



THE ROLE OF AGRICULTURAL CREDIT FINANCING ON AGRICULTURAL OUTPUT IN NIGERIA (1990–2022)

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ABSTRACT: *Agricultural credit finance is seen as the pathway to persistent increase in agricultural output. This study empirically investigates the role of agricultural credit financing on agricultural output in Nigeria from 1990 to 2022 using annual time series data. The study employed econometrics techniques such as Descriptive Statistics, Augmented Dickey-Fuller Unit Root Test, Granger Causality Test, and Ordinary Least Square Estimation Method of analysis. Results and findings show that agricultural credit financing via commercial bank credits, government expenditures on agricultural sector, and agricultural credit guarantee scheme fund (ACGSF) has a positive significant effect on agricultural output and has contributed massively to the growth of agricultural output and productivity in Nigeria. It is therefore recommended that government and monetary authorities should formulate policies that will both increase and expand access to credit by farmers as it will further boost agricultural output, thereby fostering sustainable economic growth and development in Nigeria.*

KEYWORDS: Agricultural Output, Commercial Banks Credit, Government Expenditures, Agricultural Credit Guarantee Scheme Fund, Economic Growth and Development.



INTRODUCTION

The role of agriculture in any economy is indeed significant and it is the most dominant sector and a major source of livelihood for its citizens (Ijoya & Abdulabeem, 2000). Nigeria is endowed with huge expanses of fertile lands, rivers, streams, lakes, forest and grasslands as well as a large active population that can sustain a 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 (CBN, 2000). Ironically, the reverse is the case. Nigerian agriculture is essentially traditional and subsistent in nature, hence the low and poor performance of the sector. Several factors account for the poor performance of the agricultural sector in Nigeria; these include physical neglect of the sector due to the oil discovery in the 70s, poor access to modern inputs and technology, and lack of access to credit facilities. Besides the problem of poor access to modern inputs and technology, the major distress of agricultural development in Nigeria is low investment finance (Salami & Arawomo, 2013).

The importance of credit finance to agricultural development cannot be over-emphasized. Credit enables farmers to have more access to resources through the removal of financial constraints. The traditional argument for the provision of agricultural credit is that additional capital can be temporarily used to enhance the level of households' productive and physical capital (Eswaram & Kotawal, 1990). The provision of credit will reduce the cost of capital intensive technology and assets relative to family labour. Thus, instead of growing low yielding local crops, for example, access to credit may allow an increased use of improved seeds and fertilizers, leading to higher crop output per unit of labour and land (Feder et al. 1985). This may in turn encourage the adoption of labour-saving technologies such as animal traction in crop production.

In light of the role of agriculture as a solution for sustainable development, agricultural credit finance is seen as the path to sustainable economic growth. In less developed and developing countries like Nigeria, government has initiated agricultural credit programs, schemes and policies that farmers will have access to formal sources of credit without "bankable" collateral, high administrative costs and the perceived high risks associated with agricultural credit facilities, so as to increase agricultural productivity and assist households in achieving and maintaining food security (Dadson, 2012). The primary goal of agricultural credit financing policies in Nigeria is to establish an effective system of sustainable agricultural financing schemes, programs and institutions which could provide micro and macro credit facilities for small, medium and large scale farmers, producers, processors as well as marketers of agricultural produce. This is because agricultural credit financing is expected to play a critical role in agricultural outputs and development in Nigeria. It is in the light of the foregoing that we want to know the role agricultural credit financing plays regarding agricultural output in Nigeria over a certain period.



Research Questions:

The following research questions were raised in order to analyze the role of agricultural credit financing on agricultural output in Nigeria.

1. Does agricultural credit financing by commercial banks affect agricultural output in Nigeria?
2. Does government expenditure in the agricultural sector affect agricultural output in Nigeria?
3. Does agricultural credit financing via agricultural credit guarantee scheme fund (ACGSF) affect agricultural output in Nigeria?
4. Does the interest rate of commercial banks' agricultural loans and credits affect agricultural output in Nigeria?

Research Objectives

The main objective of this study is to investigate the impact of agricultural credit financing on agricultural output and productivity in Nigeria. Specifically, the study seeks to:

1. Examine the effect of agricultural credit financing via commercial banks on agricultural output in Nigeria.
2. Investigate the effect of government expenditures on agricultural output in Nigeria.
3. Investigate the effect of agricultural credit financing via agricultural credit guarantee scheme fund (ACGSF) on agricultural output in Nigeria.
4. Examine the effect of commercial banks interest rate on agricultural output in Nigeria.

Research Hypothesis

The following hypotheses were formulated and tested to guide the study:

HO1: Agricultural credit financing by commercial banks does not have a positive significant effect on agricultural output in Nigeria.

HO2: Government expenditure in the agricultural sector does not have a positive significant effect on agricultural output in Nigeria.

HO3: Agriculture Credit Guarantee Scheme Fund (ACGSF) does not have a positive significant effect on agricultural output in Nigeria.

HO4: Interest rate of commercial banks' credits does not have a positive significant effect on agricultural output in Nigeria.



LITERATURE REVIEW

Theoretical Review

The theoretical work stimulating agricultural development and productivity is based on physiocracy, a school of thought in economics. The physiocrats theory stems from 18th century France and comprised economists that posited that the wealth of a nation rests on its agriculture. The position of physiocracy is also echoed by Nobel Laureate in Economics, Gunnar Myrdal (Higgs, 1897), who asserted that the long-run economic growth and development of any nation rests on the agricultural sector. Several other routes have been identified to increase agricultural advancement and productivity, such as access to agricultural inputs, capital and labour which supports the neoclassical growth model. Among the inputs recommended is agricultural credit, which is pivotal to economic advancement and development. This aligns with conventional and empirical reasoning (Mahajan & Romola, 1996; Umoh, 2006).

Empirical Review

To understand the agricultural credit financing and agricultural outputs relationship in Nigeria, we reviewed some studies that have been conducted both in developed and developing economies.

Salecm and Jan (2011) studied the impact of agricultural credit on agricultural GDP in a specific district of Pakistan using a linear regression model based on Cobb-Douglas, taking information from 1990–2008. This study concluded that more supply of credit can foster agricultural production.

Narayanan (2015) examined the relationship between agricultural credit and agricultural GDP in India by using state level data for the period of 1995–2011/12. The findings of the study suggested that an increase in agricultural credit is highly responsive to an increase in agricultural production.

Yadav and Sharma (2015) comprehensively reviewed the agricultural credit situation in developing countries considering the 110 studies on this background. The study found that small farmers are still in vulnerable situations due to limited access to institutional sources of credit and in rural markets, the informal sources of credit are playing a dominating role.

Okosodo (2016) examined the impact of agricultural credit on the economic development of Nigeria using cointegration bound testing approach for the period of 1980 to 2014. This study suggested that disbursing more bank credit along with reducing the lending interest rate should be implemented for facilitating the agricultural sector in Nigeria.

Tiamiyu et al. (2017), in a study on Economic Revitalization Through Agriculture: The Role of Agricultural Credit Guarantee Scheme Fund in Nigeria, reported that a significant proportion of change in agricultural GDP was due to an increase in credit funds supplied to farmers.

Imoise et al. (2012) used secondary data sources between 1970 and 2010 to investigate the linkages between how agricultural credit facilities contribute to the output and productivity of the agricultural sector in Nigeria. The result of the study showed that there exists a significant relationship between deposit money banks' credit and agricultural output in Nigeria.



Obilor (2013) examined the impact of agricultural credit schemes, agricultural product prices, government fund allocation and commercial banks' credit to the agricultural sector on agricultural productivity in Nigeria. 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.

Jonathan and Cynthia (2017) examined the impact of deposit money banks' credit on agricultural productivity in Nigeria using an error correction model and annual time series data for the period of 1981–2014. The results indicate that an equilibrium relationship exists between the variables. They found out that deposit money banks' agricultural credit impacts positively and significantly on agricultural productivity in the long-run, but this impact is quite negligible in the short-run.

In Poland, Tomasz (2008) carried out a study titled, 'Do Farm Credits Stimulate the Development of Agriculture in Poland?' He found that farm credit provided by cooperative banks stimulates the development of agriculture and its impact is positive and statistically significant.

Chisasa and Makinwa (2015), in studying the South African economy, revisited the theme under review by empirically investigating the impact of bank credit and agricultural output using Cobb-Douglas production function while accounting for capital accumulation, labour and other control variables like rainfall between the period of 1970 to 2009. Their study found a positive significant impact of agricultural credit on agricultural output. This was similar to the finding of Liqiu and Yanqiu (2011) for the case of China.

The above reviewed studies show the perception of different scholars regarding the subject matter of this study, which reveal that there is yet to be a consensus regarding the subject matter, hence the importance of this study (which shall be using recent macro-level data and applying standard econometric techniques).

METHODOLOGY

Data Source

This study aims to examine the role of agricultural credit financing on the output of the agricultural sector in Nigeria. The empirical analysis employs annual times series data for the period of 1990 to 2022 from the Central Bank of Nigeria Statistical Bulletin and Nigeria Bureau of Statistics. The econometric techniques used in analyzing the data are Descriptive Statistics, Augmented Dickey-Fuller Unit Roots Test, Granger Causality Test and the Ordinary Least Square Estimation Method.



Model Specification

Based on theoretical postulation, the study specified agricultural (output) as a linear function of credit disbursed by commercial banks to the agricultural sector, government expenditure on agriculture, agricultural credit guarantee scheme fund (ACGSF) and interest rate. Agricultural output as the dependent variable is proxied by agricultural gross domestic product. The model is stated thus:

$$AOUT = f(CBCA, GEAS, ACGSF, INTR)$$

where

AOUT = Agricultural Output, measured by gross domestic product in Nigeria

CBCA = Commercial Banks Credit to Agricultural Sector

GEAS = Government Expenditure on Agricultural Sector

ACGSF = Agricultural Credit Guarantee Scheme Fund

INTR = Interest Rate of Commercial Bank's Credits to Agricultural Sector.

Therefore,

$$AOUT = b_0 + b_1CBCA + b_2GEAS + b_3ACGSF + b_4INTR + U$$

The Model in a Log Form:

$$\text{Log}(AOUT)_t = b_0 + b_1\text{Log}(CBCA)_t + b_2\text{Log}(GEAS)_t + b_3\text{Log}(ACGSF)_t + b_4\text{Log}(INTR)_t + U_t$$

where

b_0 = the autonomous intercept

b_1 to b_4 = the parameters to be estimated

U = random error term

t = time trend.

The theoretical expectations about the signs of the coefficient of the parameters are $b_1 > 0$, $b_2 > 0$, $b_3 > 0$, $b_4 < 0$.



DATA PRESENTATION, ANALYSIS, RESULTS AND DISCUSSION OF FINDINGS

Data Presentation

The value of the variables for the period under review (1990–2022) are shown in Table 4.1 in the appendix.

Data Analysis, Results and Discussion of Findings

The Descriptive Statistics of Annual Time Series Data Covering 1990 to 2022

Table 4.2.1: Descriptive Statistics

	AOUT	CBCA	GEAS	ACGSF	INTR
Mean	12016.75	293.7625	28.17342	4239889.	18,20990
Median	7513.298	67.73860	22.43520	4087448.	17.95000
Maximum	47944.06	1812.470	81.86696	12456251.	29.80000
Minimum	106.6267	4.221400	0.208700	79107.40	11.48313
Std. Dev.	13117.99	432.9545	26.12640	3999159.	3.704860
Skewness	1.175819	2.098537	0.585111	0.413696	0.894889
Kurtosis	3.519633	7.003611	2.067909	1.758823	4.813680
Jarque-Bera	7.975302	46.26095	3.077544	3.059510	8.927512
Probability	0.018543	0.000000	0.214645	0.216589	0.011519
Sum	396552.7	9694.163	929.7228	1.40E+08	600.9267
Sum Sq. Dev.	5.51E+09	5998386.	21842.84	5.12E+14	439.2317
Observation	33	33	33	33	33

Source: Author`s work using E-view 10

From the descriptive statistics table above, the value of the standard deviation of AOUT and CBCA variables are greater than their mean values. This indicates that the data is widely spread out over a large range of values, whereas the values of the standard deviation of GEAS, ACGSF and INTR variables are lower than their mean values. This on the other hand indicates that data points are clustered close to the mean values, which suggests that the data are more consistent and reliable. Hence, they follow the normal distribution. However, all the variables possess positive skewness and kurtosis. This shows that the data tend to have higher values.



The Augmented Dicky-Fuller (ADF) Unit Root Test

Table 4.2.2: ADF Unit Root Test

Variable	t-Statistics	Probability	Order of Integration	Decision
AOUT	-3.509889	0.0142	I(0)	Stationary at Level
CBCA	-6.301777	0.0001	I(1)	Stationary at 1 st Difference
GEAS	-4.499711	0.0084	I(1)	Stationary at 1 st Difference
ACGSF	-5.076301	0.0003	I(1)	Stationary at 1 st Difference
INTR	-5.441901	0.0005	I(0)	Stationary at Level

Source: Author's work using E-view 10

The result of the ADF unit root test in the table above shows that data on AOUT and INTR variables were stationary at level, in their original form. Meanwhile, data on CBCA, GEAS and ACGSF variables were originally non-stationary. However, they became stationary as the first difference was taken.

The Pairwise Granger Causality Test

Table 4.2.3: Pairwise Granger Causality Test

Sample: 1990–2022

Lags: 2

Null Hypothesis	Obs	F-statistic	Prob
AOUT does not Granger cause CBCA	31	0.17680	0.8389
CBCA does not Granger cause AOUT		1.72585	0.1978
AOUT does not Granger cause GEAS	31	6.72906	0.0044
GEAS does not Granger cause AOUT		1.10900	0.3450
AOUT does not Granger cause ACGSF	31	1.71642	0.1995
ACGSF does not Granger cause AOUT		0.71226	0.4999
AOUT does not Granger cause INTR	31	3.77336	0.0312
INTR does not Granger cause AOUT		0.16675	0.8473



Source: Authors work using E-view 10

The result of the granger causality shows that both GEAS and INTR have a unidirectional causal relationship with AOUT, which runs from AOUT to GEAS and AOUT to INTR. However, none of the explanatory variables (CBCA, GEAS, ACGSF and INTR) Granger cause AOUT in Nigeria within the period. This indicates that agricultural credit financing through commercial banks and government institutions in Nigeria is yet to witness its direct feedback from the agricultural sector within the study period.

Ordinary Least Squares (OLS) Estimation

Table 4.3: Summary of OLS Estimation Result

Dependent Variable: LAOUT				
Method: Least Squares				
Sample: 1 33				
Included Observation: 33				
Variable	Coefficient	Std Error	t-Statistic	Prob.
LCBCA	0.513192	0.067419	7.611992	0.0000
LGEAS	0.226192	0.063080	3.585809	0.0013
LACGSF	0.315807	0.052837	5.977029	0.0000
INTR	-0.006928	0.016701	-0.414817	0.6814
C	1.134250	0.714495	1.587485	0.1236
R-Squared	0.982711	Mean dependent Var		8.420147
Adjusted R-Squared	0.980241	S.D dependent Var		1.775149
S.E of regression	0.249527	Akaike info Criterion		0.200227
Sum square resid	1.743383	Schwarz Criterion		0.426971
Log likelihood	1.696248	Hannan - Quinn Criter.		0.276520
F-Statistic	397.8786	Durbin - Watson Stat.		1.178879
	Prob (F-Statistic)	0.000000		

Source: Author`s work using E-View 10

t-critical = 2.04 at 5 percent level of significant

The summary of OLS results in Table 4.3 shows that R-squared = 0.98 and Adjusted R-square = 0.98. This is an indication that about 98 percent of the total variation in the AOUT has been explained by the explanatory variables (CBCA, GEAS, ACGSF and INTR) collectively. This is a good fit since the unexplained variation is just 2 percent. The Durbin Watsons statistic of 1.18 indicates a positive autocorrelation in the residuals of the regression analysis.



Test of Hypothesis

H01 Test: That Agricultural financing by commercial banks does not have a positive significant effect on agricultural output in Nigeria. Since the t-calculated of 7.61 is greater than the t-critical of 2.04, the alternative hypothesis which states that agricultural credit financing through commercial banks has a positive significant impact on agricultural output in Nigeria is accepted and validated.

H02 Test: That government expenditure in the agricultural sector does not have a positive significant effect on agricultural output in Nigeria. Since the t-calculated of 3.59 is greater than t-critical of 2.04, the alternative hypothesis which states that the government expenditure in agricultural sector has a positive significant effect on agricultural output in Nigeria is also accepted and validated

H03 Test: That agricultural credit guarantee scheme fund (ACGSF) does not have a positive significant effect on agricultural output in Nigeria. Since the t-calculated of 5.97 is greater than the t-critical of 2.04, the alternative hypothesis which states that agricultural credit guarantee scheme fund (ACGSF) has a positive significant impact on agricultural output in Nigeria is also accepted and validated.

H04 Test: That interest rate on commercial banks' credit facilities to the agricultural sector does not have a positive significant effect on agricultural output in Nigeria. Since the t-calculated of -0.42 is less than the t-critical of 2.04 and is also negative, the alternative hypothesis which states that interest rate has a positive significant effect on agricultural output in Nigeria is rejected and invalidated. Hence, the stated null hypothesis is accepted and validated.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

This study examined the role of agricultural credit financing on Agricultural output in Nigeria, from 1990 to 2022. The OLS estimation technique was employed in specifying and analyzing the model of study. The empirical analysis and result of the study thus have far reaching implications. The study's a priori theoretical expectations about the signs of the coefficient of the parameters were fulfilled. The t-calculated of agricultural credit financing by commercial banks has a value of 7.61 which is greater than the t-critical of 2.04 at 5% level of significance. This is an indication of a positive significant relationship between commercial banks credit to the agricultural sector and agricultural output in Nigeria. Similarly, the t-calculated of government expenditure in the agricultural sector has a value of 3.59 which is greater than the critical value of 2.04 at 5% level of significance. This is also an indication of a positive significant relationship between government expenditure in the agricultural sector and agricultural output in Nigeria. Furthermore, the t-calculated of agricultural credit guarantee scheme fund (ACGSF) has a value of 5.97 which is greater than the t-critical value of 2.04 at 5% level of significance. This is also an indication of a positive significant relationship between agricultural credit guarantee scheme fund (ACGSF) and agricultural output in Nigeria. On the other hand, the t-calculated of interest rate of commercial banks' credit to the agricultural sector has a value of -0.42 which is lower than the t-critical value of 2.04 at 5% level of significance.



This is an indication of a negative relationship between commercial banks' interest rate and agricultural output in Nigeria.

Overall, the values of the R-squared and Adjusted R-squared of 0.98 and 0.98 respectively are an indication that the model of the study is a good fit for this empirical analysis. More also, the F-statistics value of 397.8786 (with a prob. value of 0.000000) is far greater than the 3.59 critical value. This indicates that the model is significant and reliable.

Conclusion

The study reviews that agricultural credit financing of the agricultural sector via commercial banks credit, government spending on agricultural sector and agricultural credit guarantee scheme fund (ACGSF) has a positive significant impact on agricultural output in Nigeria and has contributed massively to the growth of agricultural production and output in Nigeria within the study period.

Recommendations

Based on the above-stated empirical findings from the investigation carried out, the study makes the following recommendations:

- (1) The policy thrust of the government should focus on return to agriculture as well as the adoption and implementation of a comprehensive energy policy, with stable electricity as a critical factor.
- (2) The government should strengthen the agricultural credit guarantee scheme via meaningful budgetary allocation in order to enhance its capital base significantly.
- (3) The government through its agency, the Central Bank of Nigeria, should maintain bank interest rate at a level that will encourage funds mobilization for the agricultural sector to improve agricultural output and productivity in the entire economy.
- (4) The government should also make deliberate efforts to expand its agricultural expenditure by increasing its financial grants to agricultural firms and small-scale farmers in order to boost food production and enhance the supply of agricultural raw materials for the growth and development of our industries, which translates to economic growth.
- (5) Agricultural extension and training services should be provided by the government to the farmers regularly as the case may be so as to keep them abreast of the modern techniques in farming.



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APPENDIX

Table 4.1. Selected Macroeconomic Variables

YEAR	AOUT (# BILLION)	CBCA (# BILLION)	GEAS (# BILLION)	ACGSF (# BILLION)	INTR (%)
1990	106.63	4.22	0.26	98,494.50	25.50
1991	123.24	5.01	0.21	79,107.40	20.01
1992	184.12	6.98	0.46	91,953.10	29.80
1993	295.32	10.75	1.80	80,845.80	18.32
1994	445.27	17.76	1.18	104,463.00	21.00
1995	790.14	25.28	1.51	164,133.10	20.18
1996	1,070.51	33.26	1.59	225,519.50	19.74
1997	1,211.46	27.94	2.06	242,028.30	13.54
1998	1,341.04	27.18	2.89	219,144.20	18.29
1999	1,426.97	31.05	59.32	241,839.00	21.32
2000	1,508.41	41.03	6.34	361,449.00	17.98
2001	2,015.42	55.85	7.06	728,545.40	18.29
2002	4,251.52	59.85	9.99	1,050,982.30	24.85
2003	4,585.93	62.10	7.54	1,151,015.00	20.71
2004	4,935.26	67.74	11.26	2,083,744.70	19.18
2005	6,032.33	48.56	16.33	9,366,392.90	17.95
2006	7,513.30	49.39	17.92	4,195,099.68	17.26
2007	8,551.98	149.58	32.48	4,087,447.94	16.94
2008	10,100.33	106.35	65.40	6,497,958.93	15.14
2009	11,625.44	135.70	22.44	8,328,565.78	18.99
2010	13,048.89	128.41	28.22	7,840,496.63	17.59
2011	14,037.83	255.21	41.20	10,028,988.81	16.02
2012	15,816.00	316.36	33.30	9,332,484.23	16.79
2013	16,816.55	343.70	39.43	9,256,676.80	16.72
2014	18,018.61	478.91	36.70	12,456,250.87	16.55
2015	19,636.97	449.31	41.27	10,857,380.83	16.85
2016	21,523.51	525.95	36.30	7,858,643.35	16.87
2017	23,952.55	528.24	50.26	5,849,388.73	17.56
2018	27,371.30	610.15	53.99	4,377,626.29	19.33
2019	31,904.14	772.38	70.27	4,070,032.47	15.53
2020	37,241.61	1,047.68	76.61	4,321,663.90	12.32
2021	41,126.06	1,457.82	72.27	5,786,729.90	11.48
2022	47,944.06	1,812.47	81.87	8,481,234.80	12.34