# Impact of Commercial Banks' Credit on Agricultural Productivity in Nigeria (Time Series Analysis 1980 - 2013)

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**Abstract**
This study was carried out to examine the impact of commercial banks' credits on agricultural productivity in Nigeria. The aim is to determine the relationship between commercial banks credit and agricultural productivity in the Nigeria economy. The statistical tool of analysis is the Ordinary Least Squares (OLS) techniques. However the variables were subjected to the Unit Root Test to ensure stationarity before the application of the OLS. On the whole, three hypotheses were tested; all the alternative hypotheses were validated by the OLS result. The t-calculated of commercial banks credit has a value of 6.28 which is greater than the t-critical of 1.96. This is an indication of positive relationship between commercial banks' credit and agricultural productivity. The t-calculated of interest rate on commercial banks credit has a value of -9.38 as against 1.96 t-critical. This is an indication of a negative relationship between interest rate and agricultural productivity. While the t-calculated of government spending, as a complimentary variable, has a value of 3.42 as against the 1.96 of t-critical. This, as the case of hypothesis one, is also indication of significant positive relationship between government spending and agricultural productivity in Nigeria. Based on the findings, we recommended that the Agricultural Credit, Guarantee Scheme should improve on their conditions for credit guarantee in order to make agricultural financing attractive to commercial banks. Furthermore, the paper advocates amongst others, that the government should subsidized interest rate to the agricultural sector and stop fuel subsidy as this will provide more benefit to the society than the fuel subsidy.

**Keywords:** Agricultural productivity, Commercial banks' Credit, interest rate, Government expenditure and Ordinary least square.

## 1. Introduction

According to CBN (2000), Nigeria is endowed with huge expanse of fertile land, rivers,streams, lakes, forests and grasslands, as well as a large active population that can sustain highly productive and profitable agricultural sector which can ensure self-sufficiency in food and raw materials for the industrial sector and as well provide gainful employment for the teeming population and generate foreign exchange for the economy. Ironically, the reverse is the case. Several factors account for the poor performance of the agricultural sector in Nigeria; these include virtual neglect of the sector, poor access to modern inputs and technology, and lack of optimum credit supply. (Enyim, Ewno and Okoro, 2013). Aside the problem of poor access to modern technology, the major bane of agricultural development in Nigeria is low investment finance. (Salami and Arawomo, 2013).

According to Udih (2014) Bank credit is expected to impact positively on the investible sectors of the economy through improved agricultural production of goods and services. He opined that sufficient financing of agricultural projects will not only promote food security, but also enhance the entrepreneurship performance of our young investors. Concluding that, this is borne out of the expectation that a good match between adequate bank credit and agricultural entrepreneurship will ensure massive agricultural productivity.

Qureshi, Akhtar and Shan (1996), in their contribution argued that Banks credit has the capacity to remove the financial constraints faced by farmers, as it provides incentives to enable farmers to switch quickly to new technologies which can enhance the achievement of rapid productivity and growth. Ijere (1996) viewed banks' credit as a catalyst that can activates the engine of growth enabling it to mobilize its inherent potentials and to advance in the planned or expected direction. In support of the same view, Umoh (2003) maintained that banks' credit constitutes the power or key to unlock latent talents, abilities, visions and opportunities, which in turn act as the mover of economic development. Banks' credit has a significant contribution to economic development by enhancing production and productivity and thus higher income and better quality of life to the people. (Well, 1970).

However, from available statistics of commercial banks total sectoral credit distribution in Nigeria, the allocation to the agricultural sector, given the importance of the sector, is insignificant. For instance, credit allocation to the sector fluctuated between 6.98% and 10.66% in 1981 to 1985; between 10.66% and 16.15% in 1985 to 1990; between 16.15% and 17.5% in 1990 to 1995. It declined sharply to 8.07% in 2000, 2.46% in 2005, 1.67% in 2010, and fluctuated between 1.67% and 3.44% in 2010 to 2013 (Source: CBN Statistical Bulletin, 2013)

### 1.1 Statement of the Research Problem
Nigeria, like most other countries in the African continent is not only, endowed with vast agricultural farmland, but also conducive geographical condition that favours agricultural production throughout the year. Despite this great potential, there is not much to show for it. (Salami and Arawomo, 2013).

Several studies in this area including Enyim, Ewno and Okoro (2013), have identified poor credit supply as one of the factors accounting for the poor performance of the agricultural sector in Nigeria. According to Obilor (2013), banks precisely the commercial banks, obviously have no kin interest in agricultural finance. In order to encourage the banks, the government established the Agricultural Credit Guarantee Scheme (ACGS) to provide guarantees against inherent risk in agricultural lending. This measure could not achieve the intended objectives because agricultural being both labour and capital intensive venture requires huge capital outlay (Nwankwo, 2013).

Consequently, the country with it highly diversified agro-econological condition is relying on massive importation of basic food items and raw materials for industrial imputs (Itodo, Apeh and Adeshima, 2013). The resultant effect of the high cost of living coupled with high level of unemployment on the common man is beyond reasonable imagination. Obviously, the government's effort to fortify the Nigeria agricultural sector has not yielded the desired result (Udensi, Orebiyi, Ohajianya and Eze, 2012). Thus, the need for further investigation in this area cannot be overemphasized.

## 1.2 Objectives of the Study
The objectives of the study include:
(a)  To evaluate the impact of commercial banks' credit on agricultural productivity in Nigeria.
(b)  To determine the influence of interest rate on commercial banks' credit on agricultural productivity in Nigeria.
(c)  To assess the effect of government spending on agricultural productivity in Nigeria.

## 1.3 Research Hypotheses
To facilitate the study, the following hypotheses were formulated and tested:
$Ho_1$: Commercial banks' credit does not have a positive impact on agricultural productivity in Nigeria.
$Ho_2$:  Interest rate on commercial banks' credit does not have a positive influence on agricultural productivity in Nigeria.
$Ho_3$:  Government spending on the agricultural sector has no severe effect on
      agricultural productivity in Nigeria.

## 2. Review of Related Literature
### 2.1 The Concept of Agricultural Finance
Agricultural financing has suffered a great set back in Nigeria. Perhaps this is due to the fact that agricultural lending is considered to be more risky, problematic and unprofitable relative to other sectors (Enyim, Ewno and Okoro, 2013). To this end, the commercial banks which are the major conventional financial institutions have no kin interest in agricultural finance (Obilor 2013). In the days of sectoral allocation, the agricultural sector was favoured and banks complied because of the penalties involved of which some of the banks even preferred to pay than to comply (Gurdenson, 2003).

Thus, the Nigerian agricultural sector which is significantly made up of peasant farmers relies more on the informal sources of fund for credit supply. These include: cooperatives, community development associations, thrift associations, family, friends and money lenders

(Akinleye, Akanni and Oladoja, 2003). Nwankwo (2013) in his contribution asserted that the informal sources cannot meet the credit needs of the farmers adequately. Consequently, in order to enhance credit flow to the sector, the government established the Nigerian Agricultural Cooperative Bank (NACB) now the Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB) in 1973 (Nwankwo, 2013).

However, with the establishment of the NACRDB the challenge of poor credit supply to the agricultural sector was yet unbated. This is indication amongst others that the budgetary allocation of NACRDB was insufficient for the credit needs of the agricultural sector (Akinleye, Akanni and Oladoja, 2003). According to Zakaree (2014), in an attempt to address this issue, the government established the Agricultural Credit Guarantee Scheme (ACGS) in 1977 to encourage commercial banks to increase credit supply to the agricultural sector by providing guarantees against inherent risk in agricultural lending.

Akinleye, Akanni and Oladoja (2013) asserted that despite several years of the establishment of the Agricultural Credit Guarantee Scheme (ACGS), the level of commercial bank involvement in credit distribution to the agricultural sector is yet uncertain. Nigeria as a country with highly diversified agro-ecological endowment, is yet relying on massive importation of basic food items and industrial raw materials, it is ironical.

## 2.2 Empirical Review

Udih (2014) investigated banks credit and agricultural development. The paper used primary and secondary sources of information that were extracted from five (5) banks and ten (10) agricultural enterprises in Delta State. A simple random sampling technique through the lottery method was adopted to select the samples. The data were analysed using percentage, mean, and Standard Deviation and Pearson product moment correlation to test the hypotheses. The research findings include: that banks' credits and advances to agricultural entrepreneurs promotes agricultural development and productivity, and that regulated banks' credits to the agricultural entrepreneurs has no or little impact on the entrepreneurship performance, and thus, suggested that adequate bank credits should be granted to small scale agricultural farmers to increase productivity: and their farms land should be used as collateral instead the of usual banks loan security to promote entrepreneurship performance.

Kareem, Bakare, Raheem, Olagumela, Alawode and Ademoyewa (2013), examined the factors influencing Agricultural output in Nigeria: Macro-economic perspectives. The study seeks to determine the factors influencing agricultural production in Nigeria, and also determine the causality between Agricultural outputs and macro-economic variables. The study adopts regression analysis, descriptive statistics and the Granger causality tests on macroeconomic variables (i.e. Food import value, Interest rate, Commercial bank loans on Agriculture, GDP growth rate and Foreign direct investment) to find the significant relationship between the different variables chosen. The result shows fluctuations in the trend of variables considered (i.e. Interest rate, Commercial bank loans to Agriculture, GDP growth rate and foreign direct investment) in relation to the period under review. The result further shows that foreign direct investment: commercial bank loan, interest rate and food import value have positive relationship with Agricultural output.

Obilor (2013) examined the impact of Agricultural Credit Scheme Fund, agricultural product prices, government fund allocation and commercial banks' credit to agricultural sector on agricultural productivity. The result revealed that Agricultural Credit Guarantee Scheme Fund and Government fund allocation to agriculture produced a significant positive effect on agricultural productivity, while the other variables produced a significant negative effect.

Nwankwo (2013) examined agricultural financing in Nigeria and its implication on the growth of Nigerian economy using ordinary least square method and quantitative research design. The study revealed that there is significant relationship between agricultural financing and the growth of Nigerian economy and that the level of loan repayment rate over the years has indeed negatively impacted significantly on the growth of Nigerian economy.

Ogbanje, Yahaya and Kolawole (2012) examined the effect of commercial banks loan on the agricultural sector in Nigeria from 1981 to 2007. Growth in agricultural sector was expressed in terms of agricultural Gross Domestic Product (GDP). Secondary data for the study were obtained from the Central Bank of Nigeria. Findings revealed that commercial banks loan to the agricultural sector increased substantially from ₦590.6m in 1981 to ₦4.221.4m in 1990, a 614.76 percent increase. From 1991, the loan stock rose from ₦5,012.7m to ₦146,504.5m in 2000, representing an increase of 2822.67 percent. There was, however, a sharp decline in loan stock from ₦200,856.2m in 2001 to ₦149,578.9m in 2007. Over the period of study, agricultural GDP showed declining growth rate. Nevertheless, agricultural GDP grew from ₦84,428.5m in 1981 to ₦267,051.7m in 2007. The ordinary least square method, with lagged dependent variable, revealed that commercial banks' loan positively affected agricultural GDP at 0.01 level of probability. Hence, commercial banks' loan has contributed significantly to agricultural development in Nigeria.

Enyim, Ewno and Okoro (2013) examined banking sector credit and performance of the Agricultural sector in Nigeria. The study applied econometric tests such as unit root, co-integration and its implied error correction model and Grange causality test, in which changes in AGDP was regressed on commercial bank credit to agriculture. The result of the analysis shows that the total money stated as Government Expenditure on agriculture is not statistically significant and not theoretically in line. However, the result shows that commercial banks' credit to the agricultural sector has a positive relationship with agricultural productivity.

The available literatures provide a comprehensive view of different scholars about the relationship between government expenditure on agriculture and agricultural output. However, most of the research findings are not in consensus.

## 3. Research Method
### 3.1    Estimation Techniques
The conventional approach to time-series econometrics is based on the implicit assumption of stationarity of time-series data. A recent development in time series econometrics has cast serious doubts on the conventional time-series assumptions. There is substantial evidence in the recent literature to suggest that many macroeconomic time series may

possess unit roots. That is, they are non-stationary processes (Gujarati, 2003). A time-series of order zero 1(0), is level stationary, while a time-series integrated of order one, 1(1), is stationary at the difference. Most commonly, time series are found to be integrated of order one, or 1(1). The implication is that systematic movements of integrated variables in the estimation process may yield spurious regression results. In the case of a sample study, the risk of spurious regression is extremely high. In the presence of 1(1) or higher order integrated variables, the conventional t-test of the regression coefficients generated by conventional OLS procedure is highly misleading. (Johansen, 1991; Brooks, 2002). Thus the Unit Roots stationarity test of the variables is of utmost importance.

Once stationarity test has been conducted on the variables, they can then be used to estimate the Ordinary Least Squares results. (Johansen, 1991; Brooks 2002) The OLS is a best linear unbiased estimator. The t-statistic in the OLS will be used to test various hypotheses on the impact of commercial banks' credits on agricultural sector on the growth of agricultural productivity in Nigeria.

## 3.1    Model Specification
The model specified for this study is shown below:
AGP = b0 + b1CBCA + b2INTR + b3GSA + ut
$$b1 > 0, b2 < 0, b3 > 0$$
Where:
AGP   =        Agricultural Productivity
CBCA =        Commercial banks' credit to the agricultural sector
INTR  =        Interest rate on Commercial banks' credit to agriculture
GSA   =        Government spending on the agricultural sector
 Ut   =        Error term

The data used in this study covered the period between 1980 and 2013.

## 4. Data Analysis/Results
### 4.2: Value of the Variables
 Table 4.1.1:
The Value of the Variables for the Period under Review

| 0bs | AGP | CBCA | INTR | GSA |
|---|---|---|---|---|
| 1980 | 1861.000 | 462.2000 | 7.500000 | 165.4300 |
| 1981 | 1809.000 | 590.6000 | 7.500000 | 187.9300 |
| 1982 | 3658.000 | 768.6000 | 7.750000 | 162.1500 |
| 1983 | 7639.000 | 940.6000 | 10.25000 | 198.9600 |
| 1984 | 6838.000 | 1052.100 | 10.00000 | 258.6000 |
| 1985 | 7402.000 | 1316.200 | 12.50000 | 262.7100 |
| 1986 | 6713.000 | 1810.300 | 9.250000 | 225.0100 |
| 1987 | 6034.000 | 2427.100 | 10.50000 | 1458.800 |
| 1988 | 65023.00 | 3066.700 | 17.50000 | 3011.800 |
| 1989 | 84428.00 | 3470.500 | 16.50000 | 2402.800 |
| 1990 | 122074.0 | 4221.400 | 26.80000 | 1256.300 |
| 1991 | 85284.00 | 5012.900 | 25.50000 | 291.3000 |
| 1992 | 80979.00 | 6978.900 | 20.01000 | 8882.380 |

| 1993 | 96784.00 | 10753.60 | 29.80000 | 7382.740 |
|------|----------|----------|----------|----------|
| 1994 | 106676.0 | 17757.70 | 18.32000 | 9746.400 |
| 1995 | 102760.0 | 25278.70 | 21.00000 | 11496.15 |
| 1996 | 113498.0 | 33264.10 | 20.00000 | 14853.54 |
| 1997 | 119487.0 | 27934.30 | 19.74000 | 13589.49 |
| 1998 | 124674.0 | 27180.70 | 13.54000 | 43610.65 |
| 1999 | 129607.0 | 31045.70 | 18.29000 | 57956.64 |
| 2000 | 132699.0 | 41028.80 | 24.85000 | 39882.68 |
| 2001 | 121886.0 | 55846.10 | 20.71000 | 80530.88 |
| 2002 | 138754.0 | 30849.70 | 19.18000 | 64782.15 |
| 2003 | 143707.0 | 62102.80 | 17.95000 | 76527.65 |
| 2004 | 149513.0 | 67738.60 | 17.26000 | 82797.11 |
| 2005 | 155935.0 | 48561.50 | 16.94000 | 119018.0 |
| 2006 | 162249.0 | 49193.40 | 15.14000 | 150779.3 |
| 2007 | 170815.0 | 140378.9 | 15.44000 | 163977.5 |
| 2008 | 127875.0 | 134814.6 | 15.19000 | 137156.6 |
| 2009 | 182661.0 | 114206.6 | 15.02000 | 170770.6 |
| 2010 | 190133.0 | 135761.3 | 14.88000 | 335837.9 |
| 2011 | 203410.0 | 180262.8 | 17.41000 | 425466.5 |
| 2012 | 216209.0 | 205537.7 | 16.30000 | 472546.1 |
| 2013 | 231464.0 | 272388.4 | 15.40000 | 510465.7 |

*Source:* CBN Statistical Bulletin (2013)

## 4.2 Trend of the Variable

The trends of the variables are shown in figure. 4.2.1 and 4.2.2 below:
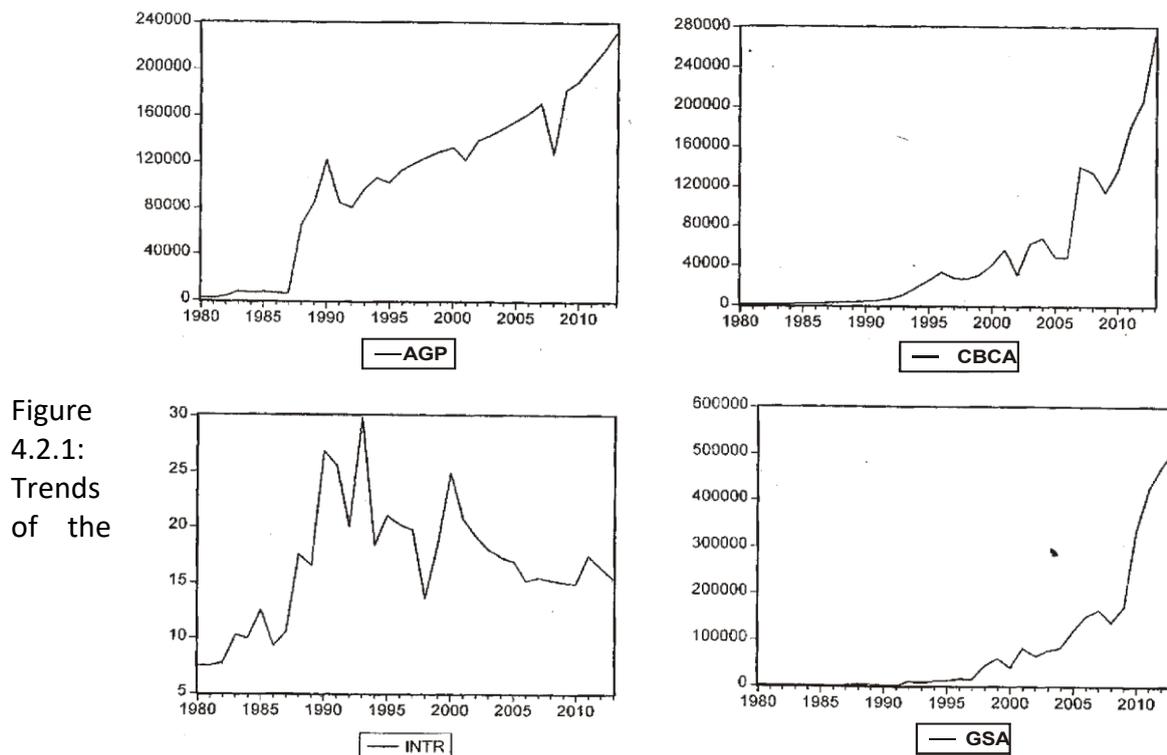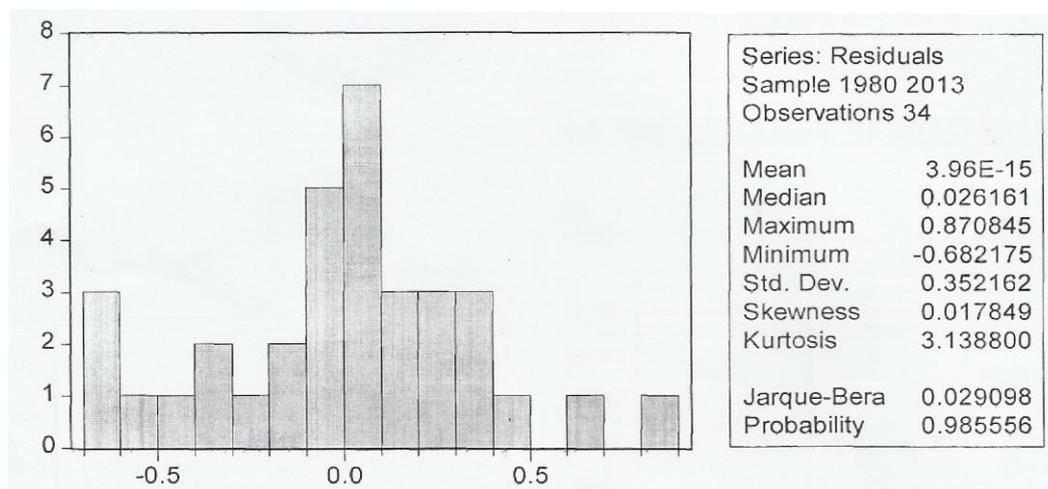
Figure 4.2.1: Trends of the Variables





Figure 4.2.2: Bar Chart of the Variables

The level of agricultural productivity was high in most of the periods under review, except between 1980 and 1985. The fluctuation in interest rate for agricultural credits in most of the periods under review is probably due to flawed interest rate policy of the government. The low level of government spending on the agricultural sector is probably symptomatic of poor government commitment to the agricultural sector.

## 4.3    The Augmented Dickey Fuller (ADF) Unit Root Test

The Augmented Dickey Fuller (ADF) unit root test is shown in table 4.3.1below:

Table 4.3.1:
Summary of ADF Unit Root Test

| Variables | Level Data | First Difference | | 1% CV | 5% CV | 10% CV | Order of Integration |
|-----------|-----------|------------------|---|-------|-------|--------|----------------------|
| AGP | -0.35 | -4.22 | * | -3.66 | -2.96 | -2.62 | |
| CBCA | 2.21 | -4.06 | * | -3.66 | -2.96 | -2.62 | I (1-1) |
| INTR | -2.21 | -5.25 | * | -3.66 | -2.96 | -2.62 | I (1-1) |
| GSA | 1.47 | -3.08 | ** | -3.66 | -2.96 | -2.62 | I (1-1) |

NB: (1) CV means the critical value
(2) * and ** refers to 1% and 5% levels

Table 4.3.1 above, showed that all the variables were originally non stationary. However, they became stationary after the first difference was taken. Interest rate, commercial banks' credits to the agricultural sector and agricultural productivity were stationary at 1% level, the government spending on agriculture was stationary at the 5% level.

## 4.4 Ordinary Least Square (OLS) Result

The result of the ordinary least squares which was used to test the various hypotheses is shown table 4.4.1below:

Table 4.4.1:
Summary of OLS Result

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|-------|
| LCBCA | 0.568950 | 0.090592 | 6.280353 | 0.0000 |
| LINTR | -2.071148 | 0.220822 | -9.379249 | 0.0000 |
| LGSA | 0.346186 | 0.101355 | 3.415567 | 0.0020 |
| C | 1.372348 | 0.603463 | 2.274122 | 0.0303 |
| R-squared | 0.845536 | Mean dependent var | | 10.99086 |
| Adjusted R-Squared | 0.838990 | S.D. dependent var | | 1.495338 |
| S.E. of regression | 0.369351 | Akaike info criterion | | 0.955993 |
| Sum squared resid | 4.092608 | Schwarz criterion | | 1.135565 |
| Likelihood | -12.25188 | F – statistic | | 170.2987 |
| Durbin-Watson stat | 2.048550 | Prob. (F-statistic) | | 0.000000 |

$R^2$ = 0.85, DW = 2.05, t-critical = 1.96, F-critical = 4.01

## 4.5 Test of Hypotheses

### Test of Hypothesis 1

The first hypothesis tested in this study states that "commercial banks' credit does not have a positive impact on agricultural productivity". Since the t-calculated of 6.28 is greater than the t-critical of 1.96, the null hypothesis is rejected, while the alternative hypothesis which states that "commercial banks' credit has a positive impact on agricultural productivity" is validated.

### Test of Hypothesis 2

The second hypothesis of this study states that "interest rate on commercial banks' credit does not have a positive influence on agricultural productivity in Nigeria". The alternative hypothesis which states that "interest rate on commercial banks' credit has a positive

influence on agricultural productivity" is validated since the t-calculated of 9.38 is greater than the t-critical of 1.96.

### *Test of Hypothesis 3*

The third hypothesis tested in this study states that "government spending on the agricultural sector has no severe effect on agricultural productivity in Nigeria". The t-calculated in this regard is 3.42 which is greater than the t-critical of 1.96. This is an indication of the acceptance of the alternative hypothesis that there is a significant relationship between government spending on agriculture and agricultural productivity in Nigeria. The $R^2$ shows that 85 percent of the total variation in the AGP has been explained by the CBLA, INTR and GSA together. This is good fit since the unexplained variation is just 15 percent (i.e.1-0.85). However, the DW test with a value of 2.05 did not show evidence of first order serial correlation in the model.

## 5. Summary of Findings

The result of the study has far reaching implications. The t-calculated of commercial banks' credit has a value of 6.28 which is greater than the t-critical of 1.96. This is an indication of positive relationship between commercial banks' credits and agricultural productivity. The t-calculated of interest rate on commercial banks' credit has a value of -9.38 as against 1.96 t-critical. This is an indication of a negative relationship between interest rate and agricultural productivity. While the t-calculated of government spending as a complimentary variable, has a value of 3.42 as against the 1.96 of t-critical. This is also an indication of a significant positive relationship between government spending and agricultural productivity in Nigeria.

## 6. Conclusion

Nigeria is endowed with a huge expanse of fertile land, as well as a large active population that can sustain a highly productive agricultural sector. Ironically, the reverse is the case. The agricultural sector has formed the nucleus of countries such as Australia, United States, China, India etc. However the discovery of crude oil has led to the neglect of the agricultural sector in Nigeria, which in turn has resulted in acute shortage of supply of food stuffs, industrial raw materials, and has brought about high level of importation of these commodities, thereby increasing cost of living drastically. This has significantly impoverished the common man and has resulted in huge loss of vital foreign exchange through enormous bills of imports.

## 7. Recommendations

In the light of the above findings, the following recommendations are therefore proposed:

(a)     The government should subsidized interest rate to the agricultural sector and stop fuel subsidy, as this will provide more benefit to the society than the fuel subsidy.

(b)     The Agricultural Credit Guarantee Scheme (ACGS) should improve on their conditions for credit guarantee in order to make agricultural financing attractive to commercial banks.

(c)     The government should strengthen the agricultural credit guarantee scheme by meaningful budgetary allocation in order to enhance its capital base significantly.

(d)     The government should formulate policies that will encourage the banks to give loans to farmers at a concessionary interest rate.

(e)     Also, the government should make deliberate efforts to expand its agricultural expenditure by increasing its financial grants to agricultural firms and small scale farmers.

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