Original Research Article

Impact of Government Agricultural Expenditure on Agricultural Output in Nigeria

Abstract

This study examined the impact of federal government agricultural expenditure on agricultural output in Nigeria. The study employed secondary data sourced from National Bureau of Statistics, and Financial Review of Central Bank of Nigeria. The study employed E-view 7.2 statistical output as a window in exploring the possible links between government agricultural expenditure and agricultural output. The results revealed that government agricultural expenditure has a direct relationship with agricultural output as well as economic growth which statistically significant at 5% level. From the result of the findings of the study. The study recommended that government should ensure that credit is made available to farmers with relatively low interest rate. Government should intensified effort on how to control inflation rate. Government should increase the budgetary allocation agricultural sector. Government should encourage financial institutions to make certain percentage of their total credit facility available for agricultural sector. Government should ensure that Nigerian economy is diversified in order not to make crude oil as the main stay of Nigerian economy rather agricultural sector because it helps in terms of food supply, employment generation, etc., hence economic growth.

Keyword: Expenditure, Revenue, Output, Economic Growth

1.0 Introduction

According to economists, researchers and business analysts, agricultural sector has number of roles to play in economic development—such as: employment generations; poverty alleviation; bridging the gap of youths' unemployment; rural-urban drift; source(s) of wealth generation; boosting of agricultural output; food supply; etc (Yesuf, 2000; Iganiga & Unemhilin, 2011). They revealed in their various results with different statistical package analyses that agriculture has direct relationship with economic development (Iganiga & Unemhilin, 2011).

One of the major challenges facing mankind is on how to provide an equitable standard of living, adequate food, clean water, safe shelter and energy, a healthy and secured environment, an educated public, and/or satisfying job for this and/or future generations (Helleiner, 1960; Iganiga & Unemhilin, 2011).

Of all these necessities, the first and most basic to human life and/or survival is enduring food security; which may be defined as a situation in which majority of the populace of a country have an access to domestically produced food at affordable prices at all times (Akinboyo 2008). It is not an overstatement to

assert that the growth and development of any nation depends to among other, on the development of agriculture.

For this situation to be curbed agricultural sector has a significant role to play in Nigerian economy as it were in the 1950s, 1960s and early 1970s, before the crude oil exports dominated. The saying that "agriculture was the mainstay of the Nigerian economy may have become a cliché. It nevertheless underscores the emphasis placed on agriculture as the engine of growth in the Nigerian economy. Abayomi (1997) noted that stagnation in agriculture is the principal explanation for poor economic performance, while rising agricultural productivity has been the most important concomitant of successful industrialization.

Generally, the sector contributes to the development of an economy in four major ways-*product contributions, factor contributions, market contributions and foreign exchange contributions* (Mackie 1964; Abayomi, 1997; World Bank, 2007).

In realization of this, the government has embarked on various policies and/or programmes (reforms) aimed at strengthening the sector in order to continue performing its roles, as well as measures for combating poverty and unemployment trend in Nigeria. Notwithstanding the enviable position of the oil sector in the Nigerian economy over the past three decades, the agricultural sector is arguably the most important sector of the economy. Agriculture's contribution to the Gross Domestic product (GDP) recently has remained stable at between 30 and 42 percent, and employs 65 per cent, of the labour force in Nigeria (Emeka 2007). It is estimated to be the largest contributor to non- oil foreign exchange earnings. This means that agriculture holds abundant potential for enhancing and sustaining the country's foreign exchange.

Several factors have been identified to enhance or retard growth in the agricultural sector. These factors include education (Iganiga & Unemhilin, 2011), infrastructure (Yee *et al.,* 2000) and inflation (Gokal & Hanif, 2004). Others are credit to the sector and rainfall. Empirical studies on the quantitative analysis of the determinants of agricultural output are few.

These few studies focused on factors such as the ones mentioned above without recourse to the impact of fiscal policies to agricultural output and other cooperating factors.

2.0 Conceptual Framework

Conceptually, agriculture is the production of food, feed, fiber and other goods by the systematic growing and harvesting of plants and animals. It is the science of making use of the land to raise plants and animals. It is the simplification of natures food webs and the rechanneling of energy for human planting and animal consumption (Akinboyo, 2008). Until the exploitation of oil reserves began in the 1980s, Nigeria's economy was largely dependent on agriculture. Nigeria's wide range of climate variations allows it to produce a variety of food and cash crops. The stable food crops include cassava, yams corn, coco-yams, cow-peas, beans, sweet potato, Millet, plantains, bananas, rice, sorghum, and a variety of fruits and vegetables. The leading cash crops are cocoa, citrus, cotton, groundnut, (peanuts) palm oil, palm kernel, benniseed, and rubber. They were also Nigeria's major exports in the 1960s and early 1970s. Chief among the export

destinations for Nigerian agricultural exports are Britain, the United States, Canada, France, and Germany (Emeka, 2007). Prior to the attainment of independent, agriculture was identified as a potential factor, capable of catapulting Nigeria's economic development.

The colonial administration in realizing this set up marketing boards for the major cash crops. Iganiga & Unemhilin, (2011) stressed that export production accounted for about 57 percent of Nigeria's Gross Domestic product (GDP) in 1929. The contributions of the sector to the GDP continued to increase. For example, agriculture became the leading sector of the economy in 1950s and 1960s. For these periods, agricultural output accounted for 63 and 54 percents of GDP (Aigbokhan, 2001). However, with the advent of oil in the 1970s, this dropped to 33.2 percent. This marked an epoch in Nigeria's economic history through the 1973/1974 (crude oil price shocks). It further went down to 30.2 percent for the period 1975-79. On annual average, its contribution to GDP form 1997-2006 is 4.1 percent (CBN 2006).

Over the years, government has almost been the sole provider of financial and other capital resources to support agriculture. Government has attempted to increase her expenditure on agriculture through budgetary allocation and through the provision of cheap and readily available credit facilities (Nwosu 2004). Nwosu (2004) found that over the years, the government budgeting allocation has become an important determinant of agricultural output in Nigeria.

FAO (2008) reported that in terms of capital allocation to agriculture in Nigeria, it as an average of 4.74 percent from 1970-1980. But, from 1980-2000, it rose to 7.00 percent and 10 percent from 2001-2007, though revealing an increase, but still falls short of Food and Agricultural organization (FAO) recommendation that 25 percent of government capital budget be assigned to the agricultural development capital budget.

Nwosu (2004) in his study stressed that government allocation to agriculture is relatively low and that actual expenditure falls short of budgeting expenditure and the rate of under spending is usually higher for agriculture than for other economic sectors. It is reported that a large proportion of the funds allocated to agriculture do not go directly to farmers (Iganiga & Unemhilin, 2011).

DFID (2005) reported that the largest category of private investors in Nigerian agriculture consists of the multitude of small holder farmers, scattered across the country. Thus, agricultural production in Nigeria is dominated by small-scale farms characterized by small, uneconomic and often fragmented holdings, the use of simple implements (hoes and knives) and unimproved planting and storage materials. The results have been a viscous web of low productivity, low income and low capital investment.

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, 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 contributions. The trend in the share of agriculture of GDP

shows a substantial variation and long-term decline from 60 percent in the early 1960s through 48.8 percent in the 1970s, 22.2 percent in the 1980s and 26 percent in 2000. 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. The leading cash crops are cocoa, citrus, cotton, groundnuts (peanuts), palm oil, palm kernel, benniseed, and rubber. As at 1984, the growth rate of the agriculture sector at constant basic prices had a negative figure of -5.20 percent yet the crop subsector which was the major source of food still accounted for about 30 percent of the Gross Domestic Products (GDP), livestock about five percent, forestry and wildlife about 1.3 percent and fisheries accounted 1.2 percent3. In a bid to mitigate the negative growth effect of the agriculture, manufacturing and oil sectors, the government introduced Structural Adjustment Programme (SAP) in 1986. The policy introduced deregulation of interest rates, which enabled interest rates to be determined by financial market forces rather than being determined by government. As at 1990, the growth rate of the economy had grown from a negative figure to a positive figure of 4.30 percent and in year 2003, the growth rate was 6.50 percent (CBN, 2004). Although there were fluctuations of the interest rates in between the years, the ultimate effect of the government policy to deregulate the interest rate through SAP was effective in developing the agriculture sector in terms of output, productivity, trade, as well as share of GDP contributions.

According to the Central bank's policy document, the abundance of natural resources in the rural sector has remained the treasury of Nigeria. Agricultural production in Nigeria is determined by the functions of macroeconomic environment, other factors such as political instability, civil unrest and unfavourable policies have also been found to affect agricultural output (Eyo, 2008). The combined effects of all these factors either cause a fall or rise in commercial food production, exportation and food supplies. According to Iganiga & Unemhilin, (2011), the major constraints to agriculture production include limited use of modern agricultural inputs, declining agricultural terms of trade and international debt, seasonal production bottlenecks, the risks of depending on market, lack of government financial support, government indifference and high levels of taxation, low food prices, poverty and lack of capital, land tenure systems, problems of competition with cheap food imports and food aid as well as the general world recession.

Agricultural holdings are generally small and scattered. The sector contributed to the country's major exports in the 1960s and early 1970s. Chief among the export destinations for Nigerian agricultural exports are Britain, the United States, Canada, France, and Germany. As at 1999, agriculture provided 41 percent of Nigeria's total GDP, this percentage represented a normal decrease of 24.7 percent from its contribution of 65.7 percent to the GDP in 1957. As at that time, it was envisaged that the contribution of the agriculture sector would continue to decrease yearly because, as economic development occurs, the relative size of the agricultural sector usually decreases. However, the decline in agriculture's share of GDP began with the advent of the petroleum boom in the early 1970s and not as expected. The decline had adverse effects on the production levels of both food and cash crops.

Over the years, in Nigeria, there have been occasional food supply shortfalls and high food prices in all or some parts of the country. This was often due to seasonal and cyclical food supply fluctuations, drought or poor rainfall in parts of the country. The level of dependence of a country on a particular food crop is a measure of the vitality of the food system and the vulnerability of the people to changes in production of the exporting countries and other external factors such as world prices. The price of nearly every agricultural commodity increased sharply by 55 percent between 2007 and 2008 (CBN, 2009). Nigeria imports raw materials for local food production, despite the adverse effect macroeconomic factors had on economic welfare over the years; there has been a rise of agricultural export, one that has brought numerous benefits to the country (Nwachukwu, Ehumadu, Mejeha, Nwaru, Agwu & Onwumere, 2008). The 2008 food crisis in Nigeria could not be completely isolated from the trend in food supply in the country. The gap between supply and demand for food items measured the level of food insecurity with respect to individual commodities. One major factor which accounts for food insecurity is the variability in food production from year to year which often affects mainly the physical availability of food (Badmus & Ogundele, 2009). The explanations for the food crises ranged from global warming, changes in international trade policies, the emergence of bio-fuels, increasing urbanisation and population growth (CBN, 2009). However, in analysing the performance of the Nigerian agriculture, three issues will be considered, namely the trend of the GDP growth of the agriculture sector; the trend of the agriculture sector production relative to other sectors; and the trend in agricultural imports and exports in Nigeria, focusing on the period, 1960–2010.

Despite the fact that more than half of the Nigerian population is rural and they derive their livelihood from agriculture related activities, the agriculture sector is marked by declining productivity, environmental degradation, limited use of 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 percent 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 a slow rate despite the country's rich agricultural resource endowment. A little less than 50 percent of cultivable agricultural land is under utilisation (Manyong *et al.,* 2005). Irrespective of the intervention of various agricultural programmes, 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). In terms of production, traditional farmers and small enterprises in agriculture enterprises still use primitive production skills which results into low yields from their efforts. Farmers need more access to finance, modern techniques, infrastructure, skills, efficient transportation systems, adequate access to market, accessibility of land and protection against environmental degradation.

According to Manyong *et al.* (2005), the challenges of developing Nigeria's agriculture production revolve around having appropriate strategies for promoting accelerated commercialisation 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 investments. The CBN (2007) noted that the challenges of financing Nigeria's agriculture in respect of policies are as a result of the fact that, most schemes are not adequately funded for effective performance and long gestation projects are not funded; there is undue political influence on lending procedures; private financial institutions are still skeptical about government agricultural programmes due to cumbersome procedures and high transaction costs; inadequate infrastructure and because of weak legal systems. These challenges can be mitigated by developing appropriate strategies for financing small and new businesses, promoting investment and commercialization of the agriculture sector.

The agricultural policies in Nigeria affected the level of financial deepening of the country and the relevance of the financial system to economic development (Nzotta & Okereke, 2009). Agriculture policies promote growth because it brings about monitoring and evaluation of the process of agricultural development. The policies aim at the attainment of self-sustaining growth in all the subsectors of agriculture and the structural transformation necessary for the overall socio-economic development. These policies have been found to be an important tool for agricultural performance in Nigeria.

According to Akiri and Adufu (2007), the financial system in the country as well as government efforts inculcate agricultural growth incentives in the nature of their services and functions within the economy through their role as financial intermediary. Some of these policies have failed while some are still operational; reasons for failure have been attributed to the unwillingness of the conventional banks to support small enterprises; lack of effective skill to deliver planned services; scarcity of loan able funds, absence of specialized institutions to support the sector; incompetent management and low management capacity of farmers (CBN, 2007).

The broad policy of the overall agriculture sector includes attaining self-sufficiency in basic food commodities in which the country has comparative advantage in local production; to increase production of agricultural raw materials to meet the growth of an expanding industrial sector; to increase production and processing of exportable commodities as a source of foreign exchange earnings; modernization of agricultural production, processing, storage and distribution through new technologies and management; creation of more agricultural and rural employment opportunities to increase the income of farmers and rural dwellers; protection and improvement of agricultural land resources and preservation of the environment for sustainable agricultural production. Policies are required to boost economic growth and tackle the problems in the sector. In order to attract finance for the growth of the agriculture sector the government has been involved in a list of policy initiatives on the provision of agricultural finance services in Nigeria from the 1970s to date and are discussed below. These policies include schemes, initiatives programmes and institutions.

3.0 **Theoretical Framework**

Jorgenson (1967) in Jhingan, (2006) has presented a theory of development of dual economy (.i.e. Modern Manufacturing/industrial sector and Agricultural sector).

In this theory we assume that the agricultural sector characterized by constant returns to scale with all factors variable as given by the Cobb-Douglas production functions:

$$Y = e^{\sigma t} L^{\beta} P^{1-\beta} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Where Y represents agricultural output $e^{\sigma t}$ is technical change which takes place at a constant rate (α) in the time (t); L is fixed quantity of land available in the economy; β is the share of landlords in the product which takes the form of rent; P is total population in this sector; $1-\beta$ is the share of labour in the product paid.

Since supply of land (L) is fixed, equation (1) may be written as thus:

$$Y = e^{\alpha t} p^{1-\beta} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

To obtain agricultural output per man, we divide both sides of the above equation (2) by *P*, and we have:

$$\frac{Y}{P} e^{\alpha t} P^{-\beta}$$

Or $$y = e^{\alpha t} P^{-\beta} \qquad \left[\therefore \frac{Y}{P} = y\right]$$

Now differentiating with respect to time:

$$\acute{y} = e^{\alpha t} P^{-\beta} + e^{dt} (1-\beta) P^{-\beta-1} \dot{P}$$

$$= e^{\alpha t} P^{-\beta} \left[\alpha = \frac{\beta}{P} \dot{P}\right] \qquad \left[P^{-1} = \frac{1}{P}\right]$$

$$= y \left[\alpha - \beta \frac{\dot{P}}{P}\right] \qquad \left[\therefore y = e^{\alpha t} P^{-\beta}\right]$$

Or $\frac{\dot{y}}{y} = \alpha - \beta \in \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(3)$ $\quad \therefore \in \frac{\dot{y}}{y}$

Where α is the rate of technical progress, β is the share of landlords in the product and ∈ is the net reproduction rate.

According to Jhingan, (2006), depending on the condition of production and the net reproduction rate, the agricultural sector is characterized either by a, low level equilibrium trap in which output of food per head is constant and population and food supply are growing at the same positive rate$(\alpha - \beta \in)$, or by a steady growth equilibrium in which output per head is rising and population is growing at its physiological maximum rate. The necessary and sufficient condition for a positive growth of output in the agricultural sector is $\alpha - \beta \in > 0$.

3.0 **Model Specifications and Description of Variables**

The model of this paper is hinged on the model of Shuaib (2011), which enables the examination of the impact of federal government agricultural expenditure on agricultural output in Nigeria. The model is designed below:

RGDP = f(AOUT, REXPA, DDEBT, NOR, INFL, INTR)

$$RGDP = \beta_0 + \beta_1 AOUT \pm \beta_2 REXPA \pm \beta_3 DDEBT \pm \beta_4 NOR \pm \beta_5 INTR + \mu \ldots\ldots\ldots\ldots\ldots\ldots 1$$

Where: RGDP = Real gross domestic product as a proxy for economic growth; AOUT = Agricultural Outputs; REXPA = Recurrent Expenditure on Agriculture; NOR = Non-Oil Revenue; DDEBT = Domestic Debt Rate; INFL = Inflation rate; INTR = Interest rate; μ = Stochastic term or error term

For the estimation purposes, we transformed equation (1) into log-linear form. Which is expressed as thus:

$$LOGRGDP = \beta_0 + \beta_1 LOGAOUT \pm \beta_2 LOGREXPA \pm \beta_3 DDEBT \pm \beta_4 LOGNOR \pm \beta_5 LOGINFL \pm \beta_8 LOGTINTR + \mu \ldots\ldots\ldots\ldots\ldots\ldots 2$$

Where: LOGRGDP = log of Real Gross Domestic Product as a proxy for economic growth; LOGAOUT = log of Agricultural Outputs; LOGREXPA = log of Recurrent Expenditure on Agriculture; LOGDDEBT = log of domestic Debt Rate; LOGNOR = log of Non-Oil Revenue; LOGINFL =log of Inflation rate; LOGINTR = log of Interest rate; μ = Stochastic term or error term

The a priori expectations are as follows:

$$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6 \beta_7 > 0$$

Where:

β_0= Intercept, β_1 = Coefficient of Agricultural output, β_2 = Coefficient of Recurrent Expenditure on Agricultural; β_3 = Coefficient of inflation rate; β_4 = coefficient Agricultural Outputs; β_5 = coefficient of Domestic Debt Rate; β_6 = coefficient of Non-Oil Revenue; and μ= white noise error term.

The contribution of this study to knowledge is in terms of the estimation techniques employed and the data used which is extended to 2012. An attempt will be made to empirically investigate the relationship between the impact of federal government agricultural expenditure on agricultural output in Nigeria for the period 1960 – 2012 regression analysis. The equation was estimated using a variety of analytical tools, including group unit root tests, co-integration tests, Granger Causality Analysis and Error Correction Model (ECM). The results are discussed below. The data used for the study covers the period 1960 and 2010. The study employed secondary data which are derived from various issues of CBN *Annual Report and Statement of Accounts (2010)*, CBN *Statistical Bulletin (2011), and Statistical Bulletin (2012).*

4.0 Model Summary

Table 1: Group Unit Root Test

Group unit root test: Summary
Series: LOG_RGDP_, LOG_AOUT_, LOG_DDEBT_, LOG_INTR_, LOG_NOR_, LOG_REXPA_
Date: 10/01/14 Time: 20:42
Sample: 1981 2013
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 3
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				

Levin, Lin & Chu t*	-8.77834	0.0000	6	182
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-9.89827	0.0000	6	182
ADF - Fisher Chi-square	102.365	0.0000	6	182
PP - Fisher Chi-square	132.054	0.0000	6	186

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Table1 shows the summary of the Group unit root test using summary test (.i.e. Levin, Lin & Chu t*; Im, Pesaran and Shin W-stat; ADF-Fisher Chi-square; PP-Fisher Chi-square) with the lag length selection based on SIC: 0 to 3 of the variables used for the empirical study. The group unit root test shows that; Real Gross Domestic Product (RGDP); Agricultural Output (AOUT); Domestic Debt Rate (DDEBT); Interest rate (INTR); Non oil Revenue (NOR); and Recurrent Expenditure on Agriculture (REXPA) were stationary at level at 5 percent level of significance respectively.

The top of the output indicates the type of test, exogenous variables and test equation options. If we were instead estimating a Group unit test, a list of the series used in the test would also be depicted. The lower part of the summary output gives the main test results, organized both by null hypothesis as well as the maintained hypothesis concerning the type of the unit root process.

All of the results indicate the presence of a unit root, as the LLC, IPS, and both Fisher tests fail to reject the null of a unit root at level. While all of the results indicate the absence of a unit root, as LLC, IPS and both Fisher test accept the null of a unit root.

4.1 Cointegration test results

Co-integration test is carried out in order to determine the long-run relationship between the dependent and independent variables when one or all of the variables is/are non-stationary at level which means they have number of stochastic trends in asymptotic distribution. Co-integration tests are conducted by using the reduced procedure developed by Engle and Granger, (1987). They noted that a linear combination of two or more 1(1) series may be stationary, or 1(0), on which case we say the series are cointegrated. Such linear combination defines a cointegrating equation with cointegrating vector of weights characterizing the long-run relationship between the variables. The Engle and Granger, (1987) test results are divided into three distinct sections. *First* portion display the test specification and settings, along with the test values and corresponding *p*-values. *Second (*or the middle) section of the output displays the estimated coefficients, standard error, t-statistics, and p-value for the constant, even though they are not strictly speaking valid or intermediate results used in constructing the test statistic that may be of interest. The summary statistics portion is relatively familiar but does require a bit comment. Most entries are self-explanatory, though a few deserve a bit of discussion-such as RHO S.E. and Residual Variance are the (possibly) d.f. corrected coefficient standard error of the regression. The long-run residual variance is the

estimate of the long-run variance is the estimate of the long-run of the residual based on the estimated parametric model. The number of stochastic trends entry reports the value used to obtain the *p*-value.

Engle and Granger procedure is used to determine the linear combination of two or more series and/or to identify a long-run relationship. The cointegration tests include Real Gross Domestic Product (RGDP); Agricultural Output (AOUT); Domestic Debt Rate (DDEBT); Interest rate (INTR); Non oil Revenue (NOR); and Recurrent Expenditure on Agriculture (REXPA). Which includes Automatic lag specification (lag = 0 based on Schwarz Info Criterion, maxlag = 7).

Table 2: Engle-Granger Cointegration Test

Date: 10/01/14 Time: 20:32
Series: LOG_RGDP_ LOG_AOUT_ LOG_DDEBT_ LOG_INTR_ LOG_NOR_ LOG_REXPA_
Sample: 1981 2013
Included observations: 33
Null hypothesis: Series are not cointegrated
Cointegrating equation deterministics: C
Automatic lags specification based on Schwarz criterion (maxlag=7)

Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
LOG_RGDP_	-5.355177	0.0463	53.09797	1.0000
LOG_AOUT_	-5.952451	0.0158	52.96178	1.0000
LOG_DDEBT_	-3.469144	0.5538	-15.80255	0.6797
LOG_INTR_	-3.054572	0.7358	-14.58579	0.7512
LOG_NOR_	-3.880435	0.3729	-20.11921	0.4083
LOG_REXPA_	-5.090490	0.0662	-28.52182	0.0708

*MacKinnon (1996) p-values.
Warning: p-values may not be accurate for fewer than 30 observations.

Intermediate Results:

	LOG_RGDP_	LOG_AOUT_	LOG_DDEBT_	LOG_INTR_	LOG_NOR_	LOG_REXPA_
Rho – 1	-0.935060	-0.943846	-0.493830	-0.455806	-0.628725	-0.891307
Rho S.E.	0.174609	0.158564	0.142349	0.149221	0.162024	0.175093
Residual variance	0.000101	7.63E-05	0.009397	0.014603	0.019603	0.055761
Long-run residual variance	0.000389	0.000286	0.009397	0.014603	0.019603	0.055761
Number of lags	3	3	0	0	0	0
Number of observations	29	29	32	32	32	32
Number of stochastic trends**	6	6	6	6	6	6

**Number of stochastic trends in asymptotic distribution

4.2 Pairwise Granger Causality Test

Pairwise Granger Causality test between real gross domestic product proxied as economic growth, agricultural output, domestic debt, interest rate, non oil revenue, and recurrent expenditure on agriculture are examined in Table 3 below. The Pairwise Granger causality tests were inconclusive at 5% level of significance. The results alternated between bi-directional, no causality and uni-directional, depending on the lag length allowed. The outcome in respect one two-lag length is presented in table 3. The Table reveals that we cannot reject the hypothesis that AOUT Granger causes RGDP, we do not reject the hypothesis that

RGDP does not Granger cause AOUT. We can reject the hypothesis that AOUT does not Granger cause INTR, but we do reject the hypothesis that INTR does not Granger cause AOUT. We can reject the hypothesis that REXPA does not Granger cause AOUT, but we do reject the hypothesis that AOUT does not Granger cause REXPA. Therefore it appears that Granger causality runs one-two way (s) from AOUT to RGDP, AOUT to INTR, AUOT to REXPA and not the other way.

Table 3: Pairwise Granger Causality Tests

Pairwise Granger Causality Tests
Date: 10/01/14 Time: 20:59
Sample: 1981 2013
Lags: 2

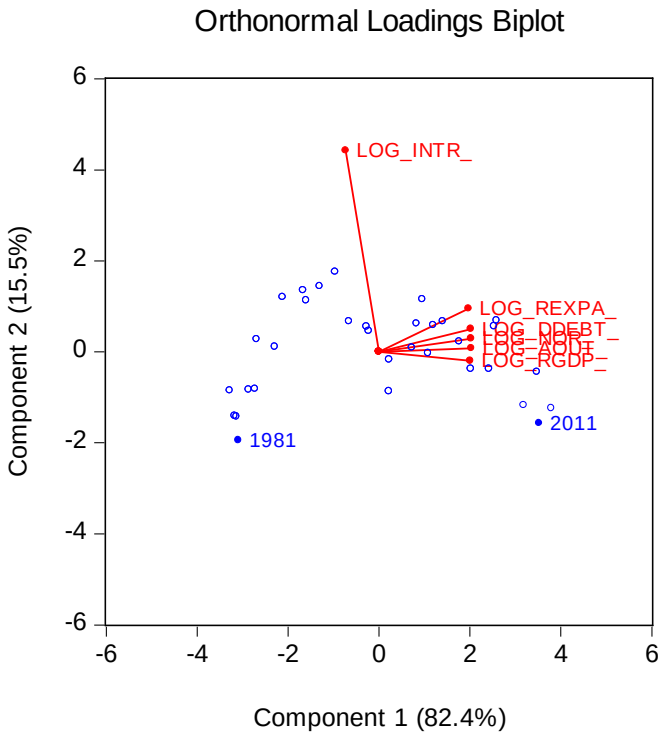
Null Hypothesis:	Obs	F-Statistic	Prob.
LOG_AOUT_ does not Granger Cause LOG_RGDP_	31	4.25589	0.0252
LOG_RGDP_ does not Granger Cause LOG_AOUT_		4.72377	0.0178
LOG_DDEBT_ does not Granger Cause LOG_RGDP_	31	1.36373	0.2734
LOG_RGDP_ does not Granger Cause LOG_DDEBT_		1.60491	0.2202
LOG_INTR_ does not Granger Cause LOG_RGDP_	31	1.00308	0.3805
LOG_RGDP_ does not Granger Cause LOG_INTR_		2.75657	0.0821
LOG_NOR_ does not Granger Cause LOG_RGDP_	31	0.19038	0.8278
LOG_RGDP_ does not Granger Cause LOG_NOR_		0.05054	0.9508
LOG_REXPA_ does not Granger Cause LOG_RGDP_	31	0.18865	0.8292
LOG_RGDP_ does not Granger Cause LOG_REXPA_		0.19085	0.8274
LOG_DDEBT_ does not Granger Cause LOG_AOUT_	31	0.71934	0.4965
LOG_AOUT_ does not Granger Cause LOG_DDEBT_		2.89631	0.0732
LOG_INTR_ does not Granger Cause LOG_AOUT_	31	0.11387	0.8928
LOG_AOUT_ does not Granger Cause LOG_INTR_		2.49777	0.1018
LOG_NOR_ does not Granger Cause LOG_AOUT_	31	0.07182	0.9309
LOG_AOUT_ does not Granger Cause LOG_NOR_		0.73365	0.4898
LOG_REXPA_ does not Granger Cause LOG_AOUT_	31	0.03408	0.9665
LOG_AOUT_ does not Granger Cause LOG_REXPA_		0.49041	0.6179
LOG_INTR_ does not Granger Cause LOG_DDEBT_	31	2.29484	0.1208
LOG_DDEBT_ does not Granger Cause LOG_INTR_		2.26402	0.1240
LOG_NOR_ does not Granger Cause LOG_DDEBT_	31	1.39928	0.2647
LOG_DDEBT_ does not Granger Cause LOG_NOR_		7.53309	0.0026
LOG_REXPA_ does not Granger Cause LOG_DDEBT_	31	0.87235	0.4298
LOG_DDEBT_ does not Granger Cause LOG_REXPA_		1.73095	0.1969
LOG_NOR_ does not Granger Cause LOG_INTR_	31	3.24516	0.0552
LOG_INTR_ does not Granger Cause LOG_NOR_		0.88709	0.4240
LOG_REXPA_ does not Granger Cause LOG_INTR_	31	2.39706	0.1108
LOG_INTR_ does not Granger Cause LOG_REXPA_		0.01361	0.9865

LOG_REXPA_ does not Granger Cause LOG_NOR_	31	17.7484	1.E-05
LOG_NOR_ does not Granger Cause LOG_REXPA_		0.63423	0.5384

4.3 Orthonormal Loadings Biplot

The component scores are displayed as circles and the variables loadings and displayed from the origin with variable labels. The Biplot clearly shows us that the first component has positive loadings for all the six variables (.i.e., general agricultural output interpretations). Second, component has positive loadings for interest rate and negative loadings for REXPA, DDEBT, NOR, AOUT, and RGDP. If REXPA does well relative to DDEBT, NOR, AOUT and RGDP, the second specific component will be positive, and vice versa. See diagram 1 below

Diagram 1: Orthonormal Loadings Biplot



5.1 Summary of Result Findings

The econometric results of the ordinary least square (OLS) technique employed to examine the impact of federal government agricultural expenditure on agricultural output in Nigeria for the period 1960 to 2010 in this study is now being summarized with some concluding remarks and/or recommendations. The results obtained conform to the existing studies in our literature that spotted the hindrance- factor (.i.e. inflation and interest rates) that is responsible for the slow pace of the growth of agricultural sector hence economic growth.

From the results of model, it was revealed that, there is an inverse relationship between inflation rate and interest rate with the economic growth of Nigeria within the period under review, even though, it is

statistically significant as the t-statistic suggests at 5% level. But, this is resulting from macroeconomic environmental problems such as inflation pressure, general price level, interest rate, exchange rate, etc.

5.3 Recommendations

From the econometric study of the impact of federal government agricultural expenditure on agricultural output in Nigeria, the following recommendations are stated below:

- Government should ensure that credit is made available to farmers with relatively low interest rate—since it has an inverse relationship with economic growth.
- Government's efforts should be intensified on how to control inflation rate even though it is statistically significant at 5% level—but it has a negative relationship with economic growth.
- Government should increase the budgetary allocation of agricultural sector. In order to curb hunger that is wagging and waxing stronger in Nigeria. Though it has a direct relationship with economic growth
- Government should encourage the financial institutions to make certain percentage of their total credit facility available for agricultural sector. In order to enhance food supply, employment generations, etc.
- Government should ensure that Nigerian economy is diversified, in other words, crude oil should not be the main stay of Nigerian economy. Nigerian economy should return to its status as it were in the late 1950s to late 1960s. Again its share to Gross Domestic Product (GDP) should increase as it were in the 50s and 60s.

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