



RESEARCH ARTICLE

AN EMPIRICAL ESTIMATION OF THE NEXUS BETWEEN AGRICULTURAL FARM INPUTS AND ECONOMIC GROWTH IN NIGERIA

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ABSTRACT

This study identifies various categories of variables that help to increase agricultural growth in Nigeria. The variables includes, an increase in agricultural farm inputs through Government Capital Expenditure (GOVTEXP) on agriculture, Agricultural Credit Guarantee Scheme Fund (ACGSF), Fertilizer input (FERCONSUM), Rainfall and Foreign Direct Investment (FDI). All these contribute to increase in the growth of agricultural commodities to Nigerian GDP. This study employs a unit root test, co integration, Error correction models and found out that the variables in the equation are co integrated which implies that there is a long run equilibrium relationship existing between the variables in the equation. This long run relationship is the basis for the short run disequilibrium adjustment in the model by the use of ECM which shows that the independent variables in the model significantly explain changes in economic growth in Nigeria.

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INTRODUCTION

The importance of farm inputs (credit) in Agricultural development cannot be over emphasized Dimits and Yoonje (1994) noted that capital is central to economic development. It is very important for agriculture. It is introduced into Agriculture as physical/mechanical capital- farm machinery and tool, biological capital- fertilizers, pesticides, herbicides, improved and certified seeds; chemical capital- mixed feeds, credit- cash or kind and bank draft (Olayide, 1976). The difference in capital resources had been noted as the most distinguishing factors of agriculture of developing countries from that of the economically advanced countries (Gadsby, 1967). In spite of this, there is still a controversy on the right position of credit in agricultural development. Miller (1976) identified two schools of thought on this issue. The first school of thought argued that it is not really the lack of credits that limits the modernization of agriculture; rather it is the absence of other essentials necessary for development (Nisbet, 1976; Miller, 1970, Schultz, 1964). The other school of thought pointed out that lack of credit on suitable terms is a major deterrent to the development of Agriculture. Finance remains a catalyst, which drives the machinery of production to optimum performance (Ijere, 1985). McNamara (1975) stated that access to credit is crucial to the smallholder operation no matter how realistic and essential the land reform. Nwosu *et al* (2010) in their study concluded that since credit is needed for

enhanced productivity and agricultural development, the three tiers of government in Nigeria should give the agricultural scheme the necessary support and publicity so that farmers (particularly small farmers) can benefit from its laudable objectives. And it was in recognition of this act that the federal government at various period put in place credit policies and establishes credit institution and scheme that could facilitate the flow of agricultural credit to farmers (Adeyeye and Dittoh, 1985). To make the farm productive is a problem for the small holder who has virtually no capital and no access to credit. A well-motivated farmer without credit cannot buy improved seeds, fertilizer, pesticide etc., hence small-scale farmers generally spend less than 20 percent of what is required on such items because they lack these resources (World Bank, 1975). Diana (2011), posits there are renewed hopes that Africa's agricultural potential may at least be realized. Since 2000, farm output trends appear to have improved. Farm productivity has remained sluggish in Nigeria in the past 30 years and so urgent action is needed to stem oil structure and nutrients while some environmentalist oppose all chemical input to farming, it is unreasonable to expect either African farmers or policy makers to ignore the yield-increasing potential of increased fertilizer use, provided this will pay. However, without irrigation, fertilizer use in Africa semi- arid region is risky and unprofitable. Nigerian concerns with Agricultural incentives and agricultural output has somewhat dominated the research activities of some scholars

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over the past years. Several studies have been carried out on agriculture and the potential of credit to stimulate growth. The studies have the consensus that agricultural credit is a very relevant variable in directing and stimulating growth. The studies indicate that more land brought under cultivation and greater use of input when credit is used has helped to increase output (Fabiya and Osotimehin, 1984). Borrowers and non-borrowers differ in what, how and how much they produce. This has resulted in lots of impact studies on credit. Among such studies, include Isijola and Ajetomobi, (2000) who studied financial systems and rural capital formation in Ogbomoso agricultural zone in Oyo State, Nigeria. This was to establish the rationale for the existence of various financial systems and to determine other existence or otherwise of a relationship between farmers' income and type of financial system they adopt. The study used descriptive statistics and the Kruskal-Wallis statistics to test relationship between income and financial system adopted. The financial system listed in the study includes commercial banks, single collector Susu system, rotating Susu system, cooperative societies, and home savings. These were described as informal, semi-formal, or formal systems depending on the degree of formality in their operations. The study concluded that there was a need to integrate the formal and informal systems. Empirical research carried out by Otu and Balogun (1991) in their study of credit policies and agricultural development in Nigeria tested two hypotheses that credit policies influence largely the behaviour of both constitutional lender and borrowers. Emmanuel, 2008 opines that although credit to the sector had no significant effect on agriculture output growth, its availability greatly depends on how high the nominal interest rates are. That is, credit policies can influence favourably the supply and demand for agricultural credit. Secondly, that a positive relationship exists between agricultural credit and a host of other variables such as output and use of modern inputs. Empirically they concluded that credit policies play very little role in influencing both lenders and borrowers behaviour. Credit subsidies are also major sources of production disincentive. They further contend that there is need to re-examine the overall objective of agricultural credit policies largely because it will be erroneous to infer that finance plays little role in agricultural development of the economy. Raji and Fakayode (2009) tried to indentify the determinants influencing commercial banks decision to ration credit in South-Western Nigeria. Data analyzed were from agricultural credit transaction of banks in Nigeria. Evidence from the multinomial model estimated shows that borrowers are heterogeneous.

Oguamanam (1996) did an empirical work on commercial bank credit to agriculture sector in Nigeria. From the analysis, commercial bank loans, and advances has positive relationship with the level of agricultural output, federal government capital expenditure contributed positively to the growth of agricultural output in Nigeria. Nnanna (2001) carried out similar work, on bank lending behaviour and output growth with implication on monetary policy in Nigeria. He revealed a significant relationship between banks lending behaviour and output growth. He further suggested that in the medium-term, the decline in output has negative influence on bank credit to private sector. In addition, Isijola (2000) revealed a significant relationship between credit supply and agricultural output in Nigeria. Isijola also identified commercial banks' loans and

advances, Agricultural Credit Guaranteed Scheme as the determinant of agricultural credit supply in Nigeria. Shanggen et'al (1998) in their empirical analysis on government spending, growth and poverty supported the view that government spending enhances the growth in agricultural productivity. His managerial analysis also shows that additional government expenditures on agricultural research and extension have the largest impact on agricultural productivity growth. Economic growth is dependent on the ability of the productive capacities of the various sectors of any economy, especially the agricultural sector which being very vital to economic growth has attracted much attention. Agricultural development makes a critical contribution to overall economic growth in many developing countries UNEP (2006). Nigeria's economy is still agrarian based despite the advent of oil. Agriculture can provide the necessary food security for the nation through self-sufficiency in food production. A viable agricultural sector can provide gainful employment for majority of the populace and improve inter-state trades based mainly on agricultural commodities. The agricultural sector when properly harnessed can stimulate futures market, agro-industries and agro-businesses by providing the necessary raw materials. Agriculture continues to be the dominant sector of the Nigerian economy (World Bank, 1992). Agriculture can provide the leverage for the nation's economic growth and diversification for sustainable development. There is therefore the need to harness the vast resources of agriculture for economic growth and development. The natural resources are described as a "mixed blessing" or even a curse" if they are not sufficiently well managed; they make nation rich for a while, true, but they tend to do so at the expense of economic growth over the long haul (see, Sachs and Warner, 1995a, Gylfason, 1999 and Gylfason, Herbertsson, and Zoega, 1999). It is recognized that one of the major impetus for increased agricultural production is the provision of Agricultural farm inputs (for instance, credit to farmers, farm machineries, pesticides etc). Credit has been identified as an input to agriculture for increased production and it is a critical factor in rural development.

Agricultural credit is considered a critical factor in the development process of any developing country, where farmers are subsistent, lack the means to purchase improved technology to engage in profitable farming and extend their farm activities. The financial markets in the developing countries are fragile with persistent shortage of loan able funds. In Nigeria, governments past and present have made efforts at providing affordable credit and farm inputs to agriculture. The issue of available and/or affordable credit and farm inputs to Agriculture in Nigeria can be analyzed on four main premises: - Fiscal policies, Monetary and Credit policies, rural Credit intervention policies, and establishment of complimentary institutions. The four are inseparable parts of the Financial System of the country.

## LITERATURE REVIEW

### Agriculture and economic growth

This section presents a number of factual observations describing how the agricultural sector changed in terms of productivity, contribution to economic growth, and indicating the relevance of the agricultural sector for poverty alleviation in different regions. In the discussion of the role of agriculture

in economic development, a leading question is how agriculture contributes to economic growth, and especially to pro-poor growth. Asoegwu and Asoegwu (2007) submit that Nigeria's agriculture requires a very strong boost because of increasing population and decreasing land resources due to environmental factors. There seems to be a paradox in the role of agriculture in economic development. The share of agriculture contributing to GDP is declining over the years. Gerdien(2007) asserts that the disappointment with agriculture led many donor organization to turn away from agriculture, looking instead to areas that would increase the well being of poor people such as health and education. At the same time, the productivity of for instance cereal yields has been increasing. It seems that as agriculture becomes more successful, its importance declines in the overall economy. Of course, other sectors in the economy can be even more successful, such as the Asian Tigers.

Question may be asked what economic growth is. By way of giving an answer to the question, we will briefly consider what determines economic development, how agriculture features in this and whether economic growth (i.e. through agricultural development) contributes to poverty reduction. What determines economic growth, or more broadly economic development, is a topic of much research. There are several factors that should be taken into consideration, and we will briefly scan these here. First, the accumulation of physical (machines, equipment, and structures) and human capital (education and training embodied in the labour force) are important explanatory factors for economic growth, but only explain part of the variations across countries. mechanization of agriculture helped transform American agriculture from the situation whose one farmer fed 5 people in 1980 to that where one farmer could feed 80 people in 1982 (Ania and Onwnala 2002). Technological and institutional factors influence the rate of accumulation of capital and therefore they are more fundamental explanations for growth. Second, besides accumulation of capital, total factor productivity (TFP) is an important element in explaining economic growth. Improving the quality of inputs (e.g. labour through education, physical inputs through technological innovation) as well as improving the organization of production and distribution increases productivity to a large extent and thus are an important determinant of growth. And this needs proper management. However, proper agricultural production management considers the decision taken and the process of implementing the operations decided together with the complex dynamics of the biophysical process underlying the production process (Cros *et al*, 2003).

Third, capital, knowledge and innovation flows between countries are important. Foreign trade and investments affect the incentives to innovate, imitate and use new technologies and thus countries' income levels are interdependent. Free trade is a politically sensitive issue, as is illustrated by the suspension of the WTO Doha trade rounds in 2006. On the one hand, trade enables a country to make use of innovations abroad, import products and to export its produce, on the other hand, it faces competition of other countries. Thus, (Helpman, 2004) concludes that international trade does not necessarily lead to the convergence of growth rates between countries. Second, even when it does, it does not necessarily lead to faster growth for all countries. Whether trade can encourage

growth of income per capita depends on several factors. Lower trade barriers promote growth when it is effected in combination with a stable and non-discriminatory exchange-rate system, prudent monetary and fiscal policies and corruption-free administration of economic policies<sup>43</sup>. It is not evident that these conditions always prevail in developing countries. Finally, a (recent) surge of research has focused on the effects of economic and political institutions on economic growth and has shown the importance of these for economic growth. North especially, has been instrumental in showing how institutional innovation have contributed to economic development, as well as how institutional failures have contributed to economic deterioration of societies. Technological know-how is necessary for success, but not sufficient. Regarding the "geography versus institutions" debate some authors, notably Jeffrey Sachs, have argued that geography plays a major role in attaining economic growth, including factors such as climate or access to seaports (vs. being landlocked). However, Helpman cites various authors who show that although geographical traits of a country play a role, they have no direct impact on its income per capita once the effects of institutions are accounted for. Institutions therefore play a prime role.

### Empirical Literature

Traditionally, the importance of agriculture in economic development is often reflected by its share in total GDP. The early development literature of the 1950's was rather pessimistic about the possibilities of spurring agricultural growth. After the groundbreaking work of Schultz and his "efficient farmer" hypothesis, a host of literature showed that not only was agriculture capable of productivity growth and responsive to technological change (on which the "green revolution" was based), but also that the agricultural sector can have significant multiplier effects and therefore growth in the agricultural sector could be spread to other sectors in the economy. Three different views have been posited to explain linkages between agriculture and the rest of the economy. The Lewis linkages focus on factor markets, especially labour and capital, and reveal the ways in which higher productivity in agriculture is reflected in the rest of the economy. Johnston-Mellor linkages look at product markets and the productive interactions by which industry and agriculture, by supplying one another with products, both grow more quickly. Non-market linkages are based on relationships among different sectors. For example, growth in agriculture improves the general food supply and nutritional levels, which in turn improves the overall economy. In another example, food security has a direct impact on social stability. Likewise, countries that have eased the profound urban bias in economic policy experience faster growth both in agriculture and in other sectors because resources are allocated more efficiently. The debate on the role of agriculture in economic growth is centuries old; yet, the realization that agriculture is central to the growth process in poor countries is relatively recent. The discussion in recent decades has been shaped by Johnston and Mellor's classic article, in which they identify five types of inter-sectoral linkages that highlight agriculture's role in economic growth. These forward and backward linkages, operating through both production and consumption, include: (a) Providing food for domestic consumption; (b) releasing labour for industrial employment; (c) Enlarging the market for

domestic industrial output; (d) Increasing the supply of domestic savings; (e) Earning foreign exchange. Recent empirical work on the regional level has specifically measured the Johnston-Mellor linkages, finding substantial growth multipliers from exogenous increases in agricultural income. In general, these studies have found the growth multipliers from agriculture to exceed those from non-agriculture. Indeed, the most recent additions to this literature have found agricultural growth multipliers in Sub-Saharan Africa to be substantially larger than previously thought (Delgado *et al.*, 1998). For instance, (Block and Timmer, 1994) calculated the economic growth multiplier associated with additional agricultural income in Kenya and found it to be nearly three times the magnitude of the growth multiplier for non-agriculture. A dollar of agricultural income generates an additional \$0.63 of income outside the agricultural sector, while a dollar of non-agricultural income generates only \$0.23 of income in the wider economy. This and related simulations suggest that economic growth strategies for countries like Kenya should give high priority to supporting the agricultural sector.

Studies show that West African cities are consuming over 80% of farm produce and thus have a significant economic impact on the rural economy<sup>96</sup>. The influence of cities on agriculture is not evenly spread across rural areas and has been recorded as favouring those areas near to urban markets (Bossard 2001). Urban cities influence rural economic growth especially in crop and livestock production. The ability of farmers to respond to demand depends on marketing conditions, transport and communication networks, transaction costs and internal and external competition. Farm product may also be processed or distributed by (rural) enterprises. The type of local agriculture will play an important role in determining the type of agro-processing or distribution services taken up by the rural enterprises. Agricultural growth plays an important role in stimulating local economies (Bossard 2001 and Gordon 2003). The rising incomes of small farmers and agro-processors are typically spent on locally provided goods and services, many of which are supplied by – or employ – poor people (for example local traders, brick-makers, carpenters etc) in villages and small towns. Estimates of the multiplier effects of increased farm output on other sectors range from 1.3 to 1.9 (Thirtle and Wiggins 2001). This in turn boosts the demand for agricultural produce and hence increases rural incomes – the so-called virtuous circle of rural-urban development (DFID 2002)

### Methodology and data

In this study, our hypothesis is to examine the causal relationship between Agricultural farm inputs, output growth and Nigerian Economic growth for the period of 1970-2009. This study makes use of time series data. The sources of the data are from annual reports and Statement of Accounts of the Central Bank of Nigeria (CBN), the federal office of Statistics, Food and Agriculture Organization (FAO) and www.ifpri.com websites respectively.

The data involved for this study, cover the Gross domestic product (GDP), foreign direct investment and agricultural farm inputs (machinery, agric credit schemes, government loans to agric etc, from 1970-2009.

### The Model

The purpose of the empirical analysis is to determine the relationship between Agricultural farm inputs and economic growth in the Nigerian economy for the period of 1970-2009. In other to achieve this objective two empirical equations will be estimated as specified below: The **Model** intends to capture the outcome of agricultural inputs to economic growth (captured as GDP<sub>t</sub>). Specifically, the estimated equations are as given below:

#### Model 1

$$\ln GDP_t = \alpha + \beta_1 \ln ACGSF_t + \beta_2 \ln FERCONSUM_t + \beta_3 \ln FDI_t + \beta_4 \ln GOVTEXP_t + \beta_5 \ln INT_t + \beta_6 \ln Rainfall_t + \mu \quad (1)$$

Where:

$\alpha$	=	Intercept term
$\ln GDP_t$	=	log Gross Domestic Product
$\ln ACGSF_t$	=	log Agricultural credit guarantee scheme fund
$\ln FDI_t$	=	log Foreign private investment (N' Millions)
$\ln FERCONSUM_t$	=	log Fertilizer consumption in Nigeria (metric tons)
$INT_t$	=	Interest Rate (%)
$\ln Rainfall_t$	=	Rainfall (milli litres (mm))
$\ln GOVTEXP_t$	=	log Government expenditure on agriculture
$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8$	=	Elasticity of the coefficients of the variables.
$\mu$	=	Error Term
$\ln$	=	logarithm

The hypothesis tested in this case are:

#### Hypothesis 1

H<sub>0</sub>: Agricultural farm inputs have significantly influenced Economic growth in Nigeria.  
H<sub>1</sub>: Agricultural farm inputs have not significantly influenced economic growth in Nigeria.

#### Hypothesis 2

H<sub>0</sub>: Agricultural farm inputs (Credit supply) have significantly influenced the output of agriculture in Nigeria.  
 $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8 \neq 0$ ,  
H<sub>1</sub>: Agricultural farm inputs (Credit supply) have not significantly influenced the output of agriculture in Nigeria.  
Where:  $\beta_i = 1-8$

### EMPIRICAL ANALYSIS

#### DATA DIAGNOSTICS

As specified earlier, the variables to be employed in this study in line with the model specification are, LGDP (log of Gross Domestic Product) LACGSF (log of Agricultural credit guarantee scheme fund), LFERCONSUM (log of Fertilizer consumption to agric in Nigeria), LGOVTEXP (log of government expenditure to agric), LRainfall (log of Rainfall), A graphical diagnostic representation of the behaviour of the economic variables used in this study (in their log forms) is presented in the following figure 2.

#### Stationarity Test

A unit root test was conducted for the variables using the Augmented Dickey-Fuller test and the Phillips-Perron test and

Table 1: Stationarity Test

Variables	Augmented Dickey-Fuller Test statistic	Phillips-Perron test statistic	Order of integration	Max. no of lags
GDP	-5.312332	-5.306094	I (1)	9
ACGSF	-5.569180	-5.537742	I (1)	9
FERCONSUM	-4.112311	-4.094296	I (1)	9
FDI	-11.62572	-11.62728	I (1)	9
GOVTEXP	-6.784527	-10.63612	I (1)	9
RAINFALL	-7.459719	-14.01034	I (1)	9
INT	-6.686256	-6.76725	I (1)	9

Source: Author's Computation

Table 3: Cointegration Result

Series: LGDP LACGSF LFERCONSUM LGOVTEXP LRAINFALL INT LFDI  
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.970636	266.0000	125.6154	0.0000
At most 1 *	0.928437	184.8562	95.75366	0.0000
At most 2 *	0.868968	124.2009	69.81889	0.0000
At most 3 *	0.787400	77.45776	47.85613	0.0000
At most 4 *	0.704554	41.84586	29.79707	0.0013
At most 5	0.422545	13.80270	15.49471	0.0885
At most 6	0.049715	1.172842	3.841466	0.2788

Trace test indicates 5 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.970636	81.14382	46.23142	0.0000
At most 1 *	0.928437	60.65522	40.07757	0.0001
At most 2 *	0.868968	46.74318	33.87687	0.0009
At most 3 *	0.787400	35.61190	27.58434	0.0038
At most 4 *	0.704554	28.04316	21.13162	0.0045
At most 5	0.422545	12.62986	14.26460	0.0892
At most 6	0.049715	1.172842	3.841466	0.2788

Max-eigenvalue test indicates 5 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

the results are presented in the table 1 that follows. Note that the MacKinnon (1996) critical values for the Augmented Dickey-Fuller (ADF) test, using the Schwartz information criterion (AIC) and Phillips-Perron test using the Newey-West bandwidth and the Bartlett-Kernel spectral estimation methods at 1%, 5%, and 10% significance level are -3.615588, -2.941145 and -2.609066 respectively. Stationarity (unit root) tests conducted for the set of variables enumerated above revealed that all the variables are I(1) variables (integrated of order 1). That is, they are not stationary at levels but are all-stationary at their various first differences.

### Agricultural Inputs and Economic Growth Determination

#### Cointegration and Error Correction Results

Table 3 above presents the cointegration result for the variables used. Here, it is observed that the variables in the

equation are cointegrated; the existence of this cointegration implies that there is a long-run equilibrium relationship existing between the variables in the equation. This is to say that if a set of variables are cointegrated, the effects of a shock to one variable spread to the others, possibly with time lags, so as to preserve a long-run relationship between the variables. The existence of this long-run relationship is the basis for the short-run disequilibrium adjustment in the model generally known as error correction mechanism (ECM), the result of which is presented in table 4 above.

It is observable from the results, given the value of the  $R^2$  (adjusted), that the independent variables in the model significantly explain changes in economic growth in Nigeria as about 99% of changes attributed to the independent variables. The model is overall significant given the probability value of the F-statistic. The Durbin-Watson

**Table 4: Error Correction Result**

Dependent Variable: LGDP

Included observations: 17 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.51099	1.317890	7.975614	0.0041
LGDP(-1)	1.273729	0.163524	7.789251	0.0044
LGDP(-2)	-0.567965	0.202824	-2.800283	0.0678
LACGSF(-2)	0.065914	0.031693	2.079764	0.1290
LFERCONSUM(-1)	0.265585	0.103997	2.553788	0.0837
LFERCONSUM(-2)	-0.544502	0.078011	-6.979788	0.0060
LGOVTEXP(-1)	0.081177	0.005151	15.76036	0.0006
LGOVTEXP(-2)	-0.103699	0.012092	-8.575774	0.0033
LRAINFALL(-1)	-0.323845	0.068137	-4.752875	0.0177
LRAINFALL(-2)	-0.443453	0.043400	-10.21787	0.0020
INT(-2)	0.057409	0.008839	6.494847	0.0074
LFDI(-1)	0.231614	0.023533	9.841901	0.0022
LFDI(-2)	-0.181383	0.046106	-3.934088	0.0293
ECM(-1)	-0.043164	0.056678	-0.761571	0.5017
R-squared	0.999938	Mean dependent var		12.17573
Adjusted R-squared	0.999667	S.D. dependent var		1.345606
S.E. of regression	0.024548	Akaike info criterion		-4.663949
Sum squared resid	0.001808	Schwarz criterion		-3.977774
Log likelihood	53.64357	Hannan-Quinn criter.		-4.595742
F-statistic	3698.013	Durbin-Watson stat		1.824009
Prob(F-statistic)	0.000006			

statistic shows that the residual of the model contains insignificant serial correlation. Coming down to the variables in the model, it is evident from thence that the inclusion of the immediate past period lagged of the dependent variable captures part of the changes in GDP accumulation. As expected, GDP in all the periods is positively related to farm inputs. Meaning that agric farm inputs has a significantly positive impact on the growth of agricultural sector. The result for FERTCONSUM is positive and significant in all the periods but for the second. As regards the effect and significance of these variables on Nigeria's economic growth, the result found out is in line with the anticipation of this study that fertilizer inputs in agric farming, increases agric output which in turn increase the monetary inflow of capital and this is in consonance with previous studies. The use of fertilizer provides the soil with nutrients and encourages high crop yields (Nelson, 2001) and Mortimore (1998)

Turning attention to GOVTEXPT, the result shows that the sign of the second period coefficient is negative but for the first period which is positive. But the overall probability shows that government expenditure as an input to farm activities contributes positively to economic growth. Economic theory suggests further that with the inflow of capital, there will be adequate provision of employment and infrastructure thus leading to general elevation from poverty, thereby obviating the necessity of de-accumulating the stock of reserves for these purposes. This result also confirms what Soludo (2007) emphasized concerning the positive impact of the variables on reserves accumulation of the country. As regards the ACGSF, the variable in the second period is not positively related to economic growth; meaning that ACGSF have no significant positive impact on its contribution to agric output of the country. This implies that agricultural

contribution to growth which is supposed to increase with economic size, moves in the opposite direction clearly indicating a mismanagement of the funds. The result for FDI is positive and significant in all the periods but for the second periods lag that is otherwise. As regards the effect and significance of these variables on its contribution to agricultural growth, the result found out is in line with the anticipation of this study that the size of agric output and growth increases with inflow of foreign direct investment and capital. Economic theory suggests further that with the inflow of FDI and capital, there will be adequate provision of employment and infrastructure (in the form of agricultural/farm inputs) which positively improves the growth capabilities of the economy. Also, the result is a negation to the findings of (Bernard, 2009), in which a negative relationship was found between FDI and its effects on agricultural output.

Regarding the interest rate variable the result show that the sign of the coefficients are positive for the current periods. This is not in line with the apriori expectation of this study. A possible explanation for this result is that since the impact of interest rate is positive it will result in the fall in agricultural contribution to growth and this is brought about by the negative demand for bank loans which in turn leads to a reduction in agricultural farm inputs purchases. Finally, the result for rainfall shows that the signs of the coefficients are not positive for the first period and second period but in the overall, the result is statistically significant. This is in line with the apriori expectation of this study. A possible explanation for this result is that rainfall helps to increase agricultural yield due to the availability of rainfall to improve plants health and viability and consequently output and growth.

## Policy Recommendation and Conclusion

This paper has identified various categories of variables that have helped to increase agricultural growth in Nigeria. An increase in agricultural farm inputs through government capital expenditure (GOVTEXP) on agriculture, agricultural credit guarantee scheme fund (ACGSF), fertilizer input (FERCONSUM), rainfall and foreign direct investment (FDI) lead to increase in the growth of agricultural commodities contribution to Nigerian GDP (a proxy for economic growth in this case). Similarly, foreign direct investment on agriculture has significantly increased growth in the sector. The study also concluded the sector experienced a slight increasing return to scale over the years. Despite this, the rate of increase is not enough to meet the challenges facing the agricultural sector and consequently, food insecurity over the years. The study indicated that the use of agricultural farm inputs to the sector is a driving force for agricultural growth in the sector and output increment. The government of Nigeria should see agriculture as the core of economic activities in terms of its employment and income generation and above all supplies food to the teeming population. In addition, the government should promote private-sector participation by attracting foreign investors in local provision and production of needed machinery, equipment and farm inputs. In the long-run, expanded local production of these inputs will likely lead to reduced unit costs through scaled economies.

Fertilizer as one of the major input to improve farm yield is already having the attention of the federal government by its recent pronouncement that subsidized fertilizers will be distributed through private individuals to farmers and not through government agencies due to their corrupt practice of selling the fertilizers to neighboring countries (Radio continental news 2011). This is a right direction as this if properly monitored will bring about higher yield by farmers. Similarly the subsidy programs in Nigeria need to be market responsive. Low fertilizer usages have been identified as adversely affecting yields and hence agricultural output and growth. Fertilizer price policy should therefore take into consideration the arrangement for effective procurement and distribution, credit disbursement to the agricultural sector, farmer's income as well as rural infrastructure, among others, in relation to the policies on achieving the objective of increased food production in the country. Consequent upon this, input subsidy programs should be used to develop, not weaken, competitive private sector-led input markets. Such programs should be targeted to poor farmers who, without subsidies, would not adopt key inputs. They should complement, not undermine, commercial sale outlets. They should be limited in duration that is, accompanied from the start with a phase-out schedule.

Agricultural commodities in Nigeria need adequate pricing, so that farm incomes will be high enough to enable farmers to purchase farm inputs. Adequate pricing must be accompanied by improved knowledge among farmers on the use of fertilizers, and adequate linkages among traders, suppliers, and farmers. There is the need for active private sector and government partnership to promote small-scale irrigation to reduce the risk associated with rainfall and to increase the profitability of adopting fertilizer, and also to develop domestic capacity for fertilizer. The federal government must

strengthen its agricultural credit guarantee scheme, in other to reawaken the confidence of commercial banks.

Since the agric schemes in Nigeria have the problem of publicity (such as the agric credit scheme, among others as noted by Oguoma (2002) then there is a low turnout of farmers in most states of the federation in patronizing the scheme because of lack of awareness, and so greater effort and mechanisms should be put in place to ensure that information about the scheme is easily accessible by the stake holders in the agricultural sector; in this case the farmers. However, stakeholders in the scheme via: the farmers, lending institutions and government must show greater commitment and dedication for the scheme to achieve its laudable objectives. Similarly, from the ensuing study we discovered that agric guarantee scheme loan have a positive impact on agric output and yet agric does not have the required impact, this therefore call for policy review of the program, where the program should be properly monitored to ensure that the funds allocated for the purpose of agricultural credit guarantee funds actually gets to the end users; in this case the farmers. In other to ensure proper participation of farmers in the program, there should be local farm loans association entrusted with the aim of proper utilization of these funds. Interest rate on loans borrowed should be low for farming activities so as to encourage loan usage to purchase agric farm inputs for optimal yield. Finally, the government must make greater investments in machinery, farm equipments and transportation infrastructure, especially for the rural-urban roads and markets. Improvements in mechanized farming and improvement in road quality will attract private investment in machinery investments, transportation, improve access to purchased inputs, credits and output markets, and enhance marketing efficiency.

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