

# Government Agricultural Spending and Agricultural Output in Nigeria (1999-2012)

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**Abstract:** - This paper examines the effect of government agricultural spending on agricultural output in Nigeria. The model built for the study proxy Agricultural Output as the endogenous variable, a function of rate of government expenditure on agriculture, management level (dummied), technological level (dummied), labour in use proxy as the exogenous variables. Annual time series data was gathered from central bank of Nigeria, statistical bulletin, national bureau of statistic (NBS) CBN economic and financial Review bulletin and CBN annuals reports spanning from 1999 to 2012. The study used descriptive test statistic and econometric techniques of Augmented Dickey- Fuller (ADF) unit root test, and Engle Granger single line co-integration test for empirical analysis. The results of unit root suggested that, all variables in the model are stationary at a level. The co-integration test shows that, long-run equilibrium relationship exist among the variables. The study recommends that measures should be undertaken to drive agricultural sector through consistent policies, robust funding, and infrastructural development, judicious use of allocated resources and above all, a genuine democracy and good governance in Nigeria in order to achieve a corresponding output/performance of the sector in Nigeria.

**Keywords:** Agriculture, Government Expenditure, Capital and Technology

**JEL Classification:** E22, Q14, O33

## I. INTRODUCTION

A strong and an efficient agricultural sector will enable a country to feed its growing population, generate employment, earn foreign exchange and provide raw materials for industries worldwide. The sector has a multiplier effect on any nation's industrial and economic development both developed and developing economies because of the multifunctional nature of agriculture.

In developing countries particularly Africa, agriculture serves as the mainstay of the continent and that the public sector absorbs a relatively large share of country's economic resources. The development process itself leads to a variety of economic activity which in turn leads to further growth in the economy.

In Nigeria, Agriculture serves as the engine of growth as well as the pride of the nation hitherto the oil boom in the 1970s. Agriculture in whatever form it comes or exists (i.e food and cash crops production, livestock poultry, animal husbandry, hunting and horticulture) has its roles to play in any nation's economic growth and development. Among these

roles are sources of food for the growing population, raw materials for the manufacturing sector, reduction of inflationary pressure, earner of foreign exchange, empowerment of the labour force, source of income and savings for the farmer and improvement in their living standards, and market for products of the manufacturing sector (Jhingan, 2002).

Prior to independence, Nigerian economy was principally an agrarian economy because agriculture was the engine of growth of the overall economy. Agriculture was the most vibrant sector of the economy and effectively dominated the other sectors of the economy. In fact, it was then regarded as the pride of the nation. Through its linkages, the sector facilitated the other sectors of the economy leading to rapid economic growth. Its contribution to GDP via outputs and export was quite significant. The reverse was the case of the agricultural sector in the seventies when its shares of the GDP declined to only 34% by 1971. By 1974 however the overall share of Nigerian agricultural products in the world production started declining just as the export (Aboyade and Ayila 1971). Likewise the value of these and other agricultural products in Nigeria's total export declined. Ever since then, Nigeria has been witnessing extreme poverty and the insufficiency of basic food items, the agricultural sector as at 1996 accounted for less than 5% of Nigeria's GDP (Ekerete: 2000).

Due to the aforementioned problem, there is need for government intervention through public spending to restore agricultural sector back to its lost glory and hence a need to establish a link between government agricultural spending and agricultural output. Over the years government policies have been directed towards accelerating economic development with the ultimate aim of transforming the economy into industrialized one as well as raising the welfare of the people. Agricultural sector is expected to act as a catalyst towards realization of this goal. This is measured by increasing the output of the agricultural sector to meet the demand of the people and industries. Therefore, the linkage between government agricultural spending and agricultural output however, is captured in Keynes proposition or hypothesis. Keynes saw the need to boost aggregate demand to lift the economy out of depression caused by market failures advocated for expansion in government spending or activities to accelerate economic growth in a short-run. Therefore, in a free market economy, interference in the economy by the

government will stimulate growth through aggregate demand. Government also intervenes in the production process in other to enhance productivity or growth. Since, agricultural credits have over the years been identified as a major input in the development of agricultural sector in Nigeria (CBN, 2005).

As a major objective of this research, we shall empirically estimate the relationship between government agricultural spending and agricultural output in Nigeria. It is against this scenario that this study is designed to examine the nature of the relationship that exists between government agricultural spending and agricultural output in Nigeria.

## II. CONCEPTUAL FRAMEWORK

There are two concepts that are of importance to this paper. These are public expenditure (Government spending) and Agriculture.

### *Public Expenditure*

The concept of public expenditure can be traced back to the classical ideology. Although the role of the governments were very narrow, as the states were restricted to function with respects to National Security (Internal and External administration of justice and maintenance of state machineries) (Salawu, 2005). The classical believed that the interference of the government in the economy will jeopardize the free working of the market but absence of perfect competition, inequitable income distribution, existence of public goods, and externalities are justified and made it inevitable and imperative for government intervention in an economy (Bhatia, 2006). The concept of government expenditure may be interpreted in various ways: It may be conceived as reflecting budgetary transactions, public enterprise, public regulations and similar concerns. Siyan (2002) posits that government expenditure is expenses incurred in the public sector. It is the expenses incurred by the government at various levels which include the federal, state and local government levels in Nigeria. Public expenditure is used to provide public goods and services to the populace through which economic growth is induced (Bello, 2003). Bhatia (2005) in Salawu (2006) posits that public expenditure is the expenses which the government incurs for its own maintenance and also for the society and the economy as a whole. He maintained that public expenditure is an important mechanism, which government can use to have significant effects on people's lives in terms of living standard and better opportunities providing such services.

### *Agriculture*

Agriculture on the other hand is the production of foods, feeds, fibre and other goods by the systematic growing and harvesting of plants and animals. It is a science of making use of land to raise plants and animals. According to Anyanwu, et al (1997) agriculture involves the cultivation of land, raising and rearing of animals for the purpose of production of food for man, feed for animals and raw materials for industries. It

involves cropping, livestock, and forestry, fishing, processing and marketing of these agricultural products. CBN (2000) defined agriculture as the business of managing a farm for the production of crops, staples, livestock, fishing and forestry. Samuelson and Nordhaus (2003) posited that agricultural outputs are various useful goods and services produced to be consumed or used for further production. Therefore, with regard to this research work, agricultural output refers to the amount of agricultural yields produced within a given time.

## III. THEORETICAL PERSPECTIVE AND LITERATURE REVIEW

The theoretical basis for this paper is anchored on both the public expenditure theories and the Agricultural output theories.

The issue of how public spending affects agricultural outputs growth is well established in a growing body of literature. Traditionally, the relationship between public expenditure and agricultural output has been viewed within the framework of Wagner, Keynesian, Solow's, and the traditional approach.

In 1883 a leading German economist, Adolph Wagner stated that government expenditure rises at a faster rate than the output of the economy. Contrary to Wagner's view, Keynesian hypothesis (Keynes, 1936) stressed that public expenditure is seen as an exogenous factor that can be used as a policy variable, and this can impact upon growth and development in the short-run. This is related to the sources of public spending and its impact on economic activities.

Robert Solow (1956), in his sources of growth analysis assumed an open economy with free trade and allowed substitution between factors of production. This theory holds that increase in the quality of factors of production and the efficiency in their application is important for long-run growth, the theory maintains that foreign capital and improvement in technology are the main sources of sustainable economic growth of LDCs.

The traditional theory of production and supply by Alfred Marshal (1920) defines the output that can be derived from various combinations of input. It shows how and to what extent output changes with variations in inputs during a specified period of time. In the words of Stigler, the production function is the name given to the relationship between rates of inputs productive services and the rate of output of product. It is the economists summary of technical knowledge' basically the production function is a technological concept which can be expressed in the form of a table, graph and equation showing the amount of output obtained from various combinations of inputs used in production, given the state of technology. Algebraically, it may be expressed in the form of linear equation as:

$$Q = f(L, M, N, C, T)$$

Where Q stands for the output, L is labour, M for management, N for land, C for capital and T for technology and f refers to the functional relationship.

In these approaches, expenditure is the key variable input and that expenditure (input) has been identified as the causative factor for output growth. The nature of the causation between the two variables has important policy implications. Several studies were conducted to assess the direction of and the nature of the causal relationship between expenditure (input) and output using Granger and Sims causality tests.

The major notion in these three approaches is that expansion in government expenditure and the efficiency in its application accelerates economic growth. Therefore, an increase in government allocation to agricultural sector (that is inputs and its efficiency in application increases agricultural output). Since expenditure or allocation provides all the necessary inputs, credit facilities, infrastructures needed to enhance agricultural productivity or output. When output increases, it stimulates the economy through the aggregate demand. When aggregate demand increases, consumption level increases, investment level increases, employment is created, savings increases and standard of living also improves hence increase national output and consequently economic growth. The general notion is that public capital and private capital are complementary factors in the production process, so an increase in the public capital stock raises the productivity of all factors in production (Anderson et al, 2006). By raising the productivity of all factors in production, public capital investment crowded in private capital investments leading to an increase in the private capital stock (David et al, 2000; Mella and Gray 2005; Kakwani and Sons, 2006) which further contributes to raising productivity.

#### *Determinants of Government Expenditure*

Some determinants of public expenditure according to Samuel (2009) are as follows;

- *Urbanization*: This is the process of expanding the existing towns. This requires large per capita expenditure on amenities to increase in order to take adequate care of the structural changes taking place.
- *Population*: As population increases there is a pressure on the existing facilities and hence the need for government to provide more facilities, leading to increase in government expenditure.
- *Economic growth*: According to Ekpo (1998) in Ogbu (2012) every government desires to raise the level of productivity which will boost flow of goods and services. This is done through the provision of more investment and social amenities which entails more government spending.
- *Depreciation*: This is the wear and tear of existing facilities which requires regular replacement and may be replaced at a high cost leading to increase in government expenditure.

- *Technological changes*: Ogbu (2012) further explained that improvement in technology is required for economic development. The change in technology facilitates production efficiency and makes more goods available in the economy thereby enhancing social welfare, and hence increasing government expenditure.
- *Reduction in inequality*: Government desires to protect the citizen from exploitation and reduce the level of inequality which exists in various classes of people by providing increasing welfare services and social security, resulting to increased government expenditure (Kakwani and Son, 2006).
- *Past level of public expenditure*: In developing economies like ours, past levels of expenditures could also exact substantial influence on the level of public expenditure.

In summary, public expenditure is a function of urbanization, technological change, transfer payments etc. it is a multivariable function (Mitchell, 2005).

#### *Cannons/Principles of Public Expenditure*

Just as there are well known cannons of taxation, similarly, we have some cannons or principles to which precedent public expenditure should conform with. These principles according to Bello (2003) in Ogbu (2012) are;

- *Maximum social benefits*: That public expenditure must satisfy maximum social advantage.
- *Economy*: Satisfying social benefit does not exonerate government existing utmost economy in the expenditure. Economy does not mean niggardliness, but avoidance of overspending and misuse of all kinds.
- *Cannon of sanction*: It must be authorized by an expert power.
- *Cannons of elasticity*: It must be flexible
- *Balanced budget*: Ever recurring deficit in the budget should be avoided.
- *Beneficial result in production as well as distribution*.

#### *Effect of Government Expenditure on the Economy's Production*

*Effect on production*: The effect of public expenditure on production can be examined with reference to its effects on ability and willingness to work, save and invest and in diversion of resources (allocation) (Mitchell, 2005).

*Effect on distribution*: The primary aim of government is to maximize social benefit through public expenditure, the objective of the maximum social benefit can be achieved only when the inequality of income is removed or minimize (Iganiga and Unemhilin, 2011).

*Effects on consumption*: Public expenditure enables redistribution of income in favour of the poor. It improves the capacity of the poor to consume. This public expenditure

promotes consumption and other economic activities (Derek, et al, 2009).

*Effects on stability:* Economic instability takes the form of depression, recession, and inflation, public expenditure is used as a mechanism to control instability.

*Effect on economic growth:* The goal of planning are effectively realized only through government expenditure. The government allocates funds for the growth of various sectors like agriculture, manufacturing, communication, health, education, energy, export, import, with a view to achieve impressive growth (Anyanwu, 1997 in Ogbu, 2012).

Conclusively, modern economists have all experience tremendous growth in public expenditure. So it is absolutely necessary for government to formulate national public expenditure policies in order to achieve the desired effect on economic activities, income, distribution, employment and growth (Mitchell, 2005).

#### *Nigeria's Economy: A Brief Analysis of the Oil Sector*

During the oil era of 1973-1977, crude oil replaced agriculture as the major export earner for the economy. As shown by Central Bank of Nigeria (2006), crude oil production (000 barrels) rose steadily from 395,689 in 1970 to 778,900 in 1999 and 919,285.6 in 2005. Similarly, its contribution rose, for instance in 2000, oil and gas export accounted for more than 98 percent export earnings and about 83 percent of the Federal Government of Nigeria's revenue (Wikipedia, 2010a).

Nigeria's proven oil reserves are approximately 35 billion barrels with natural gas reserves towering above 100 trillion ft<sup>3</sup> (Wikipedia, 2010). But Nigeria's overdependence on great oil wealth has spawned distortions in key economic variables as well as other sectors of the economy. For example, dependence and management of oil wealth have led to fluctuations of Gross Domestic Product (GDP) and its inability to translate to increased per capital income. Realities on ground indicate that this wealth, all along, did not actually permeate into society or real economy (Ekerete, 2000). A pointer to the bad health of Nigeria's economy is the rising exchange rate which measures the strength of the naira in relation to an international currency, usually the US dollar (\$).

Another economic growth indicator is inflation. As an economy grows, inflation rate is expected to decline. Thus, increasing and fluctuating inflation rates indicates economic retrogression and instability respectively (Ekpo and Egwauchide, 1994). According to Central Bank of Nigeria (2006) inflation rate (%) dropped from 13.8 in 1970 to 3.2 in 1972. But by 1975, two years into the oil boom era, it rose astronomically to 33.9 and by 1986 (SAP era), the rate dropped to 5.14. It rose again to 7.28 in 1995, but dropped to 6.6 in 1999 (CBN, 2006). In 2005, inflation rate stood at 17.9 and by the end of 2009 it was estimated at 11.5 percent (CBN, 2009).

From the foregoing, it is little or no surprise that Nigeria was ranked 151 out of 177 countries in Human Development Index. This ranking implies inefficient economy and low human capital development, coupled with the rising unemployment which was 4.7 percent in 2009, high poverty rate of 70 percent of the population, with 35 percent living in absolute poverty as well as increasing food security (Anonymous, 2008b). Nigeria economy did not fare well with oil. These are also some of the consequences of the neglect of the agricultural sector.

#### *Overview of the Nigerian Agriculture*

The importance of the Nigerian agricultural sector to the entire economy cannot be over emphasized as agriculture is the mainstay of a large portion of Nigeria's population. It was once the major foreign exchange earner before the advent of the oil boom in 1970s which suppressed the focus on agricultural development (Anyanwu, 1997).

Unfortunately, at the instance of global emerging alternatives to oil products, the economy relevance and sustainability of the oil sector in the near future remains uncertain, hence the situation reiterates the need to launch new emphasis on financing the growth of the agriculture sector.

Agriculture employs about two-third of Nigeria's total labour force, it contributed 42.2 percent of Gross Domestic Product (GDP) in 2007; and provides 88 percent of non-oil earnings in 2007. The agricultural GDP for 2009 consisted of crops (89%), livestock (7%), fisheries (3%) and forestry (1%) (CBN, 2009) more than 90 percent of the agricultural outputs are accounted for by small scale farmers with less than two (20 hectares under cultivation. It is estimated that about 75 percent (68 million ha) of the total land area has potential for agricultural activities with about 33 million hectares under cultivation (World Bank, 2008).

Nigeria is one of the largest countries in Africa; it has a total geographical area of 923,768 square kilometers which encourages extensive agricultural practices (Manyong et al, 2005). It is situated around the tropical area of the Gulf of Guinea on the West Africa Coast.

#### *Performance of the Agricultural Sector*

In the 1960s, the agricultural sector was the most important in terms of its contributions to domestic production, employment and foreign exchange earnings. The situation remained almost the same three decades later with the exception that it is no longer the principal foreign exchange earner; it is a role now being played by crude oil. The sector was stagnant during the oil boom period of the 1970s, which accounted largely for the declining share of agriculture's contribution. Unstable and often inappropriate economic policies (of pricing, trade and exchange rate), the relative neglect of the sector and the negative impact of the oil boom were also important factors responsible for the decline in its contributions (Ekpebu, 2006).

Notwithstanding, Nigeria's rich endowment in black oil and other mineral resources, the wellbeing of her economy still largely depend on agricultural sector. The Nigerian economy is essentially agriculture in terms of national output and employment generation. It is the largest contributor to gross domestic product (GDP) (average 38% in the last 8 years) with crops accounting for 80%, forestry 3% and fishery 4%. It provides employment for about 65% of the adult labour force and the food and fiber needs of a large and increasing population. The agro-industrial enterprises depend on the sector for raw materials while 88% of the non-oil exports earning come from the sector (Ekpo and Egwaikhide, 1994). The sector contributes a great deal to the development of the economy in various ways.

Agriculture contributes significantly to national food self-sufficiency by accounting for over 90% of total food consumption requirements; it helps to maintain a healthy and peaceful population and also a source of food and nutrition for households. Furthermore, according to Manyong et al (2005) the ultimate objective of interest of economist in productivity should be to find ways of increasing output per-unit of input and affaining desirable inter-firm, intra-firm and inter sector transfers of population resources thereby providing the means of raising the standard of living.

In Nigeria, agriculture export played an important role in economic development by providing the needed foreign exchange earnings for other capital development projects. For instance, Nigeria was the largest exporter of palm oil and palm kernel, second to in cocoa and third position in the exportation of groundnut. Olayide and Essang (1976) reported that Nigeria export earnings from major agricultural crops contributed significantly to the GDP.

World bank (1997) further posited that agriculture plays an important role in the overall economic development of a country, to the extent that a country that is able to achieve a 4 percent annual growth rate in agriculture will record an improvement in technology and an increase in agricultural production is capable of reducing food import bills, which in the long run can be used in increasing the importation of manufactured capital goods that would possibly improve the living standard of the people.

#### *Problems of Agriculture in Nigeria*

Despite the fact that more than half of the Nigerian population is rural and they derive their livelihood from agricultural related activities, environmental degradation, limited use yield enhancing inputs, and poor market linkages (IFDC, 2005). Inadequate funding by government budget and the private sector is a major problem in Nigeria's agriculture. About 65% of Nigeria's economically active population lack access to formal financial services (Iheancho et al, 2006). The growth of the agricultural sector in Nigeria has been at slow rate despite the country's rich agricultural resource environment. A little less than 50 percent of cultivable agricultural land is under utilization (Manyong et al, 2005).

Irrespective of the intervention of various agricultural programmers, the existence of endemic poverty among the populace still constitutes quite a number of hassles for growth of the agriculture sector because rural poverty is on the increase and unfortunately a large portion of the population are rural dwellers and are engaged in agriculture activities (Iheancho et al, 2006).

According to Manyong et al, (2005), the challenges of developing Nigeria's agriculture production revolve around having appropriate strategies for promoting accelerated commercialization and investment and dealing with the growth constraints of the sector. The most profound problems to the agriculture production system from the perspective of sustainable growth are the existence of archaic peasant practices, lack of technology strategies and poor returns on investment.

#### IV. RESEARCH METHODOLOGY

Based on its sources, the data for this study is secondary in nature, it includes annual time series data and the variables under study are from 1999-2012. The data collected are mostly from the Central Bank of Nigeria-CBN statistical bulletin which includes CBN annual reports and statement of accounts, CBN economic and financial reviews and statement of account, journals of economics study and national bureau of statistics, federal ministry of agricultural publications, internet publications and other related literatures.

Both descriptive and econometric techniques are used for the study. Tables and charts are also used as descriptive tools while econometric tools used include the Augmented Dickey-Fuller (ADF) Test; used to test the stationary properties of time series data, the Engle Granger's (1987) Co-integration test conducted to determine whether a group of non-stationary time series variable used for the study are co-integrated or not.

The model used to test the impact of government agricultural spending on agricultural output in Nigeria is adopted from the Solow Neoclassical Production Function and Traditional Production Function which posits the outputs that can be derived from various combinations of inputs where it shows how and to what extent outputs changes with variations in inputs during a specified period of time.

The model estimated in the course of this study is stated below:

Definitionally as:

$$AGRO = f(RGEA, M, L, T)$$

This model is expressed stochastically as

$$AGRO = b_0 + b_1RGEA + b_2M + b_3L + b_4T + U_i$$

Where;

AGRO= agricultural output

RGEA= Rate of Government Expenditure on agriculture

M= Management level (dummied effective<sup>(1)</sup> and ineffective<sup>(0)</sup>)

T= Technological level (dummied mechanized<sup>(1)</sup> and un-mechanized<sup>(0)</sup>)

L= Rate of labour in use

b<sub>0</sub> – b<sub>4</sub>= Parameters

U<sub>1</sub>= Stochastic error term

Theoretically, Government expenditure on productive activities (economic services and social community services) like agriculture, electricity, water, health, telecommunication, education, and transport among others are expected to contribute positively to economic growth. Therefore, government expenditure on agriculture is

expected to have a positive impact on agricultural outputs. Thus, the signs of variables for this study are expected to be positive and represented as: b<sub>1</sub>, b<sub>2</sub> . . . b<sub>n</sub>>0

First if b<sub>1</sub> = 0 in the ADF test, then the series is said to have a unit root and is non stationary. It can be concluded that the time series does not have a unit root and is integrated of order zero (that is, it has stationary properties if b<sub>1</sub> ≠ 0

Next, if the duals, U<sub>i</sub> from the ADF test are stationary then variables are said to be co-integrated and hence interrelated with each other in the long-run.

### V. DATA ANALYSIS

The data for the study was analyzed as follows:

Table 1.1: Result of Descriptive Statistic

Variable	Mean	Standard deviation	Skewness	Kurtosis	Jarque-Bera	Probability
AGRO	56.55929	81.22026	3.293298	11.93474	71.87412	0.000000
RGEA	5.157857	3.243908	1.842191	6.712128	15.95683	0.000343
M	0.142857	0.363137	2.041241	5.166667	12.46065	0.001969
T	0.071429	0.267261	3.328201	12.07692	73.90730	0.000000
L	44514524	5041481	0.498711	2.253843	0.905101	0.636004

Source: Researchers Computation using e-view.

From the descriptive result, AGRO averages 56.55929 RGEA (5.157857), M(0.142857), T(0.071429) and L averages 445124 with the standard deviation of 81.22026, 3.243908, 0.363137, 0.267261 and 5041481 respectively. The Skewness of both AGRO and T averages or is close to 3 which indicate the positive skewness of the variables with normality. More so, the JarqueBera results indicates AGRO (71.87412), RGEA (15.95683), M(12.46065), T(73.90730) and L(0.905101) which are very high with low probabilities and indicating the normality of the variables with positive skewness and kurtosis.

Before any meaningful regression is performed with the time series variables, it is necessary to test the existence of unit roots in the variable and hence to establish their order of integration. The data used for this study was transformed using the technique of semi logging so as to reduce the over bearing influence of some variables. The result of the ADF from the transformed data set is thus presented below;

Table 1.2: Result of the Unit root Test

Variable	ADF Value @ level	Mackinnon Critical value @ 5%	Order of Integration
AGRO	-3.8680	-2.9678	I(0)
RGEA	-4.9054	-2.9640	I(0)
M	-4.6343	-2.9640	I(0)
T	-4.5978	-2.9640	I(0)
L	-5.7595	-2.9763	I(0)

Source: Author's computation.

The results of the Augmented Dicker-Fuller Test in the table above revealed that, all the variables are stationary at level and are integrated of order zero. This implies that, no long run information is lost thus, the application of ordinary least squares in the estimation process is therefore appropriate and not likely to yield spurious estimates.

From the results of the single co-integration equation, the following estimates were obtained using the intermediate results;

$$AGRO = -1.025593RGEA - 1.050066M - 1.814651T - 0.317277L$$

**S.E (0.192748) (0.298684) (0.332629) (0.219193)**

From the estimated result of the single co-integrating model (Rho) as shown in appendix VI, all the variables (AGRO, RGEA, M, T, L) indicated a negative relationship with the GDP which disobeys their apriori expectation of positivity.

Going by their statistical significance, all the variables (AGRO, RGEA, M and T) except L are statistically significant which is indicated by their high estimates with their respective standard errors. This is indicated by the 5 stochastic trends with high residual variances. This implies that, there is long-run relationship between Agricultural Output and Government Spending on Agriculture in Nigeria.

Table 1.3: Result of Granger Causality

Pairwise Granger Causality Test			
Sample: 19992012			
Lags: 2			
Null hypothesis	Obs.	F-statistics	Probability
RGEA does not Granger cause AGRO	12	5.25109	0.0013
AGRO does not Granger Cause RGEA		2.88210	0.1221
M does not Granger Cause AGRO	12	604.775	1.E-08
AGRO does not Granger Cause M		0.07463	0.9288
T does not Granger Cause AGRO	12	6.73326	0.0139
AGRO does not Granger Cause T		1.12494	0.3770
L does not Granger Cause AGRO	12	4.63864	0.0218
AGRO does not Granger Cause L		0.02334	0.9770
M does not Granger Cause RGEA	12	1.79054	0.0218
RGEA does not Granger Cause M		0.03139	0.9692
T does not Granger Cause RGEA	12	0.15760	0.8571
RGEA does not Granger Cause T		0.49501	0.6294
L does not Granger Cause RGEA	12	1.52669	0.2817
RGEA does not Granger Cause L		0.70655	0.5254
T does not Granger Cause M	12	1.22500	0.3498
M does not Granger Cause T		0.20588	0.8187
L does not Granger Cause M	12	2.07403	0.1962
M does not Granger Cause L		83.7662	1.E-05
L does not Granger Cause T	12	0.44887	0.6555
T does not Granger Cause L		0.98268	0.4206

Source: Researchers Computation using e-views. See appendix III

Table 4.3 above shows that there exist a unidirectional causal relationship between AGRO to RGEA, AGRO to M, AGRO to T, AGRO to L and M to L given that the F-calculated at 5% level of significance fall in the acceptance region which necessitate the acceptance of the alternative hypothesis and the rejection of the null hypothesis as stated above in table 4.3 respectively.

On the contrary, there exist a bidirectional causal relationship between RGEA to M, RGEA to T, RGEA to L, T to M & L to T, given that the F-calculated at 5% and 1% level of significance respectively does not falls in the acceptance region, and this necessitate the acceptance of the null hypothesis and the rejection of the alternative hypothesis respectively.

VI. THE IMPACT OF GOVERNMENT AGRICULTURAL SPENDING ON AGRICULTURAL OUTPUT IN NIGERIA

Following the result of the ADF above, the study adopts the technique of ordinary least squares for the regression analysis. This is based on the premise that, all the variables in the data set are stationary and can yield best linear unbiased estimates.

The estimated regression line for this research is given below with their standard errors in parenthesis.

$$AGRO = 536.20 + 5.17RGEA + 1.34M + 5.89T + 3.96L$$

S.E (1.45) (1.39) (0.42) (2.02)

- R - Square = 0.636070
- R - Square Adjusted = 0.529879
- F – Statistics = 21.99872
- Durbin –Watson Statistics = 1.774756
- Akaike Information Criterion = 11.50436
- Schwarts Criterion = 11.73260

The results show the existence of a relationship between variable (AGRO) and each of the explanatory variables, that is (RGEA, M, T L).

The coefficient of Rate of Government Expenditure on Agriculture (RGEA) is 5.1773592. The empirical investigation shows that, there is a positive or direct relationship between the Agricultural Output and the rate of Government Expenditure on Agriculture which accounts for 5.173592 variations in the Agricultural Output.

In the OLS results, it is observed that, the coefficient of management level (M) is 1.344032 and this implies a positive relationship between the agricultural output and the management level. That is, any unit increase in the management level will lead to 1.344032 change (i.e increase) in the Agricultural Output.

More so, the relationship between the Agricultural Output and Technology (T) is positive since the coefficient is 5.885628. This simply means that a unit increase in Technology level will lead to a 5.885628 increase in Agricultural Output.

Also, from the model, the rate of labour in-use (L) has a positive relationship with the Agricultural Output since the coefficient is 3.958105. This then shows that, any unit increase in the L leads to 3.958105.

Lastly, holding all variables constant, Agricultural Output is negatively influenced by -536.2011 which shows that, consumption must take place among other factors such as decay of some perishable goods.

As show above, the coefficient from the result are:

$$b_0 = 536.2011, b_1 = 5.173592, b_2 = 1.344032, b_3 = 5.885628, b_4 = 3.958105$$

To test for the statistical results of the variable captured in the model, the following hypothesis shall be established.

- H<sub>0</sub>: The parameter is not statistically significant.
- H<sub>1</sub>: The parameter is statistically significant.

It was discovered that, the variable incorporated in the model do not assume stationarity at the same order of integration. More so, since the data period is not sufficient enough to support the application of vector error correction test, Pairwise Granger Causality was used to find the causal relationship between the variables incorporated in the model.

It thus revealed that, there exist a unit direction causal relationship among some variables and bidirectional causal relationship among other variables, implying a causal relationship between public agricultural spending and agricultural output. This is because, the Pairwise Granger Causality results shows a two way causal relationship between Rate of Government Expenditure on Agriculture and Agricultural Output which indicates a feedback mechanism.

The Result of the OLS which was conducted to ascertain the short run dynamic shows that, there is a significant relationship between government spending and Agricultural Output in Nigeria. This shows that, when government spends on agriculture, the multiplier effect of that spending contributes in increasing the output level of Agriculture in Nigeria.

It was discovered from the findings that, Government Agricultural Expenditure on Agricultural Output has a positive relationship in which case, any increase in the rate of Government Agricultural Expenditure brings about a higher Agricultural Output. More so, the increase Agricultural output necessitates increase in government expenditure through acquisition of storage facilities, transport facilities, among others.

## VII. CONCLUSION AND RECOMMENDATIONS

In summary, The study examines the impact of Government Agricultural spending on Agricultural Output in Nigeria between 1999 to 2012. The study employs VECM which was practically inapplicable because of the order of integration of units root test and the time periods used in the study. However, with the literature, OLS and Pairwise Granger Causality result, the findings shows that, Government Agricultural spending on Nigeria has not responded to the desired level that will impact positively to the Agricultural Output though with the causal effect. The literally support of this findings is found to be more acute when the needed funds to improve this sector are readily available and where the impact of new technologies has been less apparent.

There is a positive relationship between government agricultural spending and agricultural output. This means that *ceteris paribus* the greater the percentage of government spending on agriculture, the greater the output/performance of the sector, vice versa.

The percentage of government expenditure allocated to the agricultural sector is very low compared to the expenditures on other sectors of the economy. When judged against the most widely cited international benchmarks such as the 10 percent recommendation of the African Union, the 25 percent recommendation of Food Agricultural Organization (FAO) and Maputo Declaration, the budgetary allocation to agriculture in Nigeria is also very low in the covered period.

There is need to increase the budgetary allocation to the Agricultural sector from the present less than 5% of the

total government annual budget to over 10% in order to boost food production, alleviate poverty as well as meet up with the international standard in the country.

There is also the need to judiciously utilize the resources allocated to the Agricultural Sector as increase in the percentages of budgetary allocation to the sector does not automatically increase the sector's performance if the resources are mismanaged. Consistency in government policies/programs is also needed to boost the performance of the sector.

Conclusively, the effects of economic reforms on the agricultural sector in Nigeria cannot be said to be satisfactory in view of its minimal contribution to the sector. Both the government and the private sector, which should drive the agricultural sector through consistent policies, robust funding and infrastructural development, have failed to accord agricultural development the priority it deserves, given that the anticipated benefits from agricultural development have been minimal in Nigeria.

There is therefore urgent need to revamp the sector through adequate budgetary allocation, consistent policies and judicious use of allocated resources and above all a genuine democracy and good governance in Nigeria in order to achieve poverty reduction, sustainable livelihood, food security and above all, a corresponding output/performance of the sector in Nigeria.

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