Agricultural financing and economic growth in Nigeria: implications for sustainable agricultural development

Olaide Kamila Akintunde[1], Kaothar Modupe Idris-Adeniyi[2*], Khadijat Olaitan Olanrewaju[2], Adeleke Sabitu Coster[3]

[1]Department of Agricultural Economics and Agribusiness Management, College of Agriculture, Osun State University, Osogbo, Nigeria
[2]Department of Agricultural Extension and Rural Development, College of Agriculture, Osun State University, Osogbo, Nigeria
[3]Department of Agricultural Economics and Farm Management, College of Agricultural Management and Rural Development, Federal University of Agriculture, Abeokuta, Nigeria
***Corresponding author e-mail: olaide.akintunde@uniosun.edu.ng**
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Abstract

The significance of agricultural financing for sustainable agricultural and financial improvement in emerging economy like Nigeria cannot be over emphasized. This re-search work analyzed the impact of rural financing on financial sustainability in Nigeria. The dataset is time series information variables spreading a 40 year period, from 1981 to 2020. Annual aggregates data on capital expenditure, agricultural credit, ex-port loans, and gross domestic product (GDP) were sourced from the distributions of Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS). The research was conducted in 2023 and data sets were analyzed using Unit Root test, Cointegration test, and error correction model. Results revealed that agricultural credit, export financing, and capital expenditure affect GDP positively in Nigeria. Therefore, there is need for policy formulation and implementation on arrangement of satisfactory funding facilities to agricultural production and export sector with moderate interest rates at a minimal cost of capital. Government should also embark on massive infra-structural development in order to enhance sustainable financial growth and development.

Keywords: Agriculture, credit, sustainability, GDP, Error correction model

Introduction

The significance of agriculture in a developing nation like Nigeria cannot be over emphasized [1]. Right from its role as means of sustenance for the populous nation, it equally represents the foundation of all sectors of the economy and thereby offers the premise for the advancement of auxiliary change and expansion of the economy [2]. These encapsulate in its recognised role as an enhancement for development and advancement of the whole economy [3]. Investments and measures for agricultural growth thus portend innumerable potentials for Nigeria's financial development and

advancement. To this end, direct and indirect influences for strategic development and growth such as through adequate financing would offer multiple proceeds for the developing economy. In this respect, finance is highlighted as an overarching driver of national agricultural output [4].

Agricultural financing is explained as encompassing specified funds profited to the rural segment for development of agrarian activities and promotion of social welfare of the actors [2]. In Nigeria this entails lower scale and large scale provision of funds for grass root farming. The miniaturized scale source involves the provision of fund by conventional banks as capital for agrarian purposes while similar capital is allocated by government through similar agencies saddled with provision of rural banking services. It also includes Nigerian Agricultural Cooperative and Rural development Bank (NACRDB) and the Central Bank of Nigeria (CBN) [3]. The implications of agrarian funding for heralding sustainable development are perceptible from the array of positive impacts it portends on the agricultural sector, if adequate and effective. This is proclaimed for the promotion of enabling resources or investments imperative for technological inclusion in agriculture in the bid to empower substantial growth and development of the nation's agricultural sector [5].

Creation of opportunity for agricultural investment as direct offshoot of adequate agricultural financing allows for technological transformation of the rudimentary activities and processes. The importance of this cannot be overemphasised as technological upgrade of agricultural enterprises portends huge significance for the optimization of the efficiency and productivity of agricultural production [6]. As such, agricultural technological investments precipitate agricultural livelihood development to the threshold which enables quality improvement and development in agricultural production. The resultants are agricultural value chains development at the expense of usual unguarded postharvest wastages, value depreciations and associated losses. Achieving this provision an enabling environment for sustainable agrarian product as a panacea for maintaining equilibrium in growth and developmemt. Thus, the consideration in the position of [7], that agricultural production affords the required support for enabling sustainable development, agricultural financing of technological transformation thus portends a mechanism for multi-level developments. Unarguably, this has an intricate association with the enhancement of rural food security and wellbeing improvement through increased production as well as wealth and employment creation as credence for sustaining the present and the future. Availing this, undoubtedly would involve availability of adequate funding instruments to agricultural producers as well as the provision of necessary structural facilities.

Nigeria as a developing nation with unstable agricultural policies and varying developmental focus can be expected to lag behind in this wise. Successful Nigerian governments have rolled out schemes and programs for financing the agricultural sector but these are plagued by systemic implementation problems, focus derailment and corruption among many others. Evidence of this was pointed out by [8], that inadequate agricultural financing issues persists in Nigeria despite long years of operation

and investments especially through the Agricultural Credit Guarantee Scheme (ACGSF) and then the Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB). This impels questioning of the effects of the quantum of funds devoted to agricultural financing as [9], highlighted declining agricultural contribution to the nations GDP. On this premise, this research work is poised to analyze the time-bound impact of Nigeria agriculture financing on its economic growth and potentials for sustainable agricultural development.

The main objective of this research is to analyze the impact of agricultural financing on economic growth in Nigeria while the specific objective is to establish the relationship between GDP and macro-economic variables of agricultural credit, export financing, and capital expenditure.

Theoretical Framework

This study is premised on Commercial Loan Theory of Liquidity which is also referring to Real Bill Doctrine. It was propounded by Smith in 1776. The principle of bank's liquidity is the best explored when short-term loans are granted to customers to fund saleable products. Also, lucrative corporate firms should be opportune to access the bank reserves for short-term fund [10]. The Real Bills Theory can be fluently expressed as a deal relationship between a bank and corporate entity. Financial services provided by different institutions are of two concepts namely demand and supply [11]. The demand aspect is the choice of customers among the funding obligations rendered by fund providers, while the providers' aspects are the mandates or packages offering to customers by the funding institutions.

Propositions on access to funding instruments explain the concept of use and provision of funding instruments. It embedded with two propositions, the assigned supervision and the objective selection proposition which dealt with buying of funding packages (buying concept) and provision of funding (supply concept of funding instruments). In the propositions of the assigned supervision and the objective selection theory (purchase of funding instruments), and the information asymmetry/ transaction cost theory supply concept of proximity to funding instruments [12].

The analysis in the proposition of representative supervision affirms in the claims that funding organizations plays the crucial roles of delegated monitors for their depositor. Regarding this concept, depositors entrust financial institutions the responsibility of securing their funds with fiscal interposers as well as having confidence in the money kept in order to utilize it judiciously for investment earnings [13]. The strong link there exists in the theory on possession and usage of funding facilities between its request and provision concepts. As explained within the hypothesis, person who saves explore the opportunity of delegating credit institutions their responsibilities of investing their funds in order to accrue more income [14].

The judicious choice proposition is formulated by neo-classical financial specialists. The proposition is wholly based on the choice of the agrarian person in making the proper venture choice in monetary markets. The investigation of levelheaded selection proposition of request for funding opportunities involves the desire for money

related administrations, description of available financial products, and the conditions of administrations of fund as given by the credit organizations [15]. The underlying principle of judicious choice proposition is on the cardinal point that the different customers confront with the constraint of selection of credit instruments supplied by the credit organizations. Therefore, the choices made by individuals are the best choice in the interest of achieving their goals as desired. The request for credit instruments are determined by service characteristics, attributes and commitment of the provider of the service, and choice of individual customer. In this concept, this proposition is crucial in clarifying opportunities to utilize credit instruments as the qualities of the person that are unequivocally decided by both the demand and supply measurements of opportunities to utilize credit instruments [16].

Empirical review

The empirical studies conducted on the relationship of agricultural credit with country's economic growth and development is quantum in quantity both in Nigeria and in the whole world at large. In Nigeria context, [17] examined the effect of Bank Credit on Agricultural Output in Nigeria. Error Correction Mode (ECM) analysis was used to analyze data between 1970 and 2013. The findings from the study revealed that, in the long-run bank credit and industrial output contributed immensely to agricultural output in Nigeria, while only industrial output influenced agricultural output in the short-run.

Egwu, [18] analyzed the impact of agricultural financing on agricultural output, economic growth and poverty alleviation in Nigeria. The tools of data analysis adopted by the study included ordinary least square regression technique, T-test, R-Square, Standard Error Test and Durbin Watson test ADF/PP unit root and co-integration test. The study found out that Commercial Bank Credit to Agricultural sector (CBCA) and Agricultural Credit Guarantee Scheme Fund Loan to Nigeria's Agricultural sector (ACGSF) were significant to Agricultural sector output percentage to gross domestic product (ASOGDP).

Okosodo, [19] assessed the influence of agricultural credit on the growth and development of the Nigerian economy. Secondary data sets were used and analyzed using co-integration approach, unit root test and error correction mechanism. The study founded a long run relationship between agricultural credit and economic growth in Nigeria. Udoka *et al*., [3] analysed the effect of commercial banks' credit on agricultural output in Nigeria. The findings of the study revealed that there was a positive and significant relationship between agricultural credit guarantee scheme fund and agricultural output. In the same vein; the results also affirmed a positive and significant relationship between commercial banks credit to the agricultural output in Nigeria. The findings of the study also established a positive and significant relationship between government expenditure on agriculture and agricultural production. On the other hand the study revealed negative relationship between interest rate and agricultural output.

Ndubuaku *et al*., [2] investigated the effect of agricultural financing on agricultural sector contribution to GDP in Nigeria. The period of the study was 36/35 year period from 1981-2016. Data were obtained from the CBN statistical Bulletin. The dependent variable was the Agricultural GDP (AGDP). The independent variables were Government Capital Expenditure on Agriculture (GCAG), Government Recurrent Expenditure on Agriculture (GRAG), Agricultural Credit Guarantee scheme Fund (ACGSF) and Commercial Banks' Credit, Loans and Advances to the Agricultural Sector (CBCA). The study applied Regressive Distributed Lagged regression model (ARDL) as analytical tool. The study discovered that government funding to agriculture and Agricultural Credit Guarantee scheme Fund (ACGSF) had a non-significant impact on Agricultural Contribution to GDP (AGDP). Also, the study showed that Commercial Banks' Credit, Loans and Advances to the Agricultural Sector (CBCA) had a positive significant impact on AGDP.

Adeshina *et al*., [20] conducted their research on the impact of agricultural financing on economic performance in Nigeria within the period of 1978-2017. The study explored data from the Central Bank of Nigeria statistical bulletin. Analytical tools used were analyzed Unit root test, Bound Co integration test and error correction model. The findings of the study depicted that in the long-run, Agricultural Credit Guarantee Scheme Fund (ACGSF) is the most influential agricultural financing variable among other independent variables such as government expenditure on agriculture and commercial bank credit to agriculture.

Afolabi *et al.*, [21] investigated the influence of agricultural credit on Nigeria's economic growth for the period of 1981-2017. Data were sourced from Central Bank of Nigeria (CBN) statistical bulletin and world development indicator (WDI). The analytical tools used include test for stationarity, Auto-and Regressive Distributed Lag (ARDL). The study discovered that, in the long run, that Deposit Money Bank Credit (DMBCA) was significant and there exists a direct relationship, only in the short run, while Agricultural Credit Guarantee Scheme Fund (ACGSF) was insignificant both in the short and long run but has a direct relation in the short run and an inverse relationship in the long-run.

Florence and Nathan, [22] investigated the short run and long run impact of the commercial banks' credit on agricultural sector growth in Uganda. Data of the study were obtained from bank of Uganda and Uganda bureau of statistics over the sample period of 2008Q3 -2018Q4. The analytical techniques adopted was the Autoregressive Distributed Lag (ARDL) explored to analyze the short run and long-term relationship between commercial banks' credit and Uganda's agricultural GDP performance. The findings of the study showed that in the long run, credit has significant positive impact on agricultural output. However, it was discovered that in the short run, bank credit did not have immediate influence on agricultural output.

Mbelu and Ifionu, [23] analyzed the relationship between agricultural credit on economic growth in Nigeria over the period 1981 to 2019. The study made use of the stationary test, the co-integration test, the error correction model and the Granger

causality model. The findings of the study showed that in the long run, the agricultural credit guarantee scheme fund had a positive and significant influence on the gross domestic product in Nigeria. Also, loans received from both commercial bank loan and community / micro-finance banks had a positive and significant relationship on the gross domestic product in Nigeria within the time frame of the study. The empirical reviewed aforementioned affirmed the output of this research which established the positive impact of agricultural financing on economic growth and development of a nation.

Materials and Methods

The study was conducted in Nigeria which is one of the biggest nations in Africa and locates entirely inside the tropical region along the along the Inlet of Guinea on the West coast within the Sub-Saharan Africa. Nigeria is located within 40 and 140 North of the equator and within longitudes 30 and 150 east of the Greenwich. It spreads over geographical coverage of 923,769 square kilometres (356,669 sq mi), and with an inhabitants estimated at 221,602,163 million by the year 2023 [24].

Data and Sources

The study utilizes time-series information sets spanning of 40 year duration, from 1981 to 2020. Annual aggregates data on capital expenditure, agricultural credit, export loans, and gross domestic product (GDP) were sourced from the published materials of Central Bank of Nigeria (CBN) National Bureau of Statistics (NBS). Gross domestic product (GDP) is the macro-economic variable which is the reference point in determination of the size of an economy, and it measures the value of total final output of goods and services produced within a specific time frame any economy.

Estimation techniques

The study employed the Unit Root test, Cointegration test, and error correction modeling. The Augmented Dickey-Fuller statistics were utlized to analyze the stationarity of time series information sets. The Johansen's method was used in verifying co-integration among the variables of the model. The error correction mechanism (ECM) was explored to examine the the impacts of agricultural funding on gross domestic product (GDP) in Nigeria.

Model specification

The functional representation of the models as used by [2, 20, 21], and modified in this study is given as:

$$GDP = f(AGRCRDT, EXPCRDT, CAPTEXPT) \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where:

GDP = Gross Domestic Product (GDP) (₦'Billion).

AGRCRDT = Agricultural Credit (₦'Billion).

EXPFNT = Export Financing (₦'Billion).

CAPTEXPT = Capital Expenditure (₦'Billion).

The model is operationalized as:

$GDP = \beta_0 + \beta_1 AGRCRDT + \beta_2 EXPCRDT + \beta_3 CAPTEXPT + ECMt$ …….. (2)

β_0 = Intercept of the regression model.

β_1= Estimated coefficient of Agricultural Credit

β_2= Estimated coefficient Export Financing

β_3= Estimated coefficient of Capital Expenditure

ECMt = Error term.

Apriori expectation of the study is $\beta_1 - \beta_3 > 0$

Results and Discussion

Stationarity (Unit Root) Test

The stationarity of the parameters in the reference equation is tested in order to ascertain the order of integration using the Augmented Dickey Fuller test. The output of Augmented Dickey-Fuller (ADF) unit root tests for logged variables adopted in the study is presented in Table 1. The variables of the model Gross Domestic Product (GDP), Agricultural Credit, Export Financing and Capital Expenditure are not stationary at their level as revealed in the Table 01 that the value of the ADF Statistical test is lower than Mackinnon's critical at 1%, 5% and 10% levels respectively. The result in Table 01 further showed that all the parameters of the model are integrated at the first difference, as the value of the ADF Statistical test is higher than Mackinnon's critical at 1%, 5% and 10% levels of significance respectively. Therefore, the analysis is proceeded further to the co-integration test to establish the level of long-run relationship among the variables of the model.

Table (1): Unit Root Output (Augmented Dickey-Fuller)

Variable	ADF T-statistics	Test Critical Values			Probability Level	Order of Integration
	Level	1%	5%	10%		
GDP	- 1.906	--3.662	-2.954	--2.624	0.0000	I(0)
AGRCRDT	-0.798	-3.668	-2.966	-2.616	0.0001	I(0)
EXPFNT	-0.308	-3.662	--2.964	-2.614	0.0021	I(0)
CAPTEXPT	-0.668	--3.612	-2.924	-2.615	0.0001	I(0)
	1st Difference					
GDP	-4.668	-3.612	-2.864	-2.614	0.0001	I(1)
AGRCRDT	-5.798	-4.248	-2.166	-1.716	0.0021	I(1)
EXPFNT	-4.508	-3.167	-2.463	-1.116	0.0001	I(1)
CAPTEXPT	-4.678	-3.668	-2.966	-2.616	0.0001	I(1)

Source: Computation from Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS) publications, 2023.

Co-integration Test

Johansen's co-integration tests establish the long-run relationship between the variables of interest of the study as presented in Table 2. The outcome of co-integration result for regression model utilized in the study for non-logged variable depicts four co-integrating variables. The variables include Gross Domestic Product (GDP), Agricultural Credit, Export Financing and Capital Expenditure. The null hypothesis of at

most 1 co-integration equations in the model is accepted as the both values of Trace Statistic (45.9979) and Max-Eigen Statistic (33.1221) are greater than their critical values of (29.68, 35.65) and (20.97, 25.52) at 5% and 1% level respectively establishing a long-run relationship among the variables.

Table (2): Results of co-integration analysis of non-logged variables for regression

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None* **	0.78546	101.4105	47.21	54.46
At most 1 **	0.60150	45.9979	29.68	35.65
At most 2	0.29600	12.8758	15.41	20.04
At most 3	0.00665	0.2404	3.76	6.65
		Max-Eigen Statistic		
None* **	0.78546	55.4127	27.07	32.24
At most 1 **	0.60150	33.1221	20.97	25.52
At most 2	0.29600	12.6354	14.07	18.63
At most 3	0.00665	0.2404	3.76	6.65

CE(s) means Co-integration equation(s), * and** denote rejection of hypothesis of no co-integration at 1% and 5% significance level respectively. This shows a co-integration equation at 1% and 5% level. ***significant at 1% level; **significant at 5% level**

Source: Computation from Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS) publications, 2023.

Results of Error Correction Model (ECM) analysis

Table 3 presents the outputs of the ECM computation. The R-squared indicates that 75 percent of the total variation in Gross Domestic Product (GDP) is clarified by the changes within the explanatory parameters of agricultural credit, export financing and capital expenditure, been captured in the study while 25% can be ascribed to noise or other closed parameters not included in the study. The Durbin-Watson statistic of 1.91521 is approximately 2 which are within range for consideration which reveals that that there is absence of autocorrelation.

The F-value is statistically significant at 1 percent level which indicates that the reference equations of the analysis fitted the information sets adopted for the study. The error correction coefficient is negative and statistically significant at 5 percent level. The relevance of the error correction term confirms co-integration and implies the validity of long run equilibrium steady state equilibrium between market portion of palm oil and its determinants choice indicated in the reference equation of the study. The estimates of the ECM implies that the speed of adjustment from disequilibrium. The coefficient of Error Correct Model is negatively signed at 0.14 and statistically significant at 1 percent level as expected. This indicates that disequilibrium in the model will be adjusted by 54 percent annually to ensure the variables converge at equilibrium in the long-run.

The outputs of the research work as revealed that the coefficient of agricultural credit (X_1) was positive and statistically significant at 1%. It was also revealed in Table 03 that export financing (X_2) has positive coefficient and was significant at 1%. The results in Table 03 show that the coefficient of capital expenditure (X_3) was positive and statistically significant at 1%.

The coefficient of agricultural credit was positive and statistically significant at 1%. The sign is expected as there is a strong tendency for funding in agricultural sector to impact positively on economic growth of a country. This result implies that a percent rise in agricultural credit will be associated with 26.4% rise in GDP. This research output agrees with the similar research outcomes of [2, 20, 23] in which they discovered a positive effect of agricultural credit on gross domestic product in Nigeria.

It was also revealed from the outcomes of the study in which export financing has positive coefficient and was significant at 1%. The implication of the result on export financing is that a percent rise in export credit will lead to 11.1% increase in GDP of Nigeria. There is a strong tendency for increase in export promotion by adequate funding to impact positively in economic growth of a country. This finding is in line with [25, 26], that asserted that export financing has direct relationship with GDP. The magnitude of capital expenditure was positive and statistically significant at 1%. It shows that an additional percent in capital expenditure will increase the GDP by 35.3% which affirms the need for a country to focus attention on infrastructure development as a crucial factor to enhance both qualitative and quantitative output of a nation. This finding on positive effect of capital expenditure on GDP confirms the similar research outputs of [27,28].

Table (3): Results of error correction analysis

Variables	Coefficients	Std. Error	t-Statistics	Prob.
ECMt (-1)	-0.5360***	0.0303	-4.49	0.000
ΔLn X_1	0.2638***	0.0797	3.31	0.002
ΔLn X_1(-1)	0.7644	1.1444	0.67	0.200
ΔLn X_1(-2)	0.2575	0.9234	0.28	0.100
ΔLn X_2	0.1114***	0.2301	3.70	0.001
ΔLn X_2(-1)	0.5760***	0.1180	4.88	0.000
ΔLn X_2(-2)	1.9557	1.5270	1.28	0.242
ΔLn X_3	0.3531***	0.1184	2.98	0.004
ΔLn X_3(-1)	0.1485	0.1722	0.86	0.301
ΔLn X_3(-2)	0.0767***	0.0197	3.89	0.001
C	-0.1109	0.0455	-2.44	0.012
R^2	0.9750	Mean dependent var	34089.58	
Adj. R^2	0.9729	S.D. dependent var	23125.52	
S.E. of regression	7554.7	Akaike info criterion	50.88571	
Sum squared resid	4.22e+15	Schwarz criterion	51.86827	
Log likelihood	-251.9428	Hannan-Quinn criter.	53.70086	
F-statistic	67.43	Durbin-Watson stat	1.91521	
Prob(F-statistic)	0.0000			

***** Significant at 1% level, **Significant at 5% level, *Significant at 10% level**
Source: Computation from Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS) publications, 2023.

The special interest of this work is to analyze the impact of agricultural financing on economic growth and development which has an implication on sustainable agricultural development. The outcomes of this study established the positive impacts on GDP in Nigeria by agricultural credit, export financing and capital expenditure. The effect of these three parameters on financial development and advancement in a country cannot be overemphasized.

A well-executed agricultural credit policy programme will enhance overhaul agricultural production that will boost national output of a country. In the same vein, the total overhauling of export trade through financing with low interest rate will affect the economic growth of a country positively in increase in level of production of export commodities. Also, increase in the level of capital expenditure has implication on development of infrastructural facilities that will enhance increase general level of output in goods and services. Therefore, with reference to the outcomes this research it is suggested that the federal government of Nigeria should encourage commercial banks and other financial organizations to make provisions for funding facilities to agricultural sector and export sector with moderate interest rates and relaxed administrative conditions of granting the credits. Also, there is need for the government to center consideration on enormous foundation advancement in order to attain sustainable agricultural financing needed for overall development of economy.

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