

**H<sub>1</sub>:** Government expenditure on health has significant impact on agricultural productivity in Nigeria.

If P- value > 5% (0.05), accept H<sub>0</sub> and reject H<sub>1</sub>

If P- value < 5% (0.05), reject H<sub>0</sub> and accept H<sub>1</sub>

P- value = 0.0001

**Decision:** Since P- value = 0.0001 < 0.05, the alternative hypothesis (H<sub>1</sub>) is accepted and it is concluded that Government expenditure on health has significant impact on agricultural productivity in Nigeria at  $\alpha = 5\%$  level of significance.

#### 8.4.3. Test of Significance for GEXIN

**H<sub>0</sub>:** Government expenditure on infrastructure has no significant impact on agricultural productivity in Nigeria

**H<sub>1</sub>:** Government expenditure on infrastructure has significant impact on agricultural productivity in Nigeria.

If P- value > 5% (0.05), accept H<sub>0</sub> and reject H<sub>1</sub>

If P- value < 5% (0.05), reject H<sub>0</sub> and accept H<sub>1</sub>

P- value = 0.0546

**Decision:** Since P- value = 0.0546 < 0.05, the alternative hypothesis (H<sub>1</sub>) is accepted and it is concluded that Government expenditure on infrastructure has significant impact on agricultural productivity in Nigeria at  $\alpha = 5\%$  level of significance.

#### 8.4.4. Test of Significance for FDIMP

**H<sub>0</sub>:** Food import has no significant impact on agricultural productivity in Nigeria.

**H<sub>1</sub>:** Food import has significant impact on agricultural productivity in Nigeria.

If P- value > 5% (0.05), accept H<sub>0</sub> and reject H<sub>1</sub>

If P- value < 5% (0.05), reject H<sub>0</sub> and accept H<sub>1</sub>

P- value = 0.3890

**Decision:** Since P- value = 0.3890 > 0.05, the null hypothesis (H<sub>0</sub>) is accepted and it is concluded that Food import has no significant impact on agricultural productivity in Nigeria at  $\alpha = 5\%$  level of significance.

#### 8.4.5. Joint Test

**H<sub>0</sub>:** GEXAG = GEXHE = GEXIN = FDIMP = 0 at  $\alpha = 5\%$  level of significance.

**H<sub>1</sub>:** GEXAG  $\neq$  GEXHE  $\neq$  GEXIN  $\neq$  FDIMP  $\neq$  0 at  $\alpha = 5\%$  level of significance.

If Prob(F- statistic) > 5% (0.05), accept H<sub>0</sub> and reject H<sub>1</sub>

If Prob(F- statistic) < 5% (0.05), reject H<sub>0</sub> and accept H<sub>1</sub>.

### 9. Conclusion

In line with the empirical analysis, this study concludes that Government Expenditure on Agriculture, Government Expenditure on Health, Government Expenditure on Infrastructure, and Food Imports have a joint impact on Agricultural Productivity (AOUTP) in Nigeria. Government expenditure significantly impact on agricultural value chain in Nigeria. Government expenditure has short- run and long- run relationship with agricultural sector performance in Nigeria in the period 1981-2018.

The following recommendations are made based on the findings of this study:

- i. It is recommended in the light of the study that, for Nigeria to develop, budgetary expenditure on the non-oil sectors, especially the agricultural sector should not be underestimated, thus, by all available means, the government should improve and encourage the output of the agricultural sector.
- ii. More budgetary allocation should be channeled to the agricultural sector, which will help in subsidizing the cost of farm inputs and machineries such as fertilizer, seedling, agro-chemicals, tractors, harvesters, processing machines etc. This will encourage the citizens of the country to go into farming and agrobusiness, consequently, rising agricultural output.
- iii. The expenditure on health should be maintained or improved where necessary, this will help in providing all the health consumables needed in Nigerian hospitals and veterinary centers, hence, reduce the cost of treatment to farmers and their livestock, thereby, reducing the out of pocket expenditure by the farmers. This will encourage farmers to have access to the hospital and veterinary centers and take care of their health and that of their livestock, thereby improving agricultural productivity.
- iv. More resources should be invested in the construction and maintenance of good access road that links farmlands with markets, accessibility is a necessary condition to convey farm instruments such as; modern machines, fertilizers, and other necessary equipment and materials to the farmlands. Those farmlands that are linked to good access road will be more productive than those that are not, because without getting such instruments and materials to the farmlands, they cannot be put into use. Consequently, agricultural output will fall.
- v. The government should also put in place policies that will encourage the production and consumption of domestic agricultural product, while discouraging or minimizing food imports, this can be achieved by placing embargo on the importation of certain food crops or high custom duty be taxed on food imports.
- vi. Proper monitoring of the budgetary allocation to agriculture, health and road constructions & maintenance should be done to reduce corruption and mismanagement of the funds allocated to the sectors, this can be done by any of the anti-graft agencies (Economic and Financial Crimes Commission, Independent Corrupt Practices and Others Related Offences Commission). This will help in curbing embezzlement of funds, thereby, improving agricultural productivity.
- vii. Government should encourage savings by providing incentives to create an investment climate that boost agricultural output and hence, improve agricultural productivity. This can be achieved through public-private partnership in the establishment of cottage industries (at least four (4)), in each geo-political zone, where each zone has a comparative cost, weather, and soil advantage over others. This will also help in adding value to locally produced goods before exports.



- viii. Dams should be built in the villages to ensure all year round farming activities. This is expected to enhance agricultural output, generate employment opportunities and income, and serve as a sustained reservoir of raw materials to feed the industries and meet the food needs of Nigerians.

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