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## Effect of Agricultural Investments, Credit and Exports on Agricultural Growth in Nigeria (1981-2020)

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### Abstract

*This study evaluated the impact of agricultural investments, credit and exports on agricultural growth in Nigeria (1981-2020). Annual data were sourced from the CBN Statistical bulletins, FAO and World Bank websites. The Vector Error Correction Model (VECM) and Single-Equation Error-Correction-Model (ECM) were used to examine the long-run and short-run relationships of the variables respectively. The VECM results shows that coefficients of agricultural export (AEXP) and public agricultural investment (PAI) significantly influenced agricultural expansion (growth) in Nigeria in the long run. While in the short run, only the coefficient of foreign direct investment (FDIA) was found to have significant impact on agricultural growth in Nigeria. The study recommended that the government at all levels should create a favourable investment climate in terms of policies to draw foreign investment to the agricultural sector and, Federal and State Governments should increase its level of budgetary allocation to the agricultural segment of Nigeria economy to boost the agricultural sector.*

**Keywords:** Investments, Export, Credit, Agricultural Growth

**JEL Classification:** E51, O13

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### 1. Introduction

The position of agrarian sector in Nigeria's economy cannot be overstressed as the sector does not only serve the purpose of meeting the country's food requirements but aids as a generating overseas earnings and exchange through export. Nigeria was the leading major exporter of agrarian products in Africa before the discovery of crude oil, which at the time was a significant source of income for the government (Ibrahim, 2017). Investments in agriculture include spending by government, foreign and private

sectors of the economy on infrastructure, development, education and training (Linton, 2021). Government spending has over time become an important instrument employed to boost economic progress, particularly in developing nations like Nigeria. Agricultural public investment means government resources from the fiscal apportionment, generally on annual basis to the agricultural sector towards achieving growth objectives and food security (Usman *et al.*, 2011). Apata (2021) reported that government expenditure in agriculture in Nigeria remain low. Between 1981 and 2018, Nigeria's allocation of the nation's total public spending on agriculture was 4% on average. Agriculture's share of the budget increased from nearly 1.70% in 2017 to 2% in 2018, but declined to 1.56% in 2019 and 1.3% in 2020, but recording a slight increase (1.37% in 2021, and the government proposed 1.8% (N291.4 billion) for agriculture in 2022 national budget which is the highest in four years (Izuaka, 2021). Credit facility to agriculture is the provision of working capital/loans for farm businesses. Credit is a vital instrument for agrarian growth as it creates the ability to obtain inputs and is given to farmers as loan to boost agriculture. Procurement of loan facility is an important step in agriculture just like other production resources like farmland as well as other farm inputs (Adeoti & Raji, 2010). Adequate funding of agrarian projects encourages food abundance, and also enhance enterprise performance of young people who would stimulate economic development (Udih, 2014). According to World Development Indicators (2021), the export of goods and services contribution to the nation's GDP was 36% in 2000 but declined alarmingly to 8.8% in 2020. The top three agricultural exports commodities from Nigeria were cocoa beans, sesame seeds, and cashew nuts, which brought in a total of N262.99 billion for the country in 2022. Nigeria earned N81.5 billion from the export of sesame seeds in the first half of 2022, representing 0.6% of the nation's total exportations for the period. The first half of 2022, Nigeria earned approximately N67.39 billion from cashew exports, representing 0.5% of the overall exports recorded by the continent's largest market (Ekugbe, 2023).

Agricultural growth measures the increase in agrarian outputs per specific of time. Agricultural advancement (growth) in Nigeria is greatly known to be crucial to continues economic development. Agriculture plays a substantial role in ensuring food security, poverty shrinking and human livelihood enhancement. Improved agrarian input employment, technical enhancement, and technical competence are the core drivers of agricultural intensification (Omorogiuwa *et al.*, 2014). The place of farming in stimulating economic progress of a nation like Nigeria cannot be over-emphasized. The importance of agriculture in the economic improvement of developing countries has continuously gained the attention of economists and policymakers. This assertion may not be unconnected with the fact that a large number of people within developing economies like Nigeria are largely subsistent farmers. Hence, an effort aimed at turning

the sector into economic hub requires the attraction of resources from the public and private sectors together with foreign investors/bodies to the ailing agricultural sector (Angbas, 2019).

The function of agricultural sector of the Nigeria's economy is without doubt the most significant, and it offers lots of prospects for the Nigeria's future economic development, just as it did prior to the detection of petroleum. According to Onyinyechika (2017), the farming sector which was formerly the backbone of Nigeria's wealth, has experienced considerable setbacks after the commercial finding of petroleum in 1956. There is low productivity in agriculture as a result of government negligence, and lack of enthusiasm among Nigerian youths, as well as poor policy execution, among other problems (Onyinyechika, 2017). Even with the sector's position in combating malnutrition, unemployment, and the quest for economic progress, Nigeria's budgetary allocation to agriculture was low relative to other key economic segments. The exports of cash crops commodities have also decreased dramatically (Muhammad-Lawal & Atte (2006). Nigerian agricultural exports often face challenges in meeting international quality and safety standards, leading to rejections and bans in foreign markets (PwC, 2019). This issue affects products like beans and sesame seeds. Over the years, agriculture's impact to Nigeria's economic progress has decreased.

Access to credit is fundamental for agricultural growth, as it enables farmers invest in modern technologies, improved seeds, and other inputs. However, a significant proportion of Nigerian farmers, particularly smallholders, face difficulties in accessing affordable credit, constraining their ability to expand production and improve yields (Muhammad-Lawal & Atte 2006). The expenditure in the farming sector do not commensurate with the sector's needs. This lack of investment hinders the adoption of modern farming practices, infrastructure development, and value chain integration, all of which are essential for sustained agricultural growth (Enilolobo & Ode-Omenka, 2019). The effect of agricultural investments, credit and exports on agricultural growth has been examined disjointedly in available literature. No empirical study had been carried out on the impact of agricultural exports on agricultural growth in Nigeria. Based on the foregoing, the current study combined these four variables to uncover their collective impact on agricultural growth in Nigeria. The objectives of the study were to describe the trend of public investment, foreign direct Investments, agricultural output and exports in Nigeria; and to examine the effect of agricultural investments, export and credit on Nigerian agricultural growth.

## **2. Literature review**

According to Keynes, public spending is pushing factor that can be used as a tool for policy to encourage economic advancement (Ewubare and Eyitope, 2015). Nigeria

benefits from public spending in the form of better outputs, more mechanization, and long-term jobs because of trade, all of which raise productivity and accelerate economic growth (Chipaumire *et al.*, 2014). Nigeria is heavily dependent on agriculture, so it will be necessary to take into account the effect of government spending on national income in order to maximize the sector's potential and raise national income. Foreign Direct Investment (FDI) means inflow of asset (capital to gain beneficial returns, such as interest, or dividends) of foreign income into a particular economy involving multinational corporations (Agba *et al.*, 2018). Similarly, according to Adigun and Oke (2021), FDI is a form of venture that involves the infusion of overseas capital into a business in a different nation than country of the investor. This foreign income is injected into various aspects of the economy, including agriculture. FDI's potential benefits are that it promotes the effective use of locally available raw materials, incorporates contemporary management and marketing approaches, and accelerates access to sophisticated technologies. Agricultural investments in this study were disaggregated into Public agricultural investment (PAI) and Foreign Direct Investment in Agriculture (FDIA). Enilolobo and Ode-Omenka (2019) studied the influence of credits on agricultural output in Nigeria (1978 -2016). Johansen Cointegration test and Multivariate OLS regression estimate were used to examine the data to achieve the objectives of the research. Study showed no long-time association between bank funds to the agriculture sector in Nigeria and agriculture sector output. The findings of the study were in line with *a priori* expectations as deposit money bank credit to the agriculture sector in Nigeria has a positive and significant impact on agriculture sector output in Nigeria. Therefore, the bank credit is a channel through which the Nigerian government can achieve a boost in the output of the agricultural sector.

Ogbanje and Salami (2022) studied the influence of FDI on Nigeria's agricultural sector. Augmented Dickey-Fuller test displayed that the variables were  $I(1)$ . Johansen's co-integration test indicated long-time association among the variables. Findings discovered slower acceleration of agricultural productivity (6.28) than FDI (17.99). Also, FDI and exchange rate had significant and negative impact on the agricultural output, while implicit price deflator for the agricultural sector had significant positive effect on agricultural output in the long run. Adewale *et al.* (2022) explored the influence of farmers' credits on agricultural productivity from 1981 to 2016. (WDI). Agricultural bank credit has a positive influence on agricultural output, according to the Ordinary Least Squares (OLS) estimation result. The foreign exchange rate and bank lending rate had no discernible effect on agricultural output. It was suggested that the country encourage farmers to save money and take out bank loans. Olorunsola *et al.* (2017) examined the connection between agricultural credit and agricultural output in Nigeria. The findings indicated that there were positive changes in the short-run impact

of credit on output growth in the agricultural sector, but there are distinct equilibrium relation in the long time. The dynamic adjustments demonstrate that, with a four-quarter lag in the prediction prospect, the impact of the satisfactory fluctuations in credit to agriculture is primarily responsible for the growth in cumulative agricultural output. This made it clear that the agricultural sector needed a plan on a cessation on credit management.

### 3. Methodology

This study utilized annual data spanning four decades (1981-2020). The Food and Agriculture Organization (FOA), World Development Indicators, and the Central Bank of Nigeria (CBN) Statistical Bulletins were the sources of these data. Gross Domestic Product (GDP) was used as a proxy for economic progress. Public Agricultural Investments (PAI), Agricultural Export (AEXP), Agricultural credit (AGRC), Inflation Rate (INF) and Exchange Rate (EXC) were used as independent variables to capture their effect on agricultural growth in particular and economic growth in general. The measurement and data resources used for the study are recorded in Table 1 below.

Table 1: Variable Definitions, Measurements and Source

Variable	Full Meaning	Measurement	Source
GDP	Gross Domestic Product	Naira	CBN Statistical Bulletin (2023)
FDIA	Foreign Direct Investment in Agriculture	Naira	CBN Statistical Bulletin (2023)
AOUT	Agricultural Output (Value of agricultural production)	Naira	Food and Agriculture Organization (2023)
PAI	Public Agricultural Investment (Government capital budgetary allocation to agriculture)	Naira	CBN Statistical Bulletin (2023)
AEXP	Agricultural Export	% of total exports	World Development Indicators (2023)
AGRC	Agricultural Credit (Total Agricultural Credit given to Farmers through Commercial Banks)	Naira	CBN Statistical Bulletin(2023)
(INF)	Inflation Rate	Percentage	CBN Statistical Bulletin (2023)
EXC	Exchange Rate	Naira	World Development Indicators (2023)

*Source: Authors Compilation*

This study used percentage and mean to analyze the trends of agricultural growth, agricultural investments.

*Unit Root Test*

Observed data presumed to be stationary for empirical study based on time series econometrics. In other words, the series' autocorrelation, mean, and variance, structure stay unchanged across time. Most macroeconomic and financial time series variables, on the other hand, show trends, indicating that they are non-stationary. Variables containing unit root may cause a spurious regression when used in a regression model. It would be misleading to forecast or draw policy conclusions from spurious regression analysis (Umar *et al.*, 2014). Therefore, to determine the stationarity status of the data, it was imperative to test each variable for stationarity. It would also determine whether the variable in the model were integrated of the same order or not.

The Augmented Dickey-Fuller (ADF) test proposed by Dickey and Fuller (1981) and the Phillips–Perron (PP) test proposed by Phillips and Perron (1981) were used to test for stationarity of the variables.

*Augmented Dickey-Fuller (ADF)*

The Augmented Dickey-Fuller (ADF) equation is expressed as:

$$\Delta Y_t = \beta_1 + \beta_2 T + \delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-1} + \varepsilon_t \dots\dots\dots 1$$

Where:  $\Delta Y_t$ = Change in the variable series to be tested;  $Y_{t-1}$ =the variable in Lagged depended form;  $t$ = trend and  $\beta$ ,  $\delta$ = Estimable parameters.

*Phillips – Perron Test equation:*

$$\Delta Z_t = \alpha + \alpha t + \lambda Z_{t-1} + U_t \dots\dots\dots 2$$

Where,  $\Delta Z_t$ = Change in the variable series to be tested;  $Z_{t-1}$ = the variable in Lagged depended form,  $\alpha$ ,  $\lambda$ = estimable parameters.

*Cointegration Test Using Johansen-Juselius Test*

The Johansen-Juselius Cointegration test was employed to test for co-integration. The optimum lag for the model was selected using Ljung –Box Q statistic. This involves selecting the lag whose residuals correlogram P-value is less than 0.05. The Maximum Eigen and Trace Value Statistics were utilized to assess the number of cointegration models specified by the co-integration rank( $r$ ) (Johansen, 1988). The Trace and Maximum Eigen Value statistics were used to test the hypothesis of no cointegrating vectors.

Econometric analysis such as Autoregressive Distributed Lag (ARDL), Vector Error-Correction-Models (VECM) and single Equation-Error Correction Models were employed by the study.

The explicit form of the model is stated as follows:

$$\text{LnAOUT}_t = \lambda + \Psi_1 (\text{LnAGRC})_t + \Psi_2 (\text{LnAEXP})_t + \Psi_3 (\text{LnFDIA})_t + \Psi_4 (\text{LnPAI})_t + \mu_t \dots\dots 3$$

Where: AOUT = Agricultural Output; AGRC = Agricultural Credit; AEXP = Agricultural Export, FDIA = Foreign Direct Investment in Agriculture; PAI = Public

Agricultural Investment;  $t$  = Time series;  $\lambda$  = Constant;  $\ln$  = Natural log;  $\Psi$  = coefficient;  $\mu_t$  = Error term. The equation 1 was estimated using Johansen and Juselius (JJ) VECM. The implicit framework of the model is stated as follows;

$$\Delta Y_t = \alpha_1 + \sum_{i=1}^K \delta_{1i} \Delta Y_{t-i} + \sum_{i=1}^K \varphi_{1i} \Delta X_{t-i} + \lambda \varepsilon_{t-1} + \mu_{1t} \dots\dots\dots 4$$

$$\Delta X_t = \alpha_2 + \sum_{i=1}^K \delta_{2i} \Delta Y_{t-i} + \sum_{i=1}^K \varphi_{2i} \Delta X_{t-i} + \lambda \varepsilon_{t-1} + \mu_{2t}$$

$$\varepsilon_{t-i} = Y_t - (\lambda + \Psi X_t + \mu_t) \dots\dots\dots 5$$

Where:  $Y_t$  = Vector of dependent variable (as defined in equation 1);  $X_t$  = vector independent variables (as defined in equation 1); and  $\varepsilon_{t-1}$  = Error Correction Term in lag.

#### *Single Equation- Error Correction Model*

Equations 1 and 3 were later estimated using single-equation Error-Correction-Model to show the short- term relationships among the series in the respective models as follows:

$$\Delta Y_t = \alpha_1 + \sum_{i=1}^K \delta_i \Delta Y_{t-i} + \sum_{i=0}^K \varphi_i \Delta X_{t-i} + \lambda \varepsilon_{t-1} + \mu_{1t} \dots\dots\dots 6$$

Where;  $Y_t$  = Vector for dependent variables as earlier explained in equations 1 and 3 respectively  $X_t$  = vector independent variables as earlier explained in equations 1 and 3 respectively and  $\varepsilon_{t-1}$  = Error Correction Term.

## **4. Results**

### *Trends of Agricultural Output in Nigeria (1981-2020)*

In Nigeria, agricultural output is composed of four main subsectors namely crop production, forestry, fisheries, and livestock. This study considered the combined value of these subsectors. Figure 1 displays the trend of agricultural output in Nigeria from 1981 to 2020. It was observed that from 1981 to 2001 there was low growth rate of agricultural output. A growth rate of 110% was recorded in 2003. Between 2004 and 2009 there was steady growth of agricultural output without fluctuations and sharp growth was observed in 2010 which represents about 85% increase. In 2012, the value of agricultural output was about N20.8 trillion, which later increased by 24% to N28.3 trillion in 2015. An impressive growth rate was observed, as the agricultural output increased from N 28.3 trillion in 2016 to N 48 trillion in 2020, which represents 69.61% increase. This implies that there had been consistent increase in agrarian production in the country throughout the study period, which could be linked to increase in agricultural investments and population. This is in consistent with the findings of Kalikume (2015) who asserted that agricultural output in Nigeria has increased considerably over the years, with yearly average of 7.4% in the precious decade. However, the progress has not been transformative, comprehensive, or widespread.

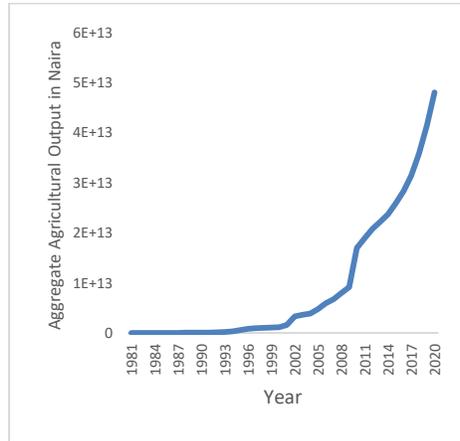


Figure 1 Trends of Agricultural output in Nigeria (1981-2020)

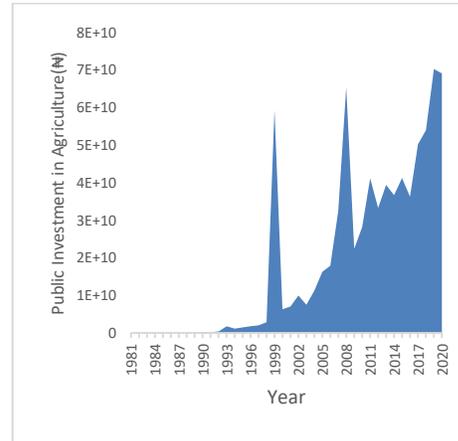


Figure 2: Trends of Agricultural Public Investment in Nigeria (1981-2020)

#### *Trends of FDI in Agriculture in Nigeria (1981-2020)*

Figure 3 shows the trend of Foreign Direct Investment in Agriculture (FDIA) in Nigeria. There were fluctuations in FDIA from 1981-1994 with annual average growth rate of about 17% (1981-1986), but in 1986 FDIA increased by 74%. In 1997 an impressive increase was recorded where FDIA increased from ₦704 million in 1986 to ₦2.45 billion in 1987. A spike observed in 1995 where ₦75.9 billion which further was increased by 47% to ₦111.3 billion in 1996 but declined by 16% between 1997 and 1999. From 2000 to 2017, FDIA was characterized by annual rise and fall. However, in 2016, FDIA entered its first trillion (₦1.12 trillion) but declined to 1.07 trillion in 2017 and which represents -4.89% decrease. Still, in 2018, FDIA witnessed the highest negative growth rate (-42.92%) as it declined to ₦610 billion in 2018 from ₦1.07 trillion in 2017. Again, FDIA fluctuated until 2019 that it recorded highest (1.8 trillion) and further declined to ₦410 billion in 2020. Again, there was a spike in 2019 as FDIA hits ₦1.7 trillion, which was the highest amount observed within the period under study. FDIA declined significantly in 2020 to 410.2 billion. The low FDIA recorded in 2020 in the country could be attributed to emergence of COVID-19 Pandemic which caused economic meltdown in every part of the world.

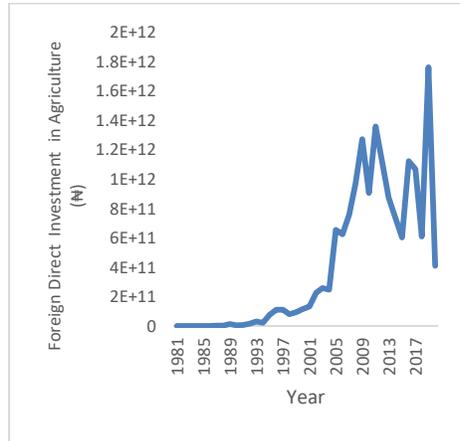


Figure 3: Trends of FDI Agriculture in Nigeria (1981-2020)

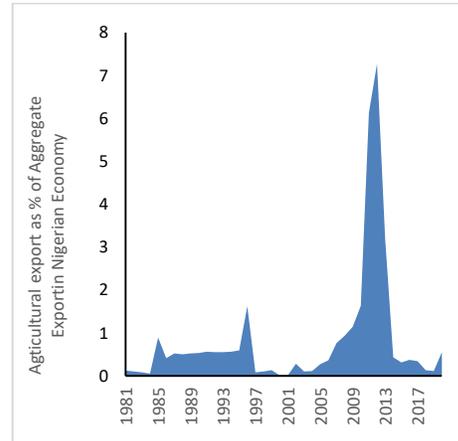


Figure 4: Trends of Agricultural Export as % of Aggregate Export in Nigerian Economy (1981-2020)

#### *Trends of Agricultural Export (1981-2020)*

Trend analysis of agrarian exports (Figure 4) shows that, from 1981 to 1995, the value of export of agricultural produce and raw materials was less than 1% with an average annual value of 0.44%. In 1996 the value of agrarian export reached 1.62%. This finding is in agreement with Olajide et al. (2012) who stated that there was a significant decrease in the production of export goods such as rubber, cocoa, groundnuts and palm oil. During the 1990s, the proportion of agrarian products in overall exports dropped to less than 2 percent. In 1997, agricultural export declined (less than 1%) until 2009 where it reached 1.14%. There was a spike in agricultural export as the percentage export was 1.14% in 2010 and spiked to 6.13% in 2011 and the highest export was recorded in 2012. Agricultural export declined by 3.32% in 2013. From 2014 to 2020, the value of agricultural export fell back to less than 1% as was recorded in the previous years with annual average of 0.32%.

#### *Trends of Agricultural Credit in Nigeria (1981-2020)*

Figure 5 depicts the trends of agricultural credit in Nigeria from 1981-2020. The trends analysis shows a continued rise in the quantity of credit allocated to the agrarian sector by the Federal Government of Nigeria. From 1981 to 1996, there was steady increase in amount of credit available to farmers in the country until 1997, where the amount decreased slightly by 16% and further decreased in 1998. From 1999 to 2006, the amount of credit increased by 59%. The volume of credit made obtainable in agrarian sector between 2007 and 2010 fluctuated. But there was persistent increase in amount

of credit from 2011 to 2020. 2020 witnessed sharp increase and amount of credit available to farmers entered its first trillion. The continued increase in agricultural credit could be attributed to several intervention programmes initiated by various federal government administrations in the country. In the recent times, some of these agricultural programmes includes Anchor Borrower, Green Revolution Programmes.

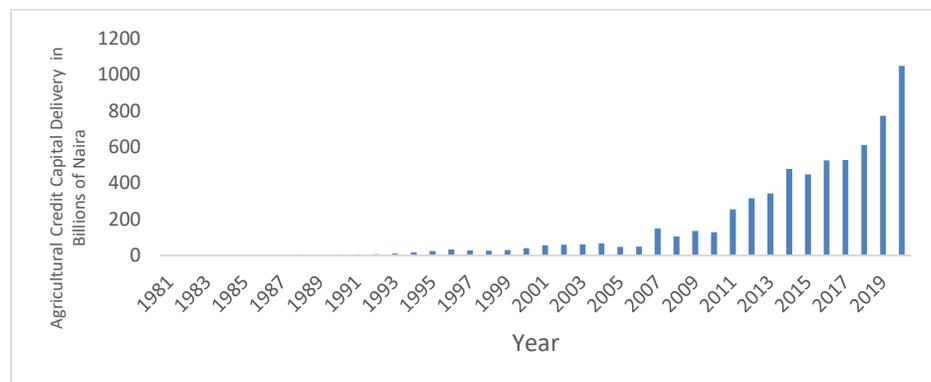


Figure 5 Trends of Agricultural Credit Delivery in Nigeria (1981-2020)

#### Stationarity Test

The Phillips-Perron (PP) and Augmented Dickey Fuller (ADF) unit root tests were used to carry out the stationarity test. The outcomes of the PP and ADF tests presented in Table 2 shows that LnAOUT (Agricultural Growth), LnPAI (Public Agricultural Investment), LnAEXP (Agricultural Export), LnAGRC (Agricultural Credit), LnFDIA (Foreign Direct Investment in Agriculture) were integrated of order one  $I(1)$ . The results imply that both ADF and PP concurred in classifying the following variables as  $I(1)$ .

Table 2 Stationarity Test Results

Variable	Level		First Difference	
	ADF	PP	ADF	PP
LnAOUT	-1.528	-1.448	-4.611***	-4.553***
LnPAI	-2.124	-1.606	-8.688***	-8.847***
LnAEXP	-2.638	-2.651	-7.051***	-7.207***
LnAGRC	-1.008	-1.805	-7.120***	-7.549***
LnFDIA	-2.554	-1.870	-9.203***	-8.818***

Note: \*\*, and \*\*\*, significant at 5 and 1%, respectively.. Source: Authors Computation

*Effect of Agricultural Investments, Export, and Credit Capital on Agricultural Growth*

Table 3 displays the results of co-integration outcomes. The outcome displays that at most one co-integration equation existed among the variables. This was indicated by the Trace value of 79.37 which was larger than the critical value of 69.82 at 5% level of significance and Max-Eigen statistics of 41.05 which was larger than the value of 33.88. Both Trace and Max-Eigen statistics indicate the presence of one cointegrating at 0.05 probability level. Hence, the null (Ho) of no cointegration was rejected. The results of this cointegration test implied presence of long-run relationship or equilibrium between Agricultural growth and its determinants namely, agric credit, export, foreign direct investment and public investments. This result suggests that the dependent and independent variables in the model had a long-run relationship.

Table 3 Johansen-Juselius Cointegration Test

Ho	Test Statistics		Critical Value 5%	
	Trace	EigenValue	Trace	Eigen Value
None*	79.37**	41.05**	69.82	33.88
At most 1	38.32	22.45	47.86	27.58
At most 2	15.87	7.49	29.80	21.13
At most 3	8.39	6.39	15.49	14.26
At most 4	1.99	1.99	3.84	3.840

Note: \*\*, Significant at 5%. Source: Authors Computation

*Long time Estimates of Effect of Agricultural Investments, Export, and Credit capital on Agricultural Growth*

The results in Table 4 shows that AEXP, FDIA and PAI were significant variables influencing agricultural growth (agricultural output) in Nigeria. This outcome illustrates that, in the long term, increase in these macro-economic variables lead to conforming surge in agrarian growth. The coefficient of Agricultural Credit (AGRC) was negative (-3.102) and insignificant, which denotes that, in the long term, agrarian growth does not respond to agrarian credit delivery in Nigeria. This result contradicts the finding of Enilolobo & Ode-Omenka (2019) who stated that bank credit in agrarian sector has a positive and substantial effect on agricultural sector output in Nigeria. The coefficient of Foreign Direct Investment in Agriculture (FDIA) was negative (-22.930) and significant, showing that the variable exhibits negative link with agricultural output in the long term. This result is in line with Ogbanje & Salami (2022) who stated that FDIA had significant and negative influence on the agrarian output in Nigeria. The coefficient of Agricultural Public Investment (PAI) was positive (24.700) and significant at 0.01% probability level which infers that agricultural growth in Nigeria is positively influenced by public investment made in the sector in the long run. This results also shows that there is positive relationship between agricultural investment

and agricultural growth. This result is supported by findings of Oji-Okoro; Iganiga & Unemhilin (2011), and Ebere & Osundina (2014) who stated that agrarian output was significantly impacted by public capital spending.

The coefficient of Agricultural Export (AEXP) (6.644) was positive and significant at 1%, which infers that AEXP had significant effect on agricultural output in Nigeria. This result illustrates that increase in agricultural export in Nigeria would result to corresponding rise in agricultural output. It could be inferred that foreign earning acquired through export of agricultural commodities can trigger a boost or progress of the agrarian sector in the long run.

Table 4: Long Run Estimates Using Johansen and Juselius Vector Error Correction Model

Co-integrating Variables	Coefficients	Normalized Coefficients	Standard Error	t-Stats
$\Delta \ln AOUT$				
$\Delta \ln AGRC$	3.102	-3.102	2.437	-1.273
$\Delta \ln AEX$	-6.644	6.644	1.185	5.609***
$\Delta \ln FDIA$	22.930	-22.930	3.347	-6.850***
$\Delta \ln PAI$	-24.700	24.700	3.298	7.490***
C	-145.738	145.738		

Note: \*\*\* Significant 1%. Source: Authors Computation

#### *Short-Run Estimates of the Effect of Agrarian Investments, Export, and Credit Capital on Agricultural Growth*

To ensure the consistency, steadiness, no autocorrelation and validity of the estimated outcomes, the short run estimate was subjected to the following postestimation tests:

#### *The Jarque-Bera Normality Test*

The normality examination of the residues by Jarque-Bera shows that the series were normally dispersed since the Jarque-Bera probability value (0.409) is greater than  $P > 0.05$  as depicted in Figure 5.

#### *Autocorrelation Test*

The F-statistic of Serial Correlation LM Examination is statistically insignificant ( $p > 0.05$ ). Hence, the research failed to reject the  $H_0$  of no autocorrelation in the series residuals. The result shows that the series had no autocorrelation problem. Therefore, the result of the estimation can be used for policy formulation.

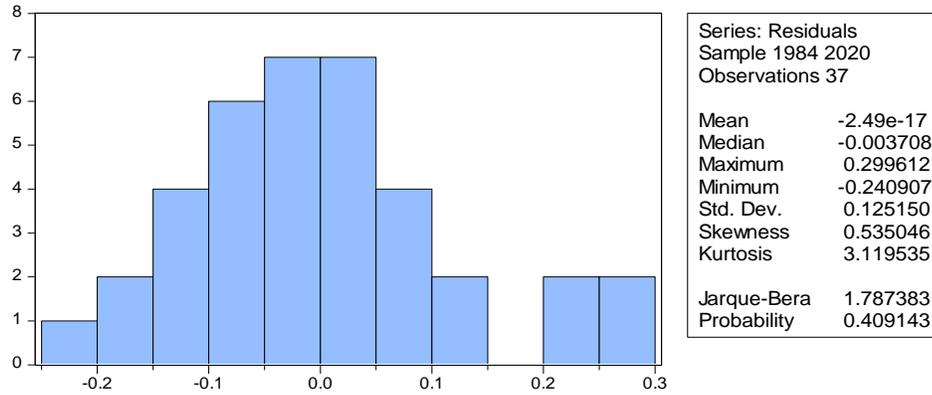


Figure 5 Normality Test Result

Table 5 Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.122424	Prob. F(2,26)	0.8853
Obs*R-squared	0.345187	Prob. Chi-Square(2)	0.8415

Source: Authors Computation

*Dynamic stability test of the Model*

Steadiness test of the equation was also conducted. Figure 6 displays that the equation was dynamically or structurally steady as CUSUM statistics do not surpass the bounds at 5% level of significant. Thus, the diagnostic tests (Jarque-Bera normality, Autocorrelation and Dynamic Stability tests of the model) showed that the series possessed the required properties which implies that the estimated outcomes from the research were valid for program formulation.

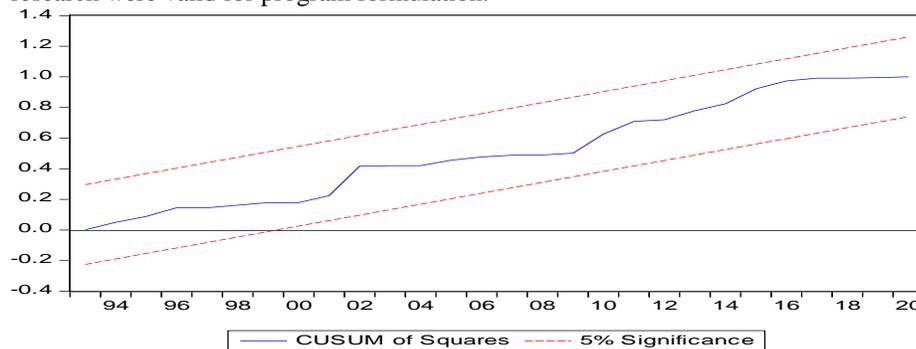


Figure 6 Stability Test

The preceding tests show that the estimated short-run relationship was valid. Hence, the outcome in Table 6 demonstrates the short run association between agricultural investments, export, and credit capital on agricultural growth in Nigeria. In the short time, agrarian export was positive (0.0469) and significant at 10% level of probability, which infers that agrarian export had positive and significant consequence on agricultural growth in the short run. This result re-affirms estimates of long run association as shown in Table 4.3. The coefficient of FDIA was progressive and significant at 5% level of probability which shows that in the short run, FDIA have positive effect on agrarian growth. The error correction term [ECT (-1)] was significant at 1% level. This further established the presence of co-integration among the variables in the model. This result is in consonance with Olakunle (2021) who reported that coefficient of the ECT was found to be negative and statistically significant at 5% in this study. The coefficient of the ECT (-0.010) shows that in the event of shock in the economic system, it will take less than a year or the economy to restore to an equilibrium.

Table 6 Short term Estimates of Effect of Agrarian Investments, Export, and Credit Capital on Agricultural Growth

Variable	Coefficient	Std. Error	t-Statistic
D(LAOUT(-1))			
D(LAGRC)	-0.090	0.100	-0.888
D(LAEXP)	0.047	0.025	1.869
D(LPAI(-1))	0.053	0.045	1.160
D(LAEXP(-2))	-0.036	0.023	-1.553
D(LFDIA(-2))	0.134	0.056	2.380**
D(LPAI(-2))	-0.090	0.051	-1.737
ECT(-1)	-0.010	0.002	-3.487***
C	0.161	0.042	3.891***

Note: Prob (F-statistic) = 0.012, \*\* and \*\*\*, significant at 5 and 1%, respectively.

Source: Authors Computation

## 5. Conclusion and Recommendations

The general objective of this study was to assess the effect of agricultural investments, credit, and exports on agricultural growth in Nigeria (1981-2020). It is obvious from the results that the agricultural investments (Public) and export trigger substantial growth in the agricultural sector in the long run and short run, respectively. Since the study established that FDIA drives agricultural growth in the nation, it is advised that government at all levels should create a favourable environment in terms of security and investment policies to attract foreign investment to the agricultural sector. Agricultural export was identified as another key factor which drives growth in

agricultural sector. The Federal Government should formulate strategies that would boost agricultural productivity performance e.g., improve seedling for agriculturalists, delivery of up-to-date mechanical tools among others. This will create surplus agricultural production for local consumption and export and Public agricultural investment was discovered to have substantial effect on agrarian growth. Based on this, Federal and State Governments should raise its level of monetary allocation to the farming sector, thereby providing sufficient funding in the sector to promote its productivity and increase its role in economic progress of Nigeria.

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